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# Leveraging Sustainable Finance and Impact Measurement in Public Administration


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# Leveraging Sustainable Finance and Impact Measurement in Public Administration

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# Index

# 1. INTRODUCTION

The concept of sustainability was introduced at the first United Nations' conference on environment in 1972, although it was not until 1987, with the publication of the Brundtland Report, that the goal of sustainable development was clearly defined. The concept developed by the Brundtland Commission, which later became a paradigm, is based on two fundamental elements: the environment, as an essential dimension of economic development, and intergenerational responsibility in the use of natural resources.

In recent years, the urgency of addressing sustainable development has reached unprecedented levels due to the escalating climate crisis and its wide-ranging consequences. The world is increasingly grappling with the devastating impacts of climate change, from extreme weather events to rising sea levels and the displacement of populations as climate migrants. Furthermore, the global pandemic caused by COVID-19 has shed light on the intricate connections between biodiversity loss, human activities, and the emergence of infectious diseases. These pressing challenges and interconnected effects of climate change amplified the interconnection among social, economic, and environmental dimensions when defining what sustainable development means.

Recognizing the significance of these issues, the public sector has emerged as a key player in approaching sustainable development due to its capacity to shape policies, regulations, and initiatives that can foster systemic change at a societal level. Understanding and addressing the challenges within these domains is vital for creating effective policies and strategies that can lead to a sustainable future.

## 1.1 Background and Motivation

In the path towards sustainable development, the involvement of the public sector operates on one hand, as a financial actor implementing projects oriented towards the welfare of communities and the protection of territories, on the other, as promoter and coordinator of the sustainable transition process at the local level. This awareness is recognized and validated by relevant players in the international and European context, such as the OECD, the European Commission (EC) and the Joint Research Centre (JRC) of the EC; in particular:

- the OECD has repeatedly stressed the need to foster an evolution of the traditional financing model of public spending towards more anchored solutions to impact finance and to the partnership between the public and private sectors (OECD, 2019); from a methodological point of view, it has defined a framework of evaluation indicators at the local level to measure the distance of cities and regions with respect to the SDGs (OECD, 2021);
- the Action Plan for Financing Sustainable Growth of the European Commission, estimated that Europe, in order to meet the climate and energy target for 2030, needs to close an annual gap investment of nearly 180 billion euros;
- the JRC of the EC has developed the Urban 2030 (Joint Research Centre, 2021) project to support local governments in monitoring the achievement of the 2030 Agenda for sustainable development and its SDGs at the local level, by promoting transformative and inclusive actions, and by underlining some good practices.

The deep motivation behind the focus of this thesis is therefore supported by a solid international and European socio-economic context, but it is also grounded on a new approach to economic policy and innovation.

At its core is the idea that governments should play a more active role in shaping and directing the economy, setting ambitious missions to address critical societal challenges. Having a mission-oriented approach aligned with sustainable development goals can drive innovation, shape markets, and foster economic growth. Historical instances of government-led missions, such as the moon landing and the Green Revolution, underscore the profound impact of such endeavors in stimulating research and development, thereby fostering technological progress and creating new market dynamics.

Consequently, this thesis is dedicated to exploring the development of tools and strategies that can empower governments, local authorities, and the private sector to forge collaborative partnerships, thereby enabling them to collectively confront global challenges and lay the foundations for a more sustainable and prosperous future. In essence, it advocates for the proactive involvement of the public sector as an investor and a pivotal driver in shaping various industries.

## 1.2 Research Objectives

The central objective of this Ph.D. thesis is to construct a structured model within the domain of sustainable finance, intended to serve as a robust and practical guide for policymakers and local governance authorities. This model, herein referred to as the Model of Impact Measurement in the Public Administration, is designed to facilitate the formulation and execution of strategies at the local level that are explicitly oriented towards the attainment of sustainable development goals. Rooted in the principles and methodologies of sustainable finance, the thesis seeks to bridge the existing chasm between financial decision-making and the pursuit of sustainable development. It endeavors to offer tangible and implementable insights and frameworks for this purpose.

In the pursuit of this main objective, the thesis addresses several instrumental goals, which form essential components of the methodological approach. These intermediate objectives encompass an exhaustive exploration of literature, real-world case studies, exemplar practices, and measurement methodologies. These components of the research methodology are designed to equip both scholars in the field of sustainable finance and policymakers with the requisite knowledge and tools. By providing a comprehensive understanding of the multifaceted landscape of sustainable finance, the thesis aims to unleash the potential for transformative change.

The ultimate objective of equipping decision-makers with this systematic Model of Impact Measurement in the Public Administration is to align local-level strategies more closely with sustainable development objectives. It is anticipated that this alignment will result in more efficacious and impactful actions, specifically in the context of addressing pressing global challenges, including but not limited to climate change and social inequality.

## 1.3 Research Questions

In order to achieve the research objectives stated above, the following key research questions will be addressed:

- What are the current practices and challenges in implementing sustainable finance in public administration, particularly within the European context?
- How can impact measurement frameworks, such as the EU Green and Social Taxonomy, be utilized to assess the social and environmental impacts of public administration initiatives?
- How can sustainable finance and impact measurement be applied to public spending for sustainable development, and what are the potential benefits and limitations of this approach?

These research questions will guide the investigation and analysis throughout the thesis, providing a comprehensive understanding of sustainable finance in public administration and offering insights into effective impact measurement methodologies.

## 1.4 Thesis Structure and Methodology

This doctoral thesis comprises six pivotal chapters, each delineating a distinct facet of sustainable finance and the measurement of impact within public administration. In Chapter 2, an all-encompassing literature review meticulously dissects the landscape of sustainable finance in the domain of public administration, with a particular focus on the European context. This review serves a dual purpose: firstly, it establishes the research context by examining existing knowledge and research related to sustainable finance within public administration. This context is crucial for positioning this work within the broader academic discourse. Secondly, during this comprehensive literature analysis, discernible gaps have been identified, especially in the area of impact measurement in public administration. This identification of gaps demonstrates that this research builds on existing knowledge while also addressing specific areas where further exploration is needed. The methodology employed for this literature review involves a systematic analysis of peer-reviewed articles, official reports, and relevant publications, enabling the comprehensive coverage of the existing academic discourse in the field.

Chapter 3 unfolds a comprehensive theoretical framework centered on impact measurement. It begins by elucidating the concept of "impact" and the necessity of robust standards and methodologies that go beyond mere activity monitoring in order to measure impact. Central to these standards are social and environmental impact indicators, serving as crucial metrics for evaluating sustainability's multifaceted dimensions. The chapter categorizes standards into "context-specific indicators," such as the Italian Well-being and Sustainable Development Indicators (BES) and the United Nations Sustainable Development Goals (SDGs), and "project-specific indicators," exemplified by the Global Reporting Initiative (GRI) standards and the Sustainability Accounting Standards Board (SASB) materiality matrix, tailored for organizations to measure and report ESG performance. These

frameworks form the foundation for comprehensive impact assessment in public administration and sustainable finance, highlighting their relevance for the research's objectives.

The subsequent chapter, Chapter 4, introduces an original impact measurement model meticulously tailored to the dynamics of public administration, with a pronounced focus on its pragmatic application within the Italian context. Through a detailed exposition of the model and relevant case studies, this chapter elucidates its practical implementation and efficacy. The methodology for the development of this impact measurement model involved a comprehensive review of existing models, an analysis of real-world case studies, and a consultative process with experts in the field to ensure its suitability and effectiveness.

In Chapter 5, the impact measurement model proposed in Chapter 3 undergoes a global extension, exploring its rationality and adaptability when transplanted into diverse public administration settings worldwide. This chapter scrutinizes the model's potential to bolster sustainable development endeavors on a global scale by aligning with the framework of the Sustainable Development Goals. The methodology for this global extension involves a comparative analysis of various international contexts and a thorough examination of the Sustainable Development Goals' framework to assess the model's adaptability.

Lastly, Chapter 6 meticulously presents the concluding remarks of this thesis. It offers a succinct summary of the key findings, a comprehensive discussion regarding the contribution made to the realm of sustainable finance within public administration, and a candid exploration of the identified limitations and potential avenues for future research. Each chapter is further enhanced by a supplementary appendix, which serves, as a repository for pertinent publications and materials, thereby affording readers an in-depth perspective on each subject matter.

## Appendix 1. Summary Table: Related Publications

| Chapter/Paragraph | Publication |
|---|---|
| **Systematic Literature Review** | *Sustainable Finance in Public Administration in Europe: a Systematic Literature Review* |
| **A Model for Impact Measurement in the Public Administration: the Case of Italy** | *Un Modello di Impact Finance per i Comuni: il Piano Strategico di Mandato BES-Oriented* |
| **A Model for Impact Measurement in the Public Administration – Global** | *Public Spending and Sustainable Development: a Pay by Result Model for the Public Administration* |

# 2. SYSTEMATIC LITERATURE REVIEW

In an era marked by increasing global concern for sustainability, the public sector faces the imperative to actively engage with the multifaceted challenges of fostering sustainable practices. Our paper, titled "Public Spending and Green Finance: a Systematic Literature Review" explores the state-of-the-art research in the realm of sustainable finance within European public administrations, with a particular emphasis on environmental aspects. As we delve into this analysis, we aim to provide a comprehensive understanding of the temporal, spatial, and thematic dimensions of the literature, identifying distinct areas of inquiry that hold significance for the field.

The heart of our investigation is rooted in a systematic literature review of 78 papers published between 1992 and 2021. To maintain rigor and transparency throughout our research, we have adopted the systematic literature review approach pioneered by Fink (2013), following the model articulated by Denyer and Tranfield (2009). This methodological choice allows us to distill key insights from the existing body of knowledge while adhering to a well-defined and replicable process.

To situate our study within the broader landscape of sustainable finance research, it is important to clarify that our work takes a holistic and cross-cutting approach to examining various facets of this domain. Unlike previous literature that often isolates specific perspectives, we integrate multiple dimensions into our analysis. By focusing on government departments at national (e.g., Ministries), regional, and local levels (e.g., Municipalities) collectively referred to as Public Administration (PA) across European Member States, we aim to offer a cohesive perspective on sustainable finance in the public sector.

Our findings reveal four primary clusters of research: measuring tools, planning for sustainable development, sustainability accounting, and public-private partnerships (PPP). Notably, we observe that the bulk of the literature focuses on the development of measurement tools (47%), followed by planning for sustainable development (19%), sustainability accounting (17%), and PPP (17%). This distribution underscores the evolving nature of sustainable finance research in the public sector, with considerable emphasis on measurement and planning aspects. Furthermore, our systematic review underscores the need for intensified scrutiny, both in terms of assessing the impact of public policies and budgeting for public expenditures, especially within the context of green finance.

## 2.1 Sustainable Finance in Public Administration

Sustainable Finance in PA can be brought down to four main clusters: sustainable development planning; sustainability accounting; measuring tools; public-private partnerships.

The first cluster of studies focused on sustainable development planning, emphasizes the strategies, policies, and tools employed by public administrations to ensure sustainable development. The formulation of sustainable development strategies is crucial for implementing growth policies, shaping the future vision of sustainable development, and establishing a path forward. Clear and

defined sustainable development policies are also essential in guiding countries towards achieving the Sustainable Development Goals (SDGs). Effective planning tools are necessary for the public administration to reach objectives, monitor progress, evaluate sustainability performance, and bridge the gap between the current state and target goals. The integration of sustainability into strategic planning within the public sector is a relatively new field of research characterized by a lack of conceptual systematization. The literature primarily adopts exploratory and descriptive approaches and promotes interdisciplinary perspectives. Financial explanations supporting planning choices are lacking in most studies, which predominantly focus on initiatives in Europe with an environmental perspective. The study highlights the need for an integrated and coherent framework for SDG implementation, discouraging isolated or linear approaches that have been less successful in the past. Inefficient public policies that lack additional evaluations can impede sustainable development, necessitating strategic planning as a starting point for vertical and horizontal partnerships within the public administration system. The adoption of a bottom-up approach is recommended for defining and evaluating policies related to sustainable territorial development, enabling a comprehensive understanding of resource utilization and outcomes, and facilitating balanced decision-making. An integrated vision of sustainability is advocated to account for the interconnected impacts on different dimensions of sustainability in development projects. Existing planning tools, though limited in number, often overlook certain aspects of sustainability and tend to focus on specialized arguments rather than a holistic perspective.

The second cluster of studies focuses on sustainability accounting, specifically sustainability reporting and the connection between public spending and sustainable development. The current debate highlights the importance of integrating sustainability into public accounting practices, with national and international institutions actively promoting this approach. However, the literature shows limited interest in these topics, primarily focusing on historical analysis of public budgets and their impact on the community and the environment. Most studies employ conventional statistical reports to assess the effectiveness of environmental policies, while some use qualitative methods like interviews and surveys to explore sustainability reporting in the public sector. Overall, the literature emphasizes the need to integrate traditional accounting with sustainability accounting, incorporating it into planning and reporting procedures at the local level. One key concern is the lack of transparency and universal reporting standards, leading to confusion and redundancy with multiple labels and alternatives. Many studies suggest using the Sustainable Development Goals (SDGs) as a reference framework when formulating public budgets. Another recurring theme is the justification for sustainability reporting, which should be mandatory or encouraged to legitimize the actions of local politicians and align with commitments to sustainable development. Historical analysis of public spending reveals that despite resource allocation to environmental and social issues, the implemented policies often prove ineffective. This calls for a strategic approach to environmental policies, focusing on objectives rather than past spending. Long-term solutions require not only infrastructure but also a community culture of sustainability and understanding the value of the environment. Additionally, the analysis highlights the disconnect between financial policies and the actual social needs of the community, emphasizing the need for indicators that reflect these needs accurately.

The third cluster of studies focuses on measurement tools in sustainability, specifically multidimensional indicators and the use of Sustainable Development Goals (SDGs). The distinction lies in the methodological process of indicator creation: the first category comprises customized tools developed to capture sustainability aspects, while the second category employs SDG indicators to measure, monitor, or guide policy choices. Some countries, such as Italy and Poland, have developed national indicators inspired by the SDGs to measure well-being and sustainability, enabling result comparisons within their territories. However, experts highlight that indicator selection is a political issue, as different political ideologies influence policy choices and SDG achievement. Public policies tend to prioritize job creation and economic development, undervaluing indicators like biodiversity protection that have significant international obligations and interconnected impacts. Correlations between SDGs and optimal use of public resources should be considered, facilitating comprehensive vision and interconnections analysis at international and national levels. Operationally, there are authors who prefer single aspect indicators while others favor aggregating multiple variables into a single index. Data location is important, as different territories within a state may have specific or sectoral problems requiring tailored indicators. By calibrating indicators to specific characteristics, territorial policies can be better targeted, leading to more efficient use of public resources.

The fourth cluster of studies focuses on Public-Private Partnerships (PPPs), specifically partnership policies, projects for sustainable development, and Pay by Result (PbR) tools. The cluster primarily consists of case studies and best practices implemented in Europe, indicating a lack of innovative systemic results. While authors agree on the importance of partnerships for sustainable development, there is a shortage of practical cases involving multi-stakeholder partnerships. The literature highlights the roles of the public sector as a project promoter, the private sector as a contributor, and the third sector as an operational arm in sustainability projects, particularly for social inclusion and well-being. Pay by result instruments, such as social impact bonds (SIBs), generate significant interest, as they enable the measurement of impacts, project replication, and attract diverse investors. Some authors suggest that SIBs and the PbR model can align with partnership architectures based on the Sustainable Development Goals (SDGs), but further investigation is needed in this area.

## 2.2 Current Practices and Challenges

For each cluster we can summarize the current practices and challenges, which represent the baseline for this thesis dissertation.

*Sustainable Development Planning*
Current practices in sustainable development planning involve the adoption of strategies, policies, and tools by public administrations to ensure future actions align with sustainable development goals. However, challenges exist, such as the lack of financial explanation for planning choices and the need for clear and defined policies. Additionally, the integration of sustainability into strategic planning is a relatively young field with a lack of conceptual systematization. Interdisciplinary approaches are being promoted, but more exploratory and descriptive research methods are predominant at this stage. Overcoming these challenges requires improved financial transparency, comprehensive frameworks for SDG implementation, and shift towards long-term, integrated planning.

*Sustainability Accounting*

The active debate on sustainability accounting focuses on two key aspects: sustainability reporting and the relationship between public spending and sustainable development. While efforts are being made to incorporate sustainability into public accounting, the literature indicates a limited interest in these issues. Challenges include the absence of universal reporting standards, resulting in a multitude of labels and confusion. The underemphasis on non-financial reporting is driven by economic and budgetary concerns, which hinders the legitimacy and effectiveness of sustainability reporting. Furthermore, historical analysis reveals that despite resource allocation, implemented policies often prove ineffective. Overcoming these challenges requires the establishment of transparent reporting standards, mandatory or encouraged non-financial reporting in the public sector, and a shift towards strategic and long-term policy formulation independently from the elections cycle.

*Measurement Tools*

The measurement tools cluster explores multidimensional indicators and the use of SDGs for measuring sustainable development. Current practices involve the development of tailor-made indicators or the adoption of SDG indicators at national levels. Challenges arise from the political nature of indicator selection and the need for transparent and comparable frameworks. The interconnections between SDGs and the optimal use of public resources are crucial considerations. There is a need to strike a balance between single aspect indicators and aggregated indices, while tailoring indicators to specific territorial characteristics. Overcoming these challenges requires political consensus on indicator selection, the development of shared frameworks, and the customization of indicators to accurately capture territorial issues and optimize resource allocation.

*Public-Private Partnership*

The cluster on Public-Private Partnership (PPP) highlights partnership policies, sustainable development projects, and Pay by Result (PbR) tools. Current practices involve analyzing case studies and best practices from Europe, indicating a lack of innovative systemic results. Challenges include the limited implementation of multi-stakeholder partnerships and the need for a stronger presence of the third sector in sustainability projects. Pay by result instruments, particularly social impact bonds (SIBs), garner significant interest due to their measurable impacts and ability to attract diverse investors. However, further investigation is needed to explore the overlay of SIBs and PbR models with partnership architectures based on SDGs. Overcoming challenges in PPPs requires promoting multi-stakeholder collaborations, strengthening the involvement of the third sector, and exploring the potential synergies between SIBs and SDG-based partnerships.

## Appendix 2. Related Publication:

Title: *Public Spending and Green Finance: a Systematic Literature Review*
Authors: *Mario La Torre, Sabrina Leo, Jenny Daniela Salazar Zapata, Alessia Palma*
Journal: *Research in International Business and Finance (RIBAF)*
Publication Status: *awaiting the outcome of submission*

# 3. Theoretical Framework on Impact Measurement

This chapter carries a distinct focus, navigating through the stream of literature known as "Measurement Tools." The measurement tools cluster is essential in our exploration, as it delves into multidimensional indicators and the employment of Sustainable Development Goals (SDGs) for quantifying sustainable development. This chapter endeavors to offer clarity on how impact measurement aligns with the sustainability narrative and anticipates the key policy and standards frameworks underpinning this critical aspect of sustainability assessment.

Impact measurement represents a fundamental pillar in assessing sustainability within the domain of public administration. To better grasp the significance of impact measurement, it is paramount to first establish a precise understanding of the term "impact." In the context of this research, "impact" encapsulates both the tangible and intangible consequences of policies, projects, or initiatives on various facets of society and the environment. It encompasses the extensive and enduring transformations that emerge because of endeavors aimed at advancing socio-economic welfare and environmental well-being.

Measuring impact demands the employment of multifaceted frameworks and methodologies to transcends the mere monitoring of activities and outputs; and delve into the profound and far-reaching changes realized within society and the environment. Thus, effectively measuring impact hinges upon the presence of a robust standards framework. At the heart of this framework lie social and environmental impact indicators, which serve as the linchpin for quantifying the multifaceted dimensions of impact. These indicators provide the essential metrics and benchmarks for evaluating the effects of policies and initiatives on various dimensions of sustainability. This chapter delves deep into the landscape of social and environmental impact indicators, scrutinizing their development, adoption, and relevance within the realm of impact measurement.

The standards frameworks considered in this thesis includes a set of indicators and methodologies, which are categorized into two main groups:

- Context-specific indicators: These frameworks and sets of indicators establish a specific geographical or territorial context as their baseline for analysis. This context can encompass a municipality, a region, or an entire country. From this perspective, our focus will be on the Italian BES framework and the international United Nations Sustainable Development Goals (SDGs);
- Project-specific indicators: These frameworks take a specific company, organization, or project as their baseline for analysis. Typically, they are tailored to address Environmental, Social, and Governance (ESG) topics or specific sectors. In this context, we will consider the Global Reporting Initiative (GRI) standards and the Sustainability Accounting Standards Board (SASB) materiality matrix.

These two categories of indicators and methodologies play a pivotal role in our examination and crafting of impact measurement within the domains of public administration and sustainable finance.

## 3.2 Context-specific indicators

*UN Sustainable Development Goals*
Starting from the Sustainable Development Goals (SDGs), established in 2015 by the consensus of 193 United Nations member countries, encompass 17 interconnected challenges to be achieved by 2030. These objectives include addressing issues such as poverty, inequality, climate change, environmental degradation, prosperity, peace, and justice.

This framework serves as a standard for impact measurement in the realm of sustainable finance and public administration for several compelling reasons. Firstly, these goals offer a universal framework that transcends national boundaries, providing a common language for addressing and measuring development challenges worldwide. While the primary focus of SDGs is to create a universal roadmap for global sustainable development, they can also be adapted to serve programmatic purposes on a national level. As a matter of fact, the flexibility of the SDGs for adaptation to local contexts ensures that their application remains pertinent and effective in diverse regions.

Secondly, the alignment of the SDGs with global priorities and their emphasis on accountability and multi-stakeholder engagement make them a potent tool for driving meaningful and relevant impact measurement. The 2030 target year encourages long-term vision and sustained efforts, discouraging short-term thinking among all actors involved.

Finally, with their interlinked nature, the SDGs promote a holistic approach, recognizing that progress in one area often affects others. This approach is supported by quantifiable indicators associated with each goal, facilitating consistent and structured impact assessment. The Statistics Division of the Department of Economic and Social Affairs of the UN maintains a list of 232 official indicators that measure progress on the SDGs. These indicators are pivotal in quantifying and tracking progress at the national and international levels.

This harmonization of performance metrics, both at the corporate and national levels, allows for a universal framework that contributes to meaningful dialogue and effective cross-sectoral collaborations, essential for driving real and accountable progress toward sustainable development.

*Welfare and Sustainable Indicators (Indicatori di Benessere Equo e Sostenibile)*
The Well-being and Sustainable Indicators (BES) hold a significant role in the realm of impact measurement, primarily because they offer a comprehensive framework for assessing the impact and well-being of a nation. Unlike traditional measures like Gross Domestic Product (GDP), which predominantly focus on economic aspects, the BES framework encompasses a broader spectrum of dimensions, encompassing economic, social, and environmental factors. This holistic approach enables a more complete understanding of societal well-being and sustainability, acknowledging that true progress goes beyond economic growth alone.

What distinguishes BES is its specific customization to the context of Italy. Developed by the Italian National Institute of Statistics (Istat), these indicators are finely tuned to the unique characteristics,

challenges, and priorities of the country. This tailoring ensures that the indicators resonate with the national context, offering a more accurate reflection of Italy's progress and areas of concern. In this sense, BES represents a unique standard for impact measurement that goes beyond one-size-fits-all approaches, recognizing the importance of context-specific assessments.

One of the key features of BES is its formal institutional integration into Italy's policymaking and decision-making processes. Since 2018, the BES indicators have been officially incorporated into Italy's Economic and Financial Document (DEF). This institutional recognition underscores their significance as a standard for impact measurement within the country's policy framework. The inclusion of BES in such a critical national document demonstrates their role as a central tool for guiding Italy's socioeconomic and environmental development.

BES also stands out due to its versatile application. While it provides a means to measure progress, it extends further by offering a framework that can be employed for programmatic purposes. This versatility empowers policymakers to use BES not only to evaluate the current state of well-being, prosperity, and sustainability but also to develop and assess policies aimed at improving these dimensions. BES, therefore, goes beyond mere measurement; it facilitates practical action by serving as a guide for crafting and evaluating policies that contribute to Italy's progress.

Additionally, BES is valuable for its ability to provide nuanced evaluations of societal and environmental conditions within Italy. By considering a wide range of dimensions, it enables policymakers to identify strengths and weaknesses in various aspects of well-being and sustainability. This nuanced perspective is instrumental in informed decision-making and the formulation of targeted policies that address specific needs and challenges within the country.

## 3.3 Project-specific indicators

*Global Reporting Initiative Standards*

The Global Reporting Initiative (GRI) standards have emerged as a prominent standard for impact measurement due to their comprehensive and globally recognized framework for sustainability reporting. These standards provide a structured and consistent approach to assessing the environmental, social, and governance (ESG) performance of organizations or ESG projects, making them a vital tool in evaluating the impact of various entities. They perhaps represent the most common example of a Triple Bottom Line categorization of non-financial information.

One key factor contributing to the status of GRI standards as a standard for impact measurement is their international adoption. GRI standards are widely recognized and utilized by organizations around the world. This global recognition ensures a common language for reporting on sustainability performance, making it easier to compare, evaluate, and benchmark the impact of different entities, whether they are corporations, government bodies, or non-profit organizations.

Moreover, GRI standards offer a flexible and adaptable framework that can be customized to suit the specific needs and goals of diverse organizations. This adaptability makes GRI standards applicable

across various sectors and industries, enhancing their relevance and utility as a standard for impact measurement. Whether an organization is focused on environmental conservation, social equity, or governance transparency, GRI standards provide a versatile set of indicators and metrics that can be tailored to address specific objectives.

The comprehensive nature of GRI standards is another key attribute that underpins their role as a standard for impact measurement. They encompass a wide range of sustainability dimensions, covering economic, environmental, social, and governance aspects. By examining a broad spectrum of factors, GRI standards enable a more complete understanding of an organization's contribution to sustainability and its effects on society and the environment.

Furthermore, the continuous development and refinement of GRI standards keep them aligned with evolving global sustainability challenges and expectations. Regular updates and revisions ensure that the standards remain relevant and responsive to emerging issues, making them a forward-looking and adaptable tool for impact measurement. This commitment to staying current with sustainability trends reinforces the standing of GRI standards as a dynamic and influential standard.

The recognition and endorsement of GRI standards by various stakeholders, including governments, investors, and civil society, further solidify their role as a standard for impact measurement. Policymakers often refer to GRI standards when designing regulations and disclosure requirements for organizations as in the case of the new Corporate Sustainability Reporting Directive in the EU. Investors use GRI-based reports to assess ESG risks and opportunities in their investment decisions. Civil society and advocacy groups rely on these reports to hold organizations accountable for their sustainability commitments. This wide-ranging endorsement reflects the credibility and utility of GRI standards in evaluating and communicating impact.

*Sustainability Accounting Standards Board Standards*

Sustainability Accounting Standards Board (SASB) standards have gained recognition as a standard for impact measurement due to their specific focus on industry-specific sustainability factors. SASB standards are designed to provide a comprehensive and sector-specific approach to assessing and reporting on the environmental, social, and governance (ESG) performance of companies. This sector-specificity allows organizations to evaluate their impact within the context of their industry, considering the unique risks, challenges, and opportunities associated with their sector.

One key reason why SASB standards are regarded as a standard for impact measurement is their alignment with industry norms and expectations. These standards are developed in consultation with various stakeholders, including industry experts, investors, regulators, and sustainability practitioners. As a result, SASB standards are tailored to address the most material and industry-relevant sustainability issues. This alignment ensures that the impact assessments carried out using SASB standards are directly related to the core business activities and risks faced by organizations in their respective sectors.

The credibility and acceptance of SASB standards in the financial industry further contribute to their status as a standard for impact measurement. Investors and financial institutions increasingly rely on SASB standards to assess the ESG performance of companies and integrate this information into their investment decisions. SASB standards enable investors to make more informed choices by providing standardized ESG metrics that are sector-specific, thereby enhancing the comparability and consistency of impact measurement across organizations.

Another crucial aspect of SASB standards is their ability to drive transparency and accountability. Organizations that adhere to SASB standards are required to disclose material ESG information that is essential for assessing their sustainability impact. This disclosure fosters transparency and accountability within the organization, as well as with external stakeholders, such as investors, customers, and regulators. By providing a clear and standardized format for impact measurement, SASB standards contribute to the credibility and trustworthiness of reported sustainability data.

To conclude, the following Table summarizes the distinction between the two cluster:

| Cluster | SDGs and BES | GRI and SAB |
|---|---|---|
| Nature | Primarily focus on assessing and promoting sustainability and well-being. They provide a broader, holistic perspective on the societal and environmental aspects of sustainability. SDGs are global in scope, encompassing various dimensions of development and well-being. | GRI and SASB are sustainability reporting standards that are primarily used by organizations, including corporations, to measure and report on their environmental, social, and governance (ESG) performance. They provide a structured framework for reporting. |
| Purpose | The main purpose of SDGs and BES is to provide a framework for achieving sustainable development, reducing inequalities, and enhancing well-being at global, national, and local levels. They are often used by governments and international organizations to guide their development policies. | The main purpose of GRI and SASB is to guide organizations in reporting their ESG performance to stakeholders, including investors, customers, and the public. They aim to provide transparency and accountability for corporate sustainability practices. |
| Scope | Address a wide range of interconnected issues, including poverty, inequality, climate change, health, education, and more. They are not limited to business or corporate reporting but are relevant to governments, NGOs, and society as a whole. | GRI and SASB are industry-specific and focus on ESG indicators that are material to businesses within various sectors. They are relevant to companies looking to report on their sustainability efforts and impacts in a standardized and comparable manner. |

# 4. A MODEL FOR IMPACT MEASUREMENT IN THE PUBLIC ADMINISTRATION: THE CASE OF ITALY

In the space of impact measurement, the article "*Un Modello di Impact Finance per i Comuni: il Piano Strategico di Mandato BES-Oriented"*, published in the Corporate Governance and Research & Development Studies Journal, focuses on its application to Public Administrations. This paper presents an Impact Finance model for Italian municipalities, aiming to align the budget policies of local administrations with social and environmental objectives related to Fair and Sustainable Well-being indicators (or BES indicators - Benessere Equo e Sostenibile).

The BES-Oriented Strategic Mandate Plan includes:
(i) a contextual analysis to define the municipality's BES positioning;
(ii) a BES-Oriented public budget analysis to assess the direct impact of budget policies on social and environmental issues;
(iii) a matrix that enables a combined reading of positioning and budget;
(iv) the use of interactions between BES domains to evaluate the indirect effects of budget policies on social and environmental aspects.

The proposed model allows local administrations to set strategic priorities and impact objectives, adopt welfare strategies benchmarked against other municipalities, evaluate the direct impact of municipal planning and individual projects on public finances, identify additional dimensions of well-being impacted indirectly, calculate direct and indirect impacts on public spending (multiplier effect).

The paper begins by emphasizing the complex mission of public administrations to improve the well-being of their communities. It discusses the need for a sustainable approach to growth and welfare, in line with new European policies influencing local administrations. The proposed model integrates two main components: the Strategic Mandate Plan and the BES framework. The Strategic Mandate Plan aligns long-term vision with shared goals, and it serves as a tool for efficient resource allocation. It outlines a process involving analysis, implementation, and continuous monitoring.

The BES framework, developed by Istat and CNEL, measures well-being in a multidimensional way, focusing on both intra- and intergenerational equity and sustainability. It consists of 12 dimensions structured into various sub-dimensions and 130 elementary indicators, offering a comprehensive view of the quality of life. This framework has been incorporated into Italy's economic planning process and presents a powerful tool for local administrations to assess their performance and prioritize policies for equitable and sustainable development.

## 4.1 Model Description

The model combines the Strategic Mandate Plan and the BES framework to create a Municipal Strategic Plan that is BES-Oriented. This model consists of five operational phases: Understanding

the BES context, Defining priorities, Developing the Implementation Plan, Integration, and Communication. Each phase involves specific steps aimed at connecting municipal strategies to well-being indicators.

The model also introduces three main tools: BES Positioning, BES Budget Analysis, and the Combined Analysis. BES Positioning identifies areas where the municipality's performance deviates from the national average or best practices in similar jurisdictions. BES Budget Analysis connects budget expenditures to BES domains to assess alignment with well-being objectives. The Combined Analysis integrates these two tools to pinpoint priority areas for intervention.

Additionally, the paper discusses the importance of understanding the interactions between BES domains to evaluate direct and indirect impacts of policy interventions. Strong correlations among domains indicate potential areas of synergy or trade-offs. This analysis helps municipalities make informed decisions about resource allocation and policy implementation.

In more detail the proposed Strategic BES-Oriented Mandate Plan includes:

- Context Analysis: To determine the BES positioning of the municipality;
- BES-Oriented Public Budget Analysis: To assess the direct impact of budget policies on social and environmental issues;
- Combined Positioning and Budget Analysis Matrix: To integrate positioning and budget data;
- Use of BES Domain Interactions: To evaluate the indirect impacts of budget policies on social and environmental aspects.

This model enables local administrations to define strategic priorities and impact objectives, adopt welfare strategies benchmarked against other municipalities, link specific projects to public expenditure items and their associated BES domains, assess the direct impact of municipal planning and individual projects on public finances, identify additional dimensions of well-being affected by investments, calculate direct and indirect impacts on public spending (multiplier effect).
The adoption of a multidimensional well-being framework necessitates the development of a system to evaluate the impact of policy and project interventions on budget reallocations. This is important for two reasons:

- Different aspects of well-being influence each other directly and indirectly. Improvements in one specific area can lead to changes, not necessarily proportional, in one or more other areas. This must be considered when evaluating the impact of interventions;
- Applying the proposed model to public administration interventions, investing more resources in a specific BES domain can have a lever effect on other spending programs. For example, it can reduce the resources required for other programs, resulting in savings.

The tool of interactions allows for the consideration and assessment of these dynamics. To implement the analysis, two correlation matrices were constructed: one among the composite indicators of each BES domain (Matrix 1) and another between elementary and composite indicators of each BES

domain (Matrix 2). These matrices help identify strong positive, positive, negative, and strong negative correlations between different well-being domains.

The results reveal strong correlations among domains like Education and Training, Employment and Work-Life Balance, Economic Well-being, Social Relationships, and Quality of Services. These domains also have moderate correlations with other aspects of well-being, such as Health, Social Relationships, Politics and Institutions, and Landscape and Cultural Heritage. No correlations were found with other domains for Research and Innovation and Security, while the Environment showed a slight correlation with Social Relationships.

In conclusion, the model also highlights the importance of aligning local government budget policies with social and environmental goals using the Fair and Sustainable Well-being (BES) framework. It proposes a strategic plan model for Italian municipalities that combines budget policies with social and environmental objectives, allowing for context analysis, budget analysis, and materiality matrix construction. This approach helps prioritize areas for intervention and assess the impact, both direct and indirect, of sustainable development projects on public spending and well-being.

## 4.2 Model Application Case Studies

*Application to Rome Municipality*

The Model described above was preliminary applied to the case of Rome Capital. This framework, as previously highlighted, harmonizes the principles of the Mandate Strategic Plan with the BES framework. The analysis of Rome Capital's BES sustainability aligns with the model's methodology, evaluating its position concerning BES territory indicators and the associated budget items concerning Rome Capital in comparison to the Italian average.

The first step of the model, Positioning Results for Rome Capital reveals a summary for each domain based on three statistical indices (percentage change in the long term, percentage change in the short term, and the indicator's level). This summary highlights Rome Capital's position, either better or worse, for each indicator compared to the national data. The top five areas where intervention was deemed necessary, with over 50% of indicators performing worse than the national average, include Environment, Social Relations, Landscape and Cultural Heritage, Politics and Institutions, Education, Quality of Service and Security. The following Table summarizes the results of the positioning analysis in terms of insights for decision makers and policymakers in the case of Roma Capitale:

| | Level | Long term trend | Short term trend |
|---|---|---|---|
| Level | Social Relations and Landscape and Cultural Heritage<br>are 2 critical BES Domains in which a process of convergence towards the national average should be implemented. | | |

| | | | |
|---|---|---|---|
| Long term trend | Politics and Institutions is a critical BES Domain in which policies need to be implemented to halt the declining trend caused by the combination of a level below the national average and a negative long-term performance. | Education is a Domain in which policies must be implemented to reverse the trend in absolute and/or relative terms. | |
| Short term trend | Security and Environment are 2 critical BES Domains in which careful monitoring is required because in the subsequent years, a declining phenomenon may occur (level below the national average + negative short-term performance that becomes chronic). | Quality of Services id a critical BES Domain in which, despite starting with a level above the national average, the need for policies to stop a negative convergence process is observed. | Roma Capital has no Domains in this scenario. |

The second step of the model Budget Analysis Results for Rome Capital are summarized in a detailed table, assessing percentages of programs with negative performance (budget reduction) in the long and short term, domain by domain, for current and capital expenditures, and their combination. Red highlights indicate critical areas in BES-oriented budget management. For instance, if we consider the "Environment" domain:

- 67% of programs related to this domain exhibit a negative performance (a decrease in absolute spending) over the long term, both in current and capital expenditures.
- 100% of programs in the capital expenditure category show negative long-term performance.
- No programs show negative short-term performance.
- Over the long term, the percentage share of all three types of expenditure (current, capital, and their sum) allocated to programs within the "Environment" domain has experienced a negative trend.

The third step of the model Combining BES Positioning and Budget Analysis resulted in a "matrix for emerging priorities" that intersects areas of concern from both positioning (step one) and budget analyses (step two). The intersection reveals domains with potential issues that could impact citizens' equitable and sustainable well-being. According to the analysis, Rome Municipality should prioritize its projects in the following domains: Social Relations, Landscape and Cultural Heritage, Environment, Service Quality, and Economic Well-being.

This analysis opens the door for building a model capable of generating a multiplier effect on investments in specific well-being dimensions.

## Appendix 3. Related Publication:

Title: *Un Modello di Impact Finance per i Comuni: il Piano Strategico di Mandato BES-Oriented*
Authors: *Mario La Torre, Lorenzo Semplici, Jenny Daniela Salazar Zapata*

Journal: Corporate Governance and Research & Development Studies
Publication Status: *published*
*(https://journals.francoangeli.it/index.php/cgrds/issue/view/871)*

# 5. A MODEL FOR IMPACT MEASUREMENT IN THE PUBLIC ADMINISTRATION – GLOBAL

This section delves into an essential component of this thesis, a model designed to empower public administrations (PAs) in systematically directing their policies toward environmental and social sustainability objectives on a global scale. In this chapter, we introduce the article "Public Spending and Sustainable Development: a Pay by Result Model for the Public Administration," which forms the core of this model. The article serves as a practical step by step application, demonstrating its potential to foster sustainable development on an international scale.

The model seamlessly integrates sustainability positioning analysis with budget analysis, offering a holistic view of fiscal decision-making within a PA. Notably, it establishes essential economic variables for fostering partnerships with impact-oriented private investors. The results derived from this model have far-reaching policy implications.

First, it encourages PAs at local and national levels to adopt quantitative tools for optimizing expenses once they recognize the linkages among Sustainable Development Goals (SDGs). Second, it highlights the potential for joint policies that simultaneously enhance multiple SDGs while maintaining budgetary stability. For instance, the model advocates for unified taxation policies that bridge environmental and health concerns, simplifying administration and bolstering fund collection. Third, the model underscores the feasibility of directly linking public expenditure to SDGs for both sustainability and economic purposes, advocating for more systematic reporting and monitoring by national and supranational institutions. Fourth, it emphasizes the role of quantified expenses and indicators in facilitating Public-Private Partnerships (PPP) setup, making social projects managed by public bodies more attractive to private investors.

## 5.1 The Rationality of the Model

The rationale behind this model stems from the urgent need to bridge the gap between policy intentions and tangible, measurable progress towards sustainable development. Sustainable Development Goals (SDGs), as outlined by the United Nations, represent a global consensus on key areas of focus ranging from poverty eradication and environmental preservation to societal well-being.

The international perspective that a framework like the SDGs offers is of profound significance. They provide a common language and a shared vision that transcend national borders, fostering global collaboration in addressing the most pressing environmental and social issues. These SDGs serve as a universal roadmap towards a more equitable and sustainable future. However, their realization depends on practical, data-driven action at various levels of governance.

The model addresses this challenge by offering a structured approach for public administrations to translate their commitment to sustainability into tangible financial strategies. Moreover, its roots in

the SDGs framework, aligns with an international perspective by not only promoting sustainability at the local and national levels but also by contributing to the broader global effort to harmonize economic growth with environmental stewardship and societal well-being. Finally, the model underscores the potential for public-private partnerships to amplify the efficiency and reach of sustainable initiatives. In essence, our model not only enhances fiscal transparency and accountability but also empowers public administrations to become proactive agents of positive change, thereby reinforcing the global pursuit of a more equitable, eco-conscious, and sustainable world envisioned by the SDGs.

## 5.2 The Model

In the pursuit of aligning public expenditure with sustainable development objectives, our model employs a systematic approach that integrates econometric analysis with sustainability indicators. This multifaceted model guides public decision-makers in strategically directing financial resources toward sustainability goals, particularly the critical ones identified in our analysis. The model unfolds in several essential steps, each designed to illuminate the relationship between public spending and Sustainable Development Goals (SDGs) while providing a framework for informed decision-making. In this section, we delve into these crucial steps, elucidating the econometric formulas and methodologies that underpin them. By the end of this journey, we hope to demonstrate how this analytical framework empowers public administrations to make data-driven, impactful choices, reinforcing their pivotal role as drivers of positive change on the path to a more sustainable future.

*Step 1: Identifying Critical Sustainability Indicators*
One of the crucial steps in our model is the identification of critical sustainability indicators. This process involves pinpointing specific Sustainable Development Goals (SDGs) or sustainability metrics that are deemed "critical" concerning a chosen benchmark. These critical indicators, represented as SDGi, are central to our analysis. The first step utilizes a linear model to assess the relationship between SDGi and other SDGs, expressed as SDGj. The formula for this step is as follows:

```
SDGi = SUM j≠i b ij SDGj + c i
```

Here, SDGi is the critical indicator, and b_ij represents the parameters capturing the correlation between SDGs i and j. The constant term c_i accounts for the specific characteristics of each goal. The result of this step informs us about the linkages between different SDGs, which are crucial for understanding how improvements in one SDG may impact others.

*Step 2: Analyzing Expenditure and SDGs Relationship*
The subsequent step involves analyzing the relationship between public expenditure and the identified critical SDGs. This step classifies all expenditure items (m_it) according to their respective SDGs

and aims to establish the linkage between expenditure and sustainability objectives. The formula utilized in this analysis is:

```
SDGi_t = α_i * m_it-1 + k_i
```

In this equation, SDGi_t represents the critical sustainability goal at time t, while m_it-1 stands for the expenditure associated with that goal at the previous time period. The parameters α_i and k_i capture the effect of expenditure on the goal and a fixed value associated with each goal, respectively. This step helps quantify the impact of financial investments on sustainability objectives, providing insights into the efficiency of resource allocation.

*Step 3: Identifying Critical Expenditure Items*
The third step involves identifying critical expenditure items that require improvement to enhance the organization's positioning with respect to critical SDGs. It compares short-term and long-term expenditure trends to national averages. If both trends are lower than their respective national averages, the expenditure items are considered critical and in need of correction. This step relies on the following criteria:

```
DELTA1m_jT < DELTA1M_jT and DELTA5m_jT < DELTA5M_jT
```

Here, DELTA1m_jT and DELTA5m_jT represent changes in expenditure for item j over one and five years, respectively, while DELTA1M_jT and DELTA5M_jT denote national averages for the same periods.

These econometric formulas and steps constitute the core of our model, facilitating a systematic analysis of public expenditure in alignment with critical sustainability indicators and goals. This approach empowers policymakers to make informed decisions and allocate resources efficiently, ultimately contributing to the attainment of sustainable development objectives.

Appendix 5. Related Publication:
Title: *Public Spending and Sustainable Development: a Pay by Result Model for the Public Administration*
Authors: *Mario La Torre, Francesco Salustri, Lorenzo Semplici, Jenny D. Salazar Zapata*
Journal: Sustainability Accounting, Management and Policy Journal
Publication Status: *submitted to publication*

# 6. Conclusions

This thesis delves deep into the dynamic landscape of sustainable finance and impact measurement within the realm of public administration, offering comprehensive insights into key dimensions of this multifaceted field. In our systematic literature review, encapsulated in the paper titled *"Public Spending and Green Finance: a Systematic Literature Review*", we dissected the evolving landscape of sustainable finance practices among European public administrations, with a particular emphasis on environmental considerations. This systematic analysis unveiled a nuanced understanding of the temporal, spatial, and thematic dimensions of the literature, shedding light on areas of inquiry that hold significant relevance and potential for further exploration in the field.

While our exploration has been thorough, it is imperative to acknowledge that sustainable finance and impact measurement constitute continuously evolving fields marked by dynamic shifts and ongoing developments. As we reflect on the journey undertaken, it becomes apparent that there is room for more detailed discussion and reflection on the challenges and constraints faced during the research process.

One potential avenue for further exploration is the conceptual roots of public administration's role in sustainable development. Certain ideas explored in this thesis may resonate with the work of scholars such as Mariana Mazzucato, Elinor Ostrom and Herman Daly. A more in-depth examination of these conceptual underpinnings can enhance the theoretical foundation of this research, providing a richer context for understanding the implications of sustainable finance initiatives in the public administration domain.

Among all thematic dimensions identified in the literature analysis, this thesis examines impact measurement, as a critical aspect in understanding the true implications of sustainable finance initiatives. In doing so, we have identified and leveraged four distinctive frameworks – the Sustainable Development Goals (SDGs), Well-being and Sustainable Development Indicators (BES), Global Reporting Initiative (GRI), and Sustainability Accounting Standards Board (SASB) – to construct theoretical models for impact measurement at both national and international levels, as elucidated in chapters 4 and 5 and the two articles "*Un Modello di Impact Finance per i Comuni: il Piano Strategico di Mandato BES-Oriented"* and "*Public Spending and Sustainable Development: a Pay by Result Model for the Public Administration*".

These standards serve as the foundational tools for capturing the social and environmental impact stemming from projects initiated by public administrations. Within these models, we intricately embed a profound comprehension of the multidimensional nature of impact and the intricate interconnectedness of these dimensions, elucidating how they reverberate within public administration practices. However, it is crucial to recognize the potential limitations regarding the generalizability of the findings to a global audience. Future research could explore potential differences and similarities with other regions, acknowledging the diverse contexts that influence sustainable finance practices in public administration.

The key findings and contributions of this thesis manifest in the nexus it establishes between impact measurement and economic metrics, integrated with the balance sheets of public administrations. This process is meticulously expounded through a step-by-step model, offering a holistic and structured approach to comprehending and quantifying the impact of public administration initiatives within the purview of sustainable finance.

Building upon this thesis' findings, there are several avenues for future exploration and growth in the domain of sustainable finance and impact measurement in public administration:

1. Impact Measurement Frameworks: Developing more comprehensive and adaptable impact measurement frameworks can be a promising direction for research. These frameworks should facilitate the assessment of a wide range of public policies, projects, and budgetary decisions with an emphasis on sustainable development. Further research could explore a more in-depth exploration of potential challenges and obstacles faced during implementation, which could enhance the practical applicability of the proposed models.

2. Sustainability Reporting and Transparency: Investigating ways to enhance sustainability reporting practices within public administration can lead to more transparent and accountable financial and environmental policies. The development of universal reporting standards and their adoption in public sector accounting should be explored.

3. Public-Private Partnerships for Sustainable Development: Further research on the design and implementation of public-private partnerships for sustainable development, particularly in the context of the SDGs, can help leverage the potential of multi-stakeholder collaborations for societal and environmental progress at a local level. For instance, the assumption that aligning local-level strategies with sustainable development objectives will result in more efficacious actions is a key underpinning of this research. Future research could delve into exploring alternative perspectives, potential limitations, and the contextual factors that may influence the effectiveness of such alignment.

4. Policy Integration: Exploring the integration of sustainability and environmental goals with other policy domains, such as economic development and health, can provide a more comprehensive perspective on the interconnections between different dimensions of sustainability.

In summary, the future holds promising prospects for advancing the agenda of sustainable finance and impact measurement in public administration. The work presented in this thesis serves as a stepping stone for future research and a testament to the continued commitment to creating a more equitable, eco-conscious, and sustainable world. As we embrace the challenges and opportunities on the horizon, we are well-positioned to drive positive change and pave the way for a better and more sustainable future for all.

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# Appendices

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# Public spending and green finance: A systematic literature review

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ABSTRACT

The public sector is being urged to actively participate in sustainability challenges more than ever before. In response, we present a systematic literature review on sustainable finance in European public administrations, particularly environmental aspects. This paper provides a systematic literature review on sustainable finance in European public administrations. It analyzes 82 papers published between 1992 and 2022, identifying areas of investigation such as sustainable development planning, sustainability accounting, measurement tools, and public-private partnerships. Further research is needed in green finance, particularly in financing methods.

## 1. Introduction

Sustainability has been at the center of every European development program in the past few years. Since 1992, with the Maastricht Treaty (Treaty on E.U., 1992), the issue of sustainable development has become part of both the E.U. legal framework and the shared ideology, together with the awareness of the need to transform the economic development model in the direction of environmental and social sustainability. This change was prompted by the adoption of agreements and action programs on a global scale - first, the Paris Agreement of 2015 and the United Nations 2030 Agenda, which defines the 17 Sustainable Development Goals (SDGs) - and at the E.U. level, with the Action Plan (European Commission, 2018), the European Green Deal (European Commission, 2020a) and the Recovery Plan (European Commission, 2020b).

The European Commission (E.C.) has estimated that, as part of the plan to achieve the goals of the Green Deal, at least one trillion euros should be used for investment over the next ten years to ensure the transition to a fair and climate-resilient economy. In this context, the role of the financial system is crucial, and that of sustainable finance, which represents a significant innovation to put the financial system at the service of collective well-being by integrating environmental, social, and governance (ESG) principles into decisions on the direction of capital flows (Ren et al., 2023).

The involvement of the public sector is essential, on the one hand, as a financial operator implementing projects oriented towards the welfare of communities and the protection of territories, and on the other, as promoter and coordinator of the sustainable transition process at the territorial level. This awareness is recognized and validated by relevant players in the international context, such as the OECD and the Joint Research Centre (JRC) of the E.C.; in particular:

- the OECD has repeatedly stressed the need to foster an evolution of the traditional financing model of public spending towards more anchored solutions to impact finance and the partnership between the public and private sectors (OECD, 2019); from a methodological point of view, it has defined a framework of evaluation indicators at the local level to measure the distance of cities and regions concerning the SDGs (OECD, 2021);

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- the JRC of the E.C. has developed the Urban 2030 (Joint Research Centre, 2021) project to support local governments in monitoring the achievement of the 2030 Agenda for Sustainable Development and its SDGs at the local level by promoting transformative and inclusive actions and underlining some good practices.

Considering the evolutionary path that the public sector faces, this work analyses state-of-the-art sustainable finance research in the public sector. Specifically, the scope of analysis is on government departments at the national (es. Ministries), regional and local levels (es. Municipalities) (hereinafter Public Administration or P.A.) of European Member States. Moreover, considering that the public sector has an enormous impact on green finance through different channels (Zhang et al., 2021), we add a green lens to the entire study to measure the weight of green finance and practices in the public administration sector.

The study follows an evidence-based practice by adopting a replicable, scientific and transparent process that aims to minimize bias through exhaustive literature searches of academic research (Tranfield et al., 2009).

To the best of our knowledge, this is the first contribution of this kind; even though there are systematic literature reviews considering public administration, they vertically focus only on some topics relating to sustainable finance. For instance, national SDG development planning (Allen et al., 2017), and public accountability integrating sustainability reporting (Biondi et al., 2018).

This work analyses the literature regarding the analysis of public policies on sustainability by providing an overview of the main investigation perspectives and related results. Finally, it focuses on environmental aspects, highlighting the most significant issues faced by public administrations, as well as the policies and financial instruments used to solve or mitigate such issues. Among the pillars of sustainability, green finance appears to be the most urgent and requires attention from all stakeholders (Dervi et al., 2022).

The analysis of unexplored or unsolved research questions represents the main contribution of this work, a valuable study for orienting future research in a functional way to meet the needs of policymakers. The systematic review highlights how, among other things, a more significant effort of analysis is necessary, both in measuring the impact of public policies and in the budgeting of public expenditure, and from a public-private partnership perspective. The paper is structured as follows: Paragraph 2 describes the research methodology used, explaining the steps that led to the construction of the database; paragraph 3 answers the research questions by reporting the results of the analysis and the primary evidence related to green finance and public sector; paragraph 4 provides the main conclusions.

## 2. Methodology

The paper adopts the systematic literature review methodology, in line with the current trend of scientific studies (Niñerola et al., 2020; Ferreira et al., 2018; Crossan and Apaydin, 2010; Venkatesh et al., 2007), to lay the foundation for the field of sustainable finance for P.A.s, acknowledging that the evolution of the business model towards a sustainable transition, from a multidimensional perspective, must take place while respecting the balance between sustainability and public spending management.

Moreover, through the use of text mining approaches, following the last literature reviews published in different academic disciplines (Hoang et al., 2023; Karami et al., 2020), the work tries to understand the coverage of green topics in the collected sample across the main streams of the literature identified.

To do that, the paper uses the "coverage per article", which refers to the proportion of an article devoted to discussing a particular issue (Barkemeyer et al., 2017; Puglisi and Snyder, 2011).

The analysis is developed through the steps of planning, execution and descriptive classification of the results (Fig. 1) by following

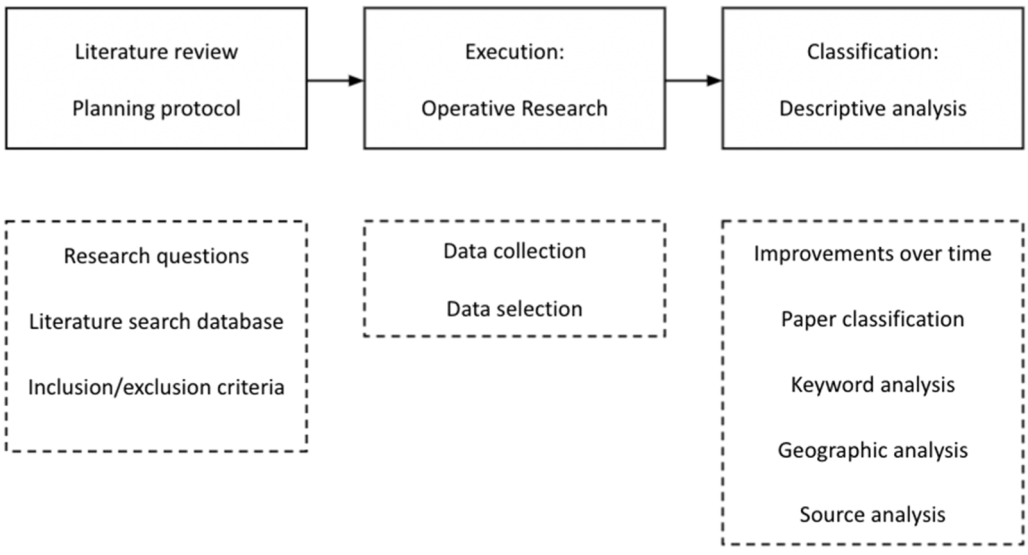


**Fig. 1.** Methodological Stages of Systematic Analysis.

the process indicated by Tranfield et al. (2003) and Kitchenham (2004).

### 2.1. Research questions, database and criteria for inclusion or exclusion

Starting from the research question, this study investigates the following:

- What are the main perspectives underlined by the literature on sustainable finance in the public sector over the last 30 years?
- What are the investigative gaps and the limits of the current scenario based on the considered perspectives?
- Is green finance part of the public resource management strategy?

After defining the research questions, operational choices related to the data collection phase were made; in particular, to ensure more excellent coverage of topics (Keathley-Herring et al., 2016), the research used the Scopus and Web of Science (WoS) academic databases for the extension and impact of the different fields (Falagas et al., 2008) and the comprehensive coverage in terms of publications (Vieira and Gomes, 2009), as well as the Business Source Complete (BSC) database. The inclusion/exclusion criteria to select those papers are:

- content corresponding to the research questions defined ex-ante; in this sense, the screening phase aims at identifying those materials that help to define, explicitly or implicitly, the research perspectives and best practices implemented at the European level on sustainable finance in the public sector and, on this path, what are the limits and the emerging criticalities;
- published over a sufficiently long period to include the different definitions of sustainable finance. The selected period, between 1992 and 2022, is defined based on the evolution and role that sustainability has played in the public debate and international political agendas. The principle of Sustainable Development emerged for the first time in the E.U. legal framework with the Maastricht Treaty in February 1992; in June of the same year, during the Earth Summit held in Rio de Janeiro, the first public definition of the word sustainability was created and, also, the Agenda21 was defined (the Action Program for the 21st century, which places sustainable development as a perspective to be pursued for people all over the world.[1]).
- whose reference context is limited to Europe. The purpose of the review involves the countries of the European Union due to the internal similarities relating to the capitalist model of the welfare state, which aims to guarantee citizens, especially the risk categories, a certain standard of living thanks to rigorous social protection, democracy and the recognition of citizenship rights; including papers analyzing non-European countries may introduce bias due to palpable differences in sustainability drivers and consequences (Lozano and Martínez-Ferrero, 2022).
- written in English, due to its general recognition as an international academic language (Genç and Bada, 2010) and in Italian;
- that open access type refers to peer-reviewed materials accessible online and available without restrictions (Table 1).

### 2.2. Sample collection and selection process

The process of research and selection of materials involved the adoption of a system of filters, which, by considering the most relevant variables for our analysis, allows us to define the final sample that has to be evaluated and discussed. In particular, we used EndNote[2] and Rayyan[3] as management software to assemble the materials and carry out a first screening; subsequently, the files were exported to Excel to analyze them more deeply. For the data collection activity, we queried the three selected databases (Scopus, WoS and BSC) using the following keywords, selected based on the potential contribution that the words could make to the literature analysis:

1. Public sustainable accounting;
2. Sustainable public finance;
3. Public sustainable expenditure;
4. Sustainable Development Goal government;
5. Impact finance public-private partnership;
6. Public sustainable innovation;
7. Pay by Results policy;
8. Public sustainability indicator;
9. Equitable and sustainable well-being.

Different research methods have been used to ensure the best results, depending on the database implemented and the Boolean operators “AND” and “OR” to combine the different terms. In particular, the research within the Scopus database was carried out using the "Article title, Abstract, Keywords" criterion; in WoS, the research was linked to the "Topic", while all available materials were selected within Business Complete Source. The first results showed 44,921 documents, 23,853 of which were in Scopus, 20,760 in WoS,

[1] Ministry of Ecological Transaction. *The path of sustainable development 1992*
[2] EndNote. Available from: https://endnote.com/
[3] Rayyan. Available from: https://www.rayyan.ai/

**Table 1**
Inclusion and Exclusion Criteria of the Works Used for the Analysis.

| Inclusion criteria of the works | Exclusion criteria |
|---|---|
| As part of the domain of sustainable public finance, where "sustainable" refers to the social, environmental and economic spheres. | Sustainable finance in the private sector and financial intermediaries; economic sustainability in public finance |
| Published from 1992 to 2021 | Out from the chosen time frame |
| Peer reviewed articles | Reports, master's or doctoral theses, notes |
| Published in the Scopus, Wos and BSC databases | Duplicates |
| Member countries of the European Union | Extra-EU |

and 308 BSC, distributed as in Table 2.

Due to the discrepancies in the papers, we carried out a screening process aimed to select all the valuable articles that could answer the research questions. Together with the keywords used for the search results, to make the database more complete and inclusive, the authors, based on their studies, gathered additional materials related to the topics covered by this work. The selection process has been divided into two parts due to the transversality of the object of analysis: the first part concerned automatic screening, directly implemented during the research phase in various databases and consistently conducted in line with the defined exclusion criteria, and the second part, concerned a manual screening, implemented to explore the collected contents in greater depth and to define the research topic accurately. During the first screening phase, a definition was created of a series of filters, including crucial research elements, to limit and refine the survey; the filters were set within the various databases, and the results have been summarised in Table 3. In particular, only the works with fully accessible content, drawn up or relating to the period between 1992 and 2021 and referring exclusively to the European context, have been selected from the 44,939 examined works collected following the first research (open filter access).

Furthermore, the review included only the documents relating to the research domains covered by the analysis; the documents have been identified through an inclusive approach to incorporate those empirical materials whose applications may be transversal to different areas. Consequently, the domains "Social sciences," "Economics, econometrics and finance," "Business Management and Accounting," "Mathematics," "Decision sciences," and "Multidisciplinary" have been selected in the Scopus database; the categories used as inclusion filters in Wos were "Economics," "Management," "Public administration," "Political science," "Business," "Business and finance," "Social sciences interdisciplinary." On the contrary, in the BSC database, the filtering system, applicable to research domains, needs to be present/has not been applied due to the characteristics of the database itself, which only provides economic content. Finally, the filter system only includes works written in Italian, English or Spanish. The designed sample was then inserted into *citation management software* (EndNote) to eliminate inter and intra-database duplicates that have been included because of the use of the exact keywords in the various databases.

After having applied the search filters, the documents have been reduced to 2542 and then, after the elimination of duplicates, to 2211, distributed as follows:

- 1652 in Scopus;
- 690 in Web of Science;
- 169 in Business Source Complete;
- 18 in other sources.

The second step, *manual screening*, was carried out with Rayyan, a support tool for the management of the collected materials as part of the systematic reviews, for a quicker and more manageable selection of the documents to be included and excluded based on the reading of the title and abstract of all documents that have been incorporated. The final database was created, starting from the 2211 documents, and it consisted of 126 documents, as summarised in Table 4. Subsequently, it was carried out a further screening step based on the integral reading of the text. The documents that did not comply with the research were not focused on the public sector and not related to the multidimensional aspect of sustainability have been eliminated; the analyzed database consisted of 78 papers.

The data collection and selection process led through standardized PRISMA techniques (M.J. et al., 2021; Moher et al., 2009), is

**Table 2**
Sustainable Finance in Public Administration: Data Collection per Database.

| | Scopus (A,A,K) | WoS (Topic) | BSC | Total |
|---|---|---|---|---|
| 1. Public sustainable accounting | 681 | 1931 | 8 | 2620 |
| 2. Sustainable public finance | 1456 | 1393 | 111 | 2960 |
| 3. Public sustainable expenditure | 936 | 620 | 9 | 1565 |
| 4. Sustainable Development Goal government | 4817 | 648 | 32 | 5497 |
| 5. Impact finance public private partnership | 228 | 2849 | 1 | 3078 |
| 6. Public sustainable innovation | 3983 | 2474 | 16 | 6473 |
| 7. Pay by Results policy | 9397 | 8920 | 109 | 18426 |
| 8. Public sustainability indicator | 2344 | 1916 | 17 | 4277 |
| 9. Equitable and sustainable well-being | 11 | 9 | 5 | 25 |
| Total | **23853** | **20760** | **308** | **44921** |

**Table 3**
Sustainable Finance in Public Administration: Data Selection.

| | Unfiltered | Open access filter | Temporal filter | Geographic filter | Domains filter | Language filter |
|---|---|---|---|---|---|---|
| Scopus | 23842 | 7925 | 5750 | 2890 | 1723 | 1652 |
| WoS | 20751 | 8223 | 8223 | 3228 | 704 | 690 |
| BSC | 303 | 267 | 256 | 173 | 173 | 169 |
| Other | 18 | 18 | 18 | 18 | 18 | 18 |
| Total | 44896 | 16415 | 14229 | 6291 | 2600 | 2542 |
| Total without duplicates | | | | | | 2211 |

summarised in Fig. 2.

## 3. The sample and its influential aspects

After having defined the database, a descriptive analysis of the collected materials was implemented to provide an overall overview of the documents through a series of variables:

- evolution of publications over time;
- classification of the document based on the nature of the analysis;
- keyword analysis;
- geographic analysis;
- analysis of the sources.

Regarding the years of publication, the sample analysis shows that there has been particularly intense research in the last four years (Fig. 3) on the most important international events that occurred in 2015: the signing of the Paris Agreement and the definition of the 2030 Agenda. The last two years, 2020 and 2021, have registered the highest number of publications, with 20 and 15 documents, respectively. Although in the previous years, there have been few publications, the current trend suggests that shortly, the number of publications will continue to increase, a sign of the growing importance and interest that the academic world has in the research topic.

The sample was divided into three groups (Fig. 4) according to the nature of the contents and the content analysis; in particular, the sample has been divided into:

- Review papers whose purpose is to analyze and describe the existing literature;
- technical-applicative papers, whose main objective is the development, calibration or refinement (and, possibly, the application) of a new or existing methodology or quantitative model;
- conceptual papers, whose focus is not the development of new models or the application of existing approaches but rather the discussion of some specific aspects or guidelines relating to the issue of sustainability in the public sector.

The keywords analysis was implemented by analyzing the abstracts of the papers using the *tag cloud*. The analysis, presented in Fig. 5, shows an attentive reflection compared to the frequency of use of keywords in the sample analyzed: the most relevant words are those written in large letters, while the smaller ones have not been used often.

“SDG” is the most common word used 63 times; "sustainable development" was used 59 times and "sustainability" 45 times; the words "government" and "indicators" were used 33 times, followed by "policies" 30, and "Planning" with a frequency of 29. It is further confirmed by this frequency analysis that the main trends in literature link to sustainable development planning (Ionescu et al., 2020, Raszkowski et al., 2019), sustainability accounting policies (Florea et al., 2021, Biondi et al., 2018), and measurement tools (Balaras et al., 2019, Arbolino et al., 2017, Bonnet et al., 2021).

From a territorial perspective (Fig. 6), we can see how the analysis has been developed at three different levels: national, European and global.

Over half of the final sample of papers is focused on a national level: it analyses some aspects related to specific European countries, such as Italy (20 papers), Spain (11) or Poland (10); 19 % of the work, on the other hand, concerns documents that are not addressed to a specific geographical area, but have a global character, or analysis in which the territorial aspect is not taken into consideration. Finally, 7 % of the sample is focused on all countries of the European Union.

Many journals have published articles relating to the research topic. From the analysis of the sources, the distribution of the articles is highly concentrated on a single journal. In contrast, the remaining articles are distributed in a relatively homogeneous way among the other sources. Fig. 7 shows the journals that have published at least two articles related to sustainability in the public sector; we can

**Table 4**
Sustainable Finance in Public Administration: Manual Screening.

| | Initial composition | Off topic | Incorrect geographical context | Private sector | Wrong type of publication | Other | Output manual screening | Final output |
|---|---|---|---|---|---|---|---|---|
| Papers | 2211 | 1506 | 325 | 109 | 5 | 141 | 126 | 78 |

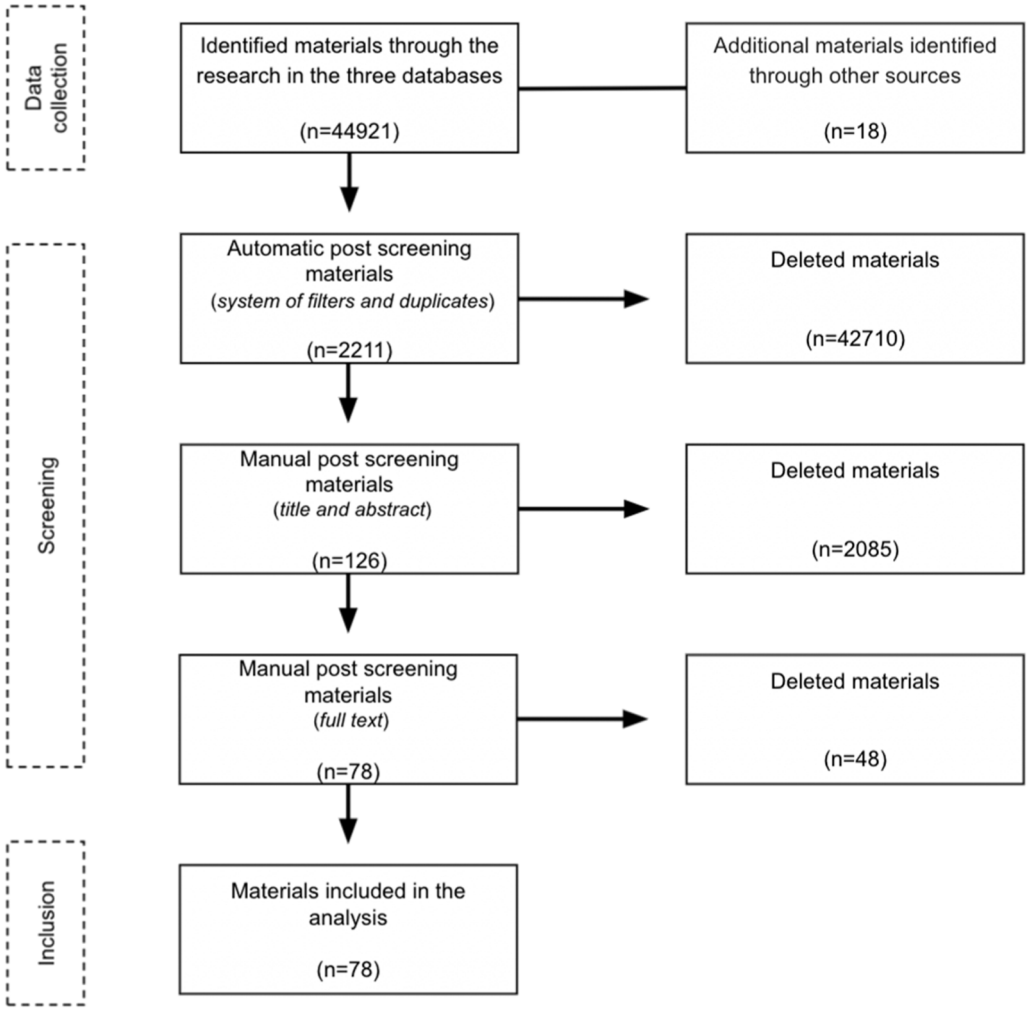


**Fig. 2.** PRISMA Flow Diagram.[41]

see how most of the articles (32 %) were published by Sustainability (Switzerland), followed by Journal of Cleaner Production (5.13 %) and Politics and Governance (3.84 %).

## 4. The evolution of sustainability-related topics in the public sector

### *4.1. Cluster analysis: the main streams of literature*

We use a combination of systematic analysis and content analysis to gain a better understanding of the most relevant literature and provide accurate insights. Following the latest research by Khan et al. (2020) and Paltrinieri et al. (2023), we analyzed 82 articles. This includes the 78 articles used in our systematic analysis, as well as four influential articles that were collected from journals with an ABS ranking of at least two stars and published in 2022 and 2023. We aim to ensure that more recent contributions are not underrepresented in our analysis.

From the analysis of the selected literature, four research perspectives on sustainable finance in the European public sector emerged and developed over the last 30 years (Table 5).

The clusters have been built through an inductive approach, given the need for an already consolidated approach. In particular, the main research focus has been identified by analyzing the individual works and related keywords, which became a variable. The different clusters allow you to divide the collected material according to the rationale of the analysis or, more generally, the cluster content. 16 of the 82 papers analyzed are related to the planning for sustainable development, 15 deal with issues related to sustainability accounting, 38 deal with measurement tools and, finally, 13 concern the topic of public-private partnership.

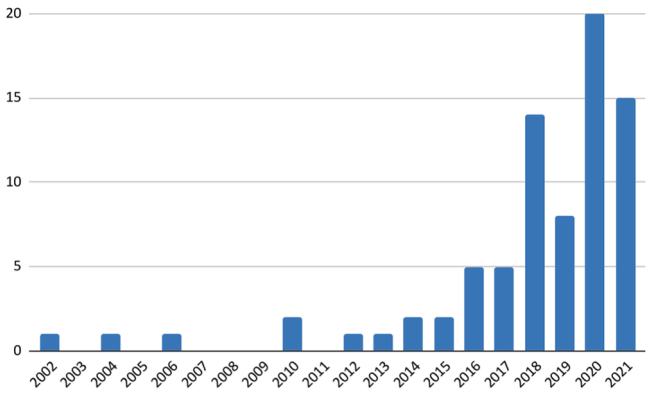


**Fig. 3.** Distribution of the Literature Over Time.

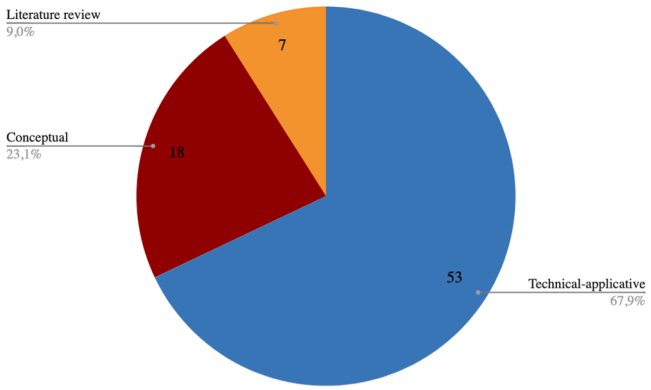


**Fig. 4.** Classification of Works Based on the Nature of the Analysis.


**Fig. 5.** Keyword Analysis.

### *4.1.1. First cluster analysis: sustainable development planning*

The first identified cluster includes studies concerning sustainable development planning, the strategies, policies and tools adopted by the public administration to define future actions to ensure sustainable development since it plays a vital role in the economic, social and political fields. The definition of sustainable development strategies is the cornerstone for implementing growth policies, designing the future vision of sustainable development and the path to follow. Another critical point to consider is the planning of defined and clear sustainable development policies that lead countries to take their steps towards achieving the SDGs. Furthermore, to allow the P.A. to carry out sustainable development planning in the best possible way, it is essential to have the planning tools that

[4] The process follows the guidelines indicated for the construction of the PRISMA flowchart.MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. (2021). PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews. BMJ 2021, 372: n71.https://doi.org/10.1136/bmj.n160

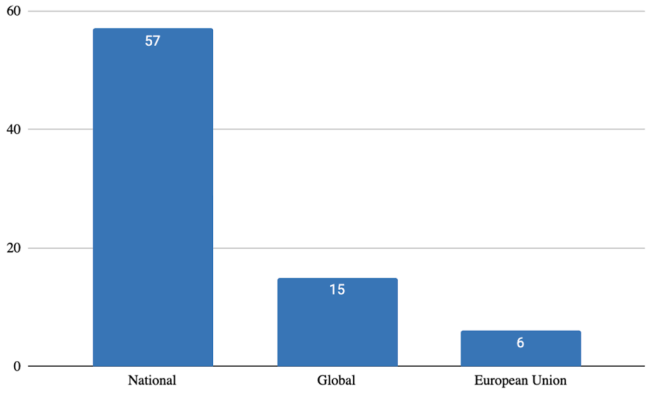


**Fig. 6.** Analysis of the Final Sample at Different Territorial Levels.

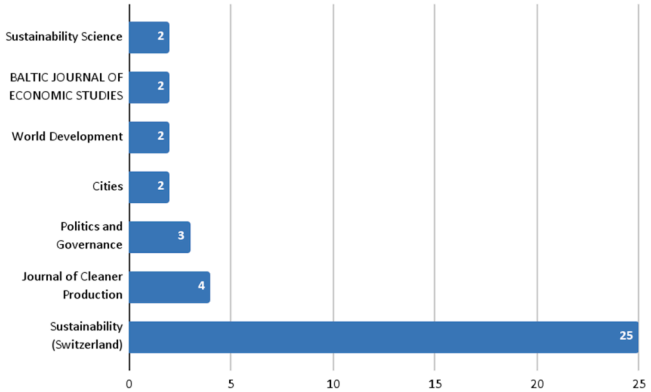


**Fig. 7.** Journals with at least two published works.

enable it to reach the objectives effectively, to carry out appropriate monitoring of the gap between the status quo and the target objectives and, also, to evaluate the achieved, and to be achieved, sustainability performances.

The analysis of the integration processes of sustainability in the strategic planning of public administration is a young field of research in which there is a lack of conceptual systematization; in this first phase of research, scientists promote a local/regional focus that allows them to observe and describe the processes more effectively. Consequently, the prevailing research methods used in the analyzed literature respond mainly to exploratory and descriptive purposes, typical of the early stages of knowledge development within a research study. The literature also promotes interdisciplinary approaches to the topic, which derive from the issue of sustainability in the public sector itself (Tommasetti et al., 2020).

The analysis of the results achieved by the literature on planning showed some areas of similarity; in particular, the lack of financial explanation in support of planning choices is the common denominator of almost all the studies, which are more concentrated on the analysis of the initiatives implemented in Europe, especially with an environmental perspective.

From a strategic point of view, the common thought concerns the current lack of an overview of public policies and the need to define an integrated and coherent framework for the implementation of the SDGs, avoiding stand-alone or linear approaches for sustainable development, which had limited success in the past (Allen et al., 2018). Furthermore, it is necessary to consider that an inefficient public policy, for example, oriented to the total financing of a specific sector without additional evaluations, impedes sustainable development: the achievement of the SDGs must be supported by local interventions with strategic planning that act as a starting point for the implementation of partnerships at the vertical and horizontal levels of the public administration system.

Many studies underline the usefulness of adopting a bottom-up approach for the definition and evaluation of policies relating to sustainable territorial development to give practical knowledge of the resources used and the results obtained and to favor policy-makers in defining policies for achieving a balance between the different dimensions of sustainability. This approach is also suitable for optimizing budgeting policies at the national level: most of the authors confirm the close link between the financial situation and the level of sustainable development of a local authority; moreover, the preparation of an evaluation model at the local level makes it possible to consider the work of governance, which is often ignored when measuring environmental or social performance.

Some authors explain the need to adopt an integrated vision of sustainability in planning sustainable development projects since, although they are designed to achieve a given goal (social, environmental, etc.), they cannot neglect the chain impacts they will have on other dimensions of sustainability. The European policies, for example, want to pay attention to the environmental issue. At the same time, in practice, this aspect is overshadowed, as projects are mainly focused on economic criteria: often, the mentioned goals in

the Action Plan to finance sustainable growth still need to be met.

From an operational point of view, the planning tools presented and analyzed by the literature - numerically very limited - tend to neglect some aspects of sustainability and not to adopt a general vision in favor of more specific and specialized arguments, such as, for example, a single SDG or a single target of an SDG (Table 6).

#### *4.1.2. Second cluster analysis: sustainability accounting*

The second identified cluster includes studies related to sustainability accounting concerning two specific topics: sustainability reporting and the relationship between public spending and sustainable development.

The debate on these aspects is very active in this historical moment: most national and international institutions are promoting efforts to ensure that public accounting gives importance to the sustainability-oriented path undertaken by the institution.

On the other hand, the literature still has little interest in these issues, focusing more on the historical analysis of public budgets to understand the effects on the community and the environment from public investments. Furthermore, most of the analyzed documents adopt a "standard" methodological approach, which does not include suggestions for innovative analysis but focuses on classic statistical reports to define the direct effectiveness of the environmental policies undertaken. Alongside this, some authors adopt qualitative approaches - such as interviews and surveys - to collect suggestions and reflections on the inclusion of sustainability in the accounting world, focusing on the issue of sustainability reporting (also called "non-financial") in the public sector.

The analysis of the results of the collected literature shows how all the authors agree that traditional accounting should be integrated with sustainability and become part of the planning and reporting procedures of the local authority jointly.

The highlighted criticality concerns the need for more transparency and clarity caused by the absence of universal reporting standards: the tools and suggestions for integrated accountability will likely become redundant and create confusion due to many labels that do not match any concrete alternatives. For this reason, in the literature, there is a widespread practice of considering the SDGs as a reference framework when drafting the public budget. Another recurring theme concerns the orientations and considerations made when creating the sustainability reporting: the studies show how, for example, the choice of most local authorities not to draw up a sustainability report is not based on assessments of usefulness of the reporting tool, but instead on economic and budget issues; the disclosure of non-financial information should be promoted as a tool to legitimize the action of the local politician, given its prediction in political and electoral programs as a result of a commitment to sustainable development, and should therefore be mandatory or encouraged.

Finally, the historical analysis of public spending, carried out by the literature in different geographical and temporal contexts, shows in almost all cases that, despite allocating resources to critical environmental and social issues, the implemented policies could be more effective. This demonstrates that, when defining environmental policies, local governments should move towards a strategic approach, structuring interventions based on the objectives to be achieved rather than based on past spending for the environment. Secondly, local governments should focus on more than short-term results. However, they should define policies that can create the conditions for solving critical issues in the medium-long term: it is not enough to provide the necessary infrastructure, but it is necessary to develop a culture of sustainability in the community that leads to the understanding of the value of the environment and the usefulness of using the available infrastructures.

Furthermore, the implemented analysis shows that the financial policies implemented by the individual local authorities are separate from the real social needs of the community: it is, therefore, necessary to develop ad hoc indicators capable of reflecting these needs (Table 7).

#### *4.1.3. Third cluster analysis: measurement tools*

The third cluster identified includes studies relating to measurement tools concerning two specific aspects: multidimensional indicators and SDGs. The distinction between the two categories is to be found in the methodological process implemented to create the indicators: the first category includes *tailor-made* tools developed ad hoc by the institution/researcher to capture one or more aspects of sustainability; the second category includes studies in which SDGs indicators are used as tools for measuring, monitoring or guiding policy choices.

There are E.U. countries, such as Italy and Poland, which have developed a set of national indicators to measure the well-being and sustainability of their territories inspired by the SDGs indicators. The advantage of this choice consists in the possibility of comparing the results within the national territory; on the other hand, a shared framework of indicators - or underlying variables - should be developed, such as, for example, the parameters provided by Eurostat, to ensure transparency and international comparability.

However, some experts underline that the choice of the indicators/measurement framework employed to measure sustainable development is also a political issue; therefore, while adopting a consolidated standard, politics can influence the achievement of individual SDGs; his political ideology influences each perception of government, implies a different selection of public policies that favor his success. Furthermore, public policies and project proposals tend to enhance impacts relating to the areas of job creation and economic development; on the contrary, some indicators are under-valued, as in the case of biodiversity protection indicators, which would substantially contribute to multiple international obligations, given the strong interconnections between biodiversity and public health, water and soil conservation and climate change mitigation.

The example is also helpful to explain a further aspect shared by most authors: the need to consider the correlations between SDGs and optimal use of public resources; this would facilitate the definition of public actions inspired by an overall vision. A significant portion of the sample of studies concerned the development and analysis of the existing interconnections and synergies between the SDGs at an international level and between the various indicators at a national level.

From an operational point of view, some authors suggest indicators created concerning a single aspect of sustainability and others,

**Table 5**
Sustainable Finance in Public Administration: Main Lines of Literature.

| Cluster | Sub-cluster | Author |
|---|---|---|
| **SUSTAINABLE DEVELOPMENT PLANNING** | *Sustainable development strategy* | Marchi, M., Capezzuoli, F., Fantozzi, P. L., Maccanti, M., Pulselli, R. M., Pulselli, F. M., & Marchettini, N. (2023); Bornemann & Christen (2021); Cherp, George & Kirkpatrick (2004); Guarini, MoriIcona & ZuffadaIcona (2021); Kovalivska, Shcherbyna, Nikolaiev. (2020); Allen, Metternicht, Wiedmann (2018) |
| | *Planning tools* | Allen, Metternicht & Wiedmann (2017); Cruz & Marquez (2014); Neamtu (2012) |
| | *Sustainable development policy* | Albrecht, Grundel & Morales (2021); Hickmann (2021); Standar & Kozera. (2019); Zolin, Ferretti, Grandi (2020); Leal Filho, Platje, Gerstlberger, Ciegis, Kääriä, Klavins, Kliucininkas (2016); Bornemann & Weiland. (2021); Suditu, Nae, Negut, Gheorghilas.(2014) |
| **SUSTAINABILITY ACCOUNTING** | *Public spending and sustainable development* | Borghesi, S., Castellini, M., Comincioli, N., Donadelli, M., Gufler, I., & Vergalli, S. (2022); Cardillo, E.; Longo, M. C. (2020); Bednarska-Olejniczak, D.; Olejniczak, J.; Svobodová, L (2020); Florea, Meghisan-Toma, Puiu, Meghisan, Doran, Niculescu (2021); Dascalu & Predescu (2016); De Matteis, Preite,Striani & Borgonovi (2021); Tafuro, Mattei, Preite, Costa, Mariella & Treviso (2019); Sisto, García López, Quintanilla, de Juanes, Mendoza, Julio Lumbreras & Mataix (2020); Soukopová & Bakoš (2013); Becchetti, Corrado & Fiaschetti. (2017); Hege & Brimont (2018) |
| | *Sustainability report* | Nicolò, G., Andrades-Peña, F. J., Ferullo, D., & Martinez-Martinez, D. (2023); Biondi, L.; Bracci, E. (2018); Giacomini, Rocca,Carini, Mazzoleni. (2018); Tommasetti, Mussari, Maione, Sorrentino (2020) |
| **MEASUREMENT TOOLS** | *Multidimensional indicators* | Balaras, C. A.; Droutsa, K. G.; Dascalaki, E. G.; Kontoyiannidis, S.; Moro, A.; Bazzan, E. (2019); Arbolino, De Simone, Carlucci, Yigitcanlar & Ioppolo (2017); Bonnet, Coll-Martínez & Renou-Maissant (2021); Braulio-Gonzalo, Bovea & Ruá (2015); Van Zeijl-Rozema & Martens. (2010); Marszalek-Kawa & Siemiatkowski (2020); Chelli, Ciommi, Emili, Gigliarano & Taralli (2016); Porreca, Rambaud, Scozzari & Di Nicola (2019); Jelinčić &Tišma. (2021); Monte & Schoier (2020); Bova & Śleszyński. (2020); Rösch, Bräutigam, Kopfmüller, Stelzer & Fricke. (2018); Urbaniec (2015); Pulselli, Ciampalini, Tiezzi & Zappia (2006); Ramos & Caeiro (2010); Mazziotta & Pareto (2016); Bellantuono, Lagrasta, Pontrandolfo & Scozzi (2021); Miola, Borchardt, Neher & Buscaglia. (2019); Onori & Jona Lasinio (2020); Davino, Dolce, Taralli & Esposito Vinzi. (2018) |
| | *SDGs* | Guerrero, O. A., Castañeda, G., Trujillo, G., Hackett, L., & Chávez-Juárez, F. (2022); Álvarez & García-Fernández (2020);Ionescu, Firoiu, Tănasie, Sorin, Pîrvu and Manta (2020); Raszkowski & Bartniczak (2019); Janoušková, Hák, Moldan. (2018); Coscieme, Mortensen & Donohue (2021);Martínez-Córdoba,Amor-Esteban,Benito, García-Sánchez. (2021); Martínez-Córdoba, Raimo, Vitolla, Benito. (2020); Ramos & Laurenti. (2020); Staszkiewicz (2019); Strologo, D′Andrassi, Paoloni, Mattei. (2021); Asadikia, Rajabifard, Kalantari. (2020); Biggeri, Clark, Ferrannini, Mauro. (2019); Schipper, Dekker, de Visser, Bolman, Lodder. (2021); Koch & Krellenberg (2018); Spaiser, Ranganathan, Swain & Sumpter (2016); Cling, Eghbal-T é hérani, Mathieu & Plateau. (2020); Pradhan, Prajal; Costa, Luis; Rybski, Diego; Lucht, Wolfgang; Kropp, Jürgen (2017) |
| **PPP** | *Partnership policies* | Alińska, Filipiak & Kosztowniak (2018); Horan (2019); Ferrer-Roca, Guia & Blasco (2020); Grotenbreg & Buuren (2018); Kamphof & Melissen (2018) |
| | *Sustainable development projects* | Bossink (2002); Chaves-Avila, R.; Gallego-Bono, J. R. (2020) Moreno-Serna,Purcell,Sánchez-Chaparro,Soberón, Lumbreras, Mataix. (2020); Stafford-Smith, Griggs, Gaffney, Ullah, Reyers, Kanie, Stigson, Shrivastava, Leach, O′Connell. (2017); Koscielniak & Gorka (2016) |
| | *PbR* | Kabli, Rizzello,Trotta. (2021); Rizzello & Kabli (2020); Fraser, Tan, Lagarde & Mays (2018) |

**Table 6**
Cluster 1 - Planning for Sustainable Development.

| Sub-cluster | Authors | Methodology | Analysis units | Search results |
|---|---|---|---|---|
| *Sustainable development strategy* | Cherp, George & Kirkpatrick (2004) | Qualitative analysis. Case studies with interviews with the main actors | National strategy and sustainable development (SNSD) of Belarus and Slovakia | The observed strengths of strategic planning: recognition of the social pillars, environmental and economic aspects of the ss, a high level of government ownership, a strong analytical basis for developing strategies. The weaknesses: lack of integration between different themes and sectors, as well as between local, regional and national planning levels, the absence of the ability to compromises and setting priorities, and ineffective public participation. Challenges in strategic planning for ss: possible tensions between the need for political commitment at the national level and the implementation of internationally defined sustainable development principles, between government ownership and the participation of non-governmental stakeholders, and between the need for political consensus and support and broad participation. |
| *Sustainable development strategy* | Guarini, MoriIcona & ZuffadaIcona (2021) | Creation of a planning guide through defined theoretical processes | Urban cities | Incorporating SDGs into city strategic plans can improve both the functioning of the strategic planning process and operational performance. The dimensions suggested in this article refer to each of the main phases of the classic strategic planning and control cycle and consist of political vision, identification of relevant SDGs, gap analysis, setting the local SDG agenda, measurement and reporting. |
| *Sustainable development strategy* | Allen, Metternicht, Wiedmann (2018) | Systematic literature review. Analysis of national documents available. | 25 papers, case studies from 26 countries and further documents | An effective approach for the implementation of the SDGs requires prioritizing objectives to focus on low, interrelated priorities, relying on analytical approaches and tools that help countries evaluate interactions and interconnections, to optimize the systemic impact of different actions. The review highlights significant gaps in practice in both developed and developing countries that undermine the effective implementation and transformative potential of the SDGs. While progress has been made in some early planning stages, there are still key gaps in terms of assessing the interconnections, trade-offs and synergies between goals (evident gaps in terms of adopting systems thinking and integrated analytical approaches and models). Countries paid more attention to the SDGs, but it is important to underline that they could risk to pursue the same stand-alone approaches to sustainable development that were not very successful in the past. Furthermore, the review of national experiences in the implementation of the SDGs highlights a significant gap between steps and approaches recommended by the community of experts and those recently put into practice. |
| *Sustainable development strategy* | Kovalivska, Shcherbyna & Nikolaiev (2020) | Use of Excel functions. SWOT analysis | Accommodation in Ukraine | A multi-stage methodology has been proposed for the selection of investment projects for budget support and the development of recommendations, in order to further explore the formulation and analysis of methods to achieve SDG 11, according to a program-oriented and funding mechanism approach, using PPPs.<br>Stages: 1. Selection of projects for budget support (cost-benefit analysis and choice of the most efficient way to implement it); 2. Evaluation of the impact of the project on the SDGs; 3. Determination of the amount and type of budget support (assessment of the state quota to finance the project based on the SDG rating of the investment; evaluation of the commercial, budgetary and social efficiency of investments with indicators); 4. Development of recommendations for project implementation (action plan to support project implementation in accordance with the SDG). |

(*continued on next page*)

**Table 6** (*continued*)

| Sub-cluster | Authors | Methodology | Analysis units | Search results |
|---|---|---|---|---|
| *Sustainable development strategy* | Bornemann & Christen (2021) | Qualitative empirical analysis | 4 Swiss cantons | Using four ideal / typical sustainability governance arrangements (SGA) resulting from an analysis of the Swiss cantons; the five specific governance requirements of the 2030 Agenda match or challenge these 4 ideal-typical arrangements and their respective governance relationships: none of the four ideal-typical SGAs meet all five requirements. The provisions have several possibilities and limitations compared to the governance requirements associated with the changes concepts of sustainability that emerge in the wake of the 2030 Agenda. |
| *Sustainable development strategy* | Marchi, M., Capezzuoli, F., Fantozzi, P. L., Maccanti, M., Pulselli, R. M., Pulselli, F. M., & Marchettini, N. (2023) | multi-faceted methodology to assess greenhouse gas (GHG) emissions | Municipality of Grosseto | The study found that the Municipality of Grosseto in central Italy had gross greenhouse gas (GHG) emissions of 395,558.59 tons of carbon dioxide equivalents, exceeding CO2 absorption by a factor of five and leading to a 17.09 % abatement target. The major sources of GHG emissions were road transport (47.57 %), heating (15.01 %), and imported electricity consumption (14.57 %), with GHG action zones identified through GIS-based mapping to guide local environmental policies. |
| *Planning tools* | Cruz & Marquez (2014) | Theoretical metrics | Municipality of Lisbon | An ideal scorecard model applied to the municipality of Lisbon is presented, in which the municipality sets very ambitious ex ante objectives and consistent levels of performance, together with quantitative and qualitative indicators and an action strategy. |
| *Planning tools* | Neamtu (2012) | Semi-structured interviews | 28<br>to function the public of the municipalities of Romania | Most interviewed believe they are familiar with the topic of sustainability and agree that performance evaluation is an important activity that should be undertaken by all public organizations. Most believe that the public sector should pursue social objectives, while the private sector should focus on the environmental aspect, whose criticalities mostly depend on companies. Furthermore, they all believe that public organizations, even in big cities, have very little experience with measuring performance in general and even less with measuring sustainability. For this reason, Romanian municipalities should borrow and adapt sets of indicators developed by other cities at the international level. |
| *Planning tools* | Allen, Metternicht & Wiedmann (2017) | Critical review of the literature | 22 national case studies of modeling scenarios | The modeling scenario has become a commonly used method to explore plausible future planning strategies and to provide analytical evidence and input for national development planning; however, there isn't a direct link to the SDGs that includes of all objectives and does not focus on just one aspect. A framework has been developed from the literature analysis, and it should be implemented ex ante for the national planning of the SDGs, which consists of 4 steps: (1) definition of the program, including the identification of priorities, objectives and indicators / variables, ( 2) development of an analytical framework and selection and definition of appropriate models and tools, (3) projection of the baseline scenario and (4) identification and analysis of intervention options, formulation and simulation of credible paths towards goals. |
| *Sustainable development policy* | Albrecht, Grundel & Morales (2021) | Semi-structured interviews.<br>Observation of the participants.<br>Analysis of secondary sources. | 3<br>forest-based regional bioeconomy in Finland<br>, Sweden and<br>Spain | The areas of public financing of green / bioeconomic developments are: job creation, consistency with European policies, sector innovation, rural economic development. European policies suggest focusing on the climate issue and biodiversity while in these cases these aspects have not been considered: the mentioned commitments in the Action Plan to finance sustainable growth are absent. The directives used by local operators to promote public funds only concern economic growth; this has a direct effect on the type of policies that are mobilized and, consequently, on the learning |

(*continued on next page*)

**Table 6** (*continued*)

| Sub-cluster | Authors | Methodology | Analysis units | Search results |
|---|---|---|---|---|
| | | | | and translation of policies which is contrary to the broader bioeconomy policies in the EU. |
| *Sustainable development policy* | Zolin, Ferretti, Grandi (2020) | raw set theory (RTD); ROSE2 software (Rough Sets Data Explorer) | peripheral and ultra-peripheral Italian municipalities of Sicily and Sardinia | Due to the vast heterogeneity, national policies cannot be adapted to the specificity of each territory: each local decision-maker must identify the current situation of the municipality and the most appropriate part of the national legislation to refer to. The results of the analysis show the importance of differentiating action plans also between the different internal areas, focusing resources on the most important pillar of sustainability in that area. The identification of sustainability at the different territorial levels allows policy makers to direct policies and strategies in order to achieve a balance between the different dimensions of sustainability. |
| *Sustainable development policy* | Hickmann (2021) | Document analysis | Cities and governments | Pioneering sustainability initiatives in urban areas underline the great potential of local authorities to contribute to global sustainability. However, some limitations for local authorities in conducting effective urban sustainability actions tend to be neglected: cities and local governments depend on the regional and national PA and international bodies to initiate and maintain large-scale urban sustainability initiatives; local authorities face structural barriers when designing innovative urban sustainability actions that bring together different local actors; the impact of transnational city networks and alliances on local sustainability initiatives is rather low. |
| *Sustainable development policy* | Bornemann & Weiland. (2021) | Systematic review of the literature. | Final sample of 22 papers | 1. The integration of policies is considered a crucial prerequisite for the successful implementation of the 2030 Agenda. It is necessary to integrate the sustainability into policies because there are numerous interconnections (trade-off and synergies) between sectors and if we do not take them into account, we could have ineffective policies. 2. Either the objectives (SDGs as an indivisible whole, interconnected SDGs), or the objectives and targets must be integrated into specific contexts. 3. The literature largely converges on a "Whole-of-government" approach in which each goal should be an integral part of any attempt at policy integration. This implies that no goals should be excluded from the remarks on policy integration. This general trend agrees with the idea that the SDGs are "indivisible". |
| *Sustainable development policy* | Suditu, Nae, Negut, Gheor ghilas. (2014) | Cartographic representations | Local budgets of Romania | There are strong disparities in the distribution of financial resources which are reflected in the ability of administrative territorial units to fulfil their responsibilities, to ensure sustainable territorial development. These disparities are determined by several factors, including economic underdevelopment and the unemployment rate; moreover, the distribution of state budget revenues also reveals regional differences and disparities: underdeveloped areas have the smallest share of income in total income. |
| *Sustainable development policy* | Standar & Kozera . (2019) | TOPSIS method; descriptive statistics; Pearson's linear correlation coefficient | 113 rural municipalities located in a Polish region (Wielkop olskie voivodes hip) | In the analysed period, there has been the development of the registered rural municipalities and also a reduction of the socio-economic development gap between them; however, there are differences in the levels of socio-economic development between the rural municipalities located in the eastern part (high, medium-high levels) and western part (low, medium-low levels) of the Polish region. Furthermore, there is a strong relationship between the financial situation of rural municipalities and their level of development in the region considered: the level of development is particularly correlated with the potential income of rural municipalities and with their potential investment. |

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**Table 6** (*continued*)

| Sub-cluster | Authors | Methodology | Analysis units | Search results |
|---|---|---|---|---|
| *Sustainable development policy* | Leal Filho, Platje, Gerstlb erger, Ciegis, Kääriä, Klavins & Kliucini nkas (2016) | Comparative qualitative analysis of sustainability governance based on a selected set of indicators | Data taken from official sources | Comparative analysis of sustainability governance in the Baltic Sea countries: the countries studied were divided into three groups: 1. Denmark and Finland: countries with the highest level of real GDP per capita and the lowest inequalities. They are characterized by a high level of good governance, trust and significant scientific and innovative efforts. This should support transitions in sustainability and good practices that can be imitated by other countries. 2. Germany: characterized by a relatively high level of good governance, while trust is at an average level. The level of real GDP per capita is lower than that of the Scandinavian countries and the distribution of income is less equal in some extent. Another problem is the administrative structure. 3: Former socialist countries have relatively low indicators of good governance, lower real GDP per capita, higher unemployment levels and higher income inequalities, and this leads to a reduction of the social cohesion. A significant problem is the emigration of relatively well-educated labour to Western Europe due to high salary difference and social security levels. |

**Table 7**
Cluster 2: Sustainability Accounting.

| SUB- CLUSTER | AUTHORS | METHODOLOGY | ANALYSIS UNITS | SEARCH RESULTS |
|---|---|---|---|---|
| *Public spending and sustainable development* | Hege & Brimont (2018) | Semi-structured interviews; analysis of the voluntary national reviews submitted | Administrative representatives from: Colombia, Mexico, France, Finland, Norway, Sweden, Slovenia, Afghanistan, Assam. | Countries integrate the SDGs into their budgeting processes in several ways: most of the studied countries map their budgets against the SDGs or include qualitative reports in their main budget document, providing an overview of how the budget is linked to the different SDGs. Others use the SDGs to improve their budget performance appraisal system or as a management tool for allocating and managing budgetary resources. Proposals on the methods of integration: 1) universal system of classification of the financial statements of the SDGs; 2) introduction of individuals and definition of budget labelling systems for transversal SDGs; 3) publication of indicators showing the state of the country based on a few SDGs. |
| *Public spending and sustainable development* | Tafuro, De Matteis, Preite, Costa, Mariella & Treviso (2019) | Spearman's correlation coefficient. semi-structured interviews | Social expenditure of 116 Italian provincial capitals and 22 ISTAT social indicators | The financial policies implemented by the individual municipalities are not linked to the real social needs measured by the indicators used. This shows that the social expenditure of the Italian capitals does not seem to be based on a sustainable approach, as there is no positive relationship between the social indicators and the financial resources allocated by the municipalities to social issues. Local authorities allocate financial commitments of a social nature on the basis of a traditional spending criterion, centred on historical social spending rather than on future social objectives. |
| *Public spending and sustainable development* | Cardillo & Longo (2020) | Interviews, direct observation and documentary analysis. | Accounting system of a medium-sized Italian local authority located in eastern Sicily; Analysis of planning and budget accounting documents. | There is a complex relationship between the accounting system and social reporting (SR). The SR is an institutionally recognized tool that work as an internal and external means of communication for the sustainable territorial development of a public body, in terms of objectives, actions and planned and achieved results. The structure of the accounting system is sometimes not suitable for developing a complete accountability and sustainability process in the public organization; the informative and economic data, resulting from the reporting system, are not always fully usable and comprehensible externally and therefore they do not represent the results in the best possible way. SR is essential in promoting social sustainability and in evaluating the effects of the choices made and therefore the accounting system should be able to detect and represent the management phases and the performances achieved according to a logic of interdependence. |
| *Public spending and sustainable development* | Becchetti, Corrado & Fiaschetti. (2017) | Online survey and sample weighting; OLS model | 2605 Italian citizens | The BES area for which Italians are willing to pay the most is the health care (17.4 % of total financial resources). Below are education and training (12.8 %) and work-life balance (about 10.7 %). All other areas are between 8.9 % (economic well-being) and 6.6 % (security), except for politics and institutions where it drops to 3.8 %. Preferences depend on 5 socio-demographic discriminations: political orientation on the left (greater importance to education and the |

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**Table 7** (*continued*)

| SUB- CLUSTER | AUTHORS | METHODOLOGY | ANALYSIS UNITS | SEARCH RESULTS |
|---|---|---|---|---|
| | | | | environment; more oriented towards achieving the SDGs) or right-wing (greater importance to economic security and well-being), gender, education, the income and the north / south geographic position. |
| *Public spending and sustainable development* | Bednarska-Olejniczak, Olejniczak & Svobodova (2020) | Analysis of the creation process of the Soleki Funds, the directions of expenditure and the amount of expenditure | Reports provided by the Ministry of Finance on the participatory budgets of the municipalities of Poland | The number of municipalities using this form of participation in the citizens' budget is increasing. The analysed directions of spending indicate that the SF are consistent with the linked SDG objectives to improve the quality of life of residents. The study shows that the SF is part of the target 16.7 of SDG 16 and target 11.3. The study also shows that the potential of the SF has not been fully used: the projects are presented but are not then implemented, however it serves as an information to the municipality on the latent needs for better strategic spending planning. |
| *Public spending and sustainable development* | Soukopová & Bakoš (2013) | Survey. Weighted techniques of multi-criteria analysis. MS Excel. | Expenditure on environmental protection of the municipalities of the Czech Republic | A methodology and information system for municipalities have been developed, both approved by the Ministry of the Environment of the Czech Republic as a voluntary tool for municipal officials. The aim is to evaluate the municipal Environmental protection expenditures (EPE) in terms of 3E (economy, effectiveness, efficiency) with 2 levels of evaluation. The result is a rating that contains the scores of each pillar of sustainable development and the assessment of the actual budget. The EPE Information System (IS-EPE) aims to evaluate the effectiveness of the current EPE and budget planning. |
| *Public spending and sustainable development* | Florea, Meghisan-Toma, Puiu, Meghisan, Doran, Niculescu (2021) | Definition of a representative equation; stationarity test: Augmented Dickey – Fuller Phillips and Perron test; cointegration and causality test (Granger) | Greenhouse gas emissions; Total revenue from energy taxes; Total revenue from transport taxes; Total expenditure of public administrations for environmental protection. | The analysis of the effort exerted by public authorities in Romania in mitigating climate change using fiscal and budgetary tools highlighted two bidirectional causal relationships (one in the short term between greenhouse gas emissions and revenue from taxes on pollution / resources and one in revenue from taxes on energy and revenue from taxes on pollution / resources), three short-term one-way causal relationships (from revenue from pollution / resource taxes to revenue from transport taxes; from revenue from taxes on transport to greenhouse gas emissions and from greenhouse gas emissions to energy tax revenues) and three long-term one-way causal relationships (from pollution / resource tax revenues to total government expenditure for the protection of environment; from government spending on |

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**Table 7** (*continued*)

| SUB- CLUSTER | AUTHORS | METHODOLOGY | ANALYSIS UNITS | SEARCH RESULTS |
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| | | | | environmental protection to greenhouse gas emissions and tax revenues on transport towards greenhouse gas emissions) |
| *Public spending and sustainable development* | DASCĂLU & PREDESCU (2016) | ABC structural analysis method (Pareto diagram) | Budget of the city of Bucharest | The analysis of public expenditure shows that the efforts of the local administration have been concentrated towards the allocation of resources for "Education", which means that the decentralization process, as to education, from the central administration to the local one, has been completed. On the contrary, in the case of health care and public order, local authorities allocate less amount of public funds than in other activities, such as social assistance: this means that the decentralization process is not completed yet. |
| *Public spending and sustainable development* | De Matteis, Preite,Striani & Borgonovi (2021) | Regression (GLS method); t-test methodology | 116 Italian cities | In general, cities direct public funds to implement environmental policies, but these turn out to be ineffective. In particular, the financial commitments of the cities that constitute the sample are closely linked to environmental criticalities: this situation occurs for all three environmental areas (Water, Urban waste, Air) and for all eight environmental indicators taken into consideration in the research. As regards the possibility that the environmental financial commitments of the local authorities in the sample will be able to solve or reduce environmental problems, both at national and sub-national level, this possibility is not confirmed or is only weakly supported. This evidence is found for all three investigated environmental areas. |
| *Public spending and sustainable development* | Sisto, García López, Quintanilla, de Juanes, Mendoza, Julio Lumbreras & Mataix (2020) | Correlation | Budget of the aggregated Spanish local administrations (SGFAL) | The research found that around 25 % of budget items have relevant statistical links with the SDGs: the least correlated are SDGs 11 and 15; the most connected are SDGs 1, 4, 7, 8 and 16. Research highlights the existence of more synergies with respect to trade-offs within and between the budget and the SDGs in most cities. Policy makers can no longer design strategies based on subjective assumptions, but they must also include in the decision-making process the necessary tools to achieve all sustainable development goals. |
| *Public spending and sustainable development* | Borghesi, S., Castellini, M., Comincioli, N., Donadelli, M., Gufler, I., & Vergalli, S. (2022) | event study analysis | stocks listed in the "STOXX 100 All Europe" index | Both green and brown sectors experienced positive cumulative abnormal returns (CARs) following green policy-related announcements (GPAs) made by European governments in 2020, with the positive sentiment effect being stronger in the green sector. Additionally, the analysis revealed that the positive sentiment was largely driven by announcements related to climate change mitigation policies, and certain sectors (energy, financial, and industrial) and countries (Switzerland, Spain, the UK, Ireland, and Italy) benefited significantly from GPAs, particularly within more sustainable portfolios. |
| *Sustainability reporting* | Giacomini, Rocca,Carini, Mazzoleni. (2018) | Survey | 1300 Italian municipalities and 314 local authorities | The results confirmed the evidence in the literature on the lack of adoption of sustainability reports by municipalities without incentives or the mandatory adoption of reports, especially for smaller entities. Most of the municipalities agreed that the reduction of costs, linked to austerity, represented an obstacle to the preparation of the |

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| SUB- CLUSTER | AUTHORS | METHODOLOGY | ANALYSIS UNITS | SEARCH RESULTS |
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| | | | | sustainability report in terms of time and availability of staff. The second reason was the voluntary nature of the reporting tool, indicated by 39 % of the interviewed municipalities. Only 8 % of the municipalities have linked the SR to its usefulness. |
| *Sustainability reporting* | Biondi and Bracci (2018) | Comparative analysis method (qualitative) | Official documents | There are many elements in common between the different accountability tools that the public sector can use to report non-financial aspects (there is the risk of creating only new labels without real sustainability reporting innovation). The analysis discusses the proposal to merge two or all three reporting tools, but there is also the risk that a single reporting tool covers too much, and that is so broad in scope and content that it neutralizes its own purpose of being easy to read and accessible to non-experts. |
| *Sustainability reporting* | Tommasetti, Mussari, Maione, Sorrentino (2020) | Structured literature review (SLR) | 31 documents relating to sustainability accounting and reporting (SAR) in the public sector | SAR is a young research area. Scholars are approaching SAR in the public sector by privileging the national and local / regional focus in their investigations, with an interdisciplinary approach. From a methodological point of view, prevailing research methods used in the analysed literature are primarily for exploratory and descriptive purposes. Future research on SAR in the public sector could head towards quantitative methodologies and the connection between co-creation of public value and SAR practices in the public sector. |
| *Sustainability reporting* | Nicolò, G., Andrades-Peña, F. J., Ferullo, D., & Martinez-Martinez, D. (2023) | Content analysis | local governments in two Mediterranean countries | Local governments in Spain and Italy have limited online disclosure of information related to the United Nations' Sustainable Development Goals (SDGs) on their official websites. It suggests that these governments have responded to the SDGs by adopting compromise and avoidance strategies, indicating a restrained approach to SDG-related disclosure rather than full alignment with the SDGs. |

**Table 8**
Cluster 3 – Measurement Tools.

| SUB- CLUSTER | AUTHORS | METHODOLOGY | ANALYSIS UNITS | SEARCH RESULTS |
|---|---|---|---|---|
| *Multidimensional indicators* | Monte & Schoier (2020) | Multiple Factor Analysis (MFA) | BES indicators of the Italian provinces | The results of the analysis identify a main dimension that describes approximately 48 % of the total variability between provinces over time. The main dimension explains the socio-economic and environmental aspects: increasing the values of this dimension would have an improvement in Health, Education, Work and life balance, Economic well-being, social relations, Politics and institutions, Landscape and cultural heritage, environment and quality of services. |
| *Multidimensional indicators* | Bova & Śleszyński. (2020) | Surveys. Error test, adequacy test, subjective weight test. | 700 people from the city of Ceccano. | The suggested model (B-BES) is based on the following assumptions: 1) the indicators must reflect the specificities of a given place; 2) the indicators must reflect the specificity associated with local aspirations and preferences (each place has its own objectives and priorities). Therefore, starting from the idea of the Italian Bes, the model assumes that the different public sectors need different levels of information. The involvement of the population is crucial for the local evaluation of the quality of life and sustainability and allows a deeper evaluation of the usefulness of the B-BES model. The empirical results of the case study showed that the B-Bes has a degree of adequacy of 84 %. |
| *Multidimensional indicators* | Urbaniec (2015) | Literature review | Key European and international strategic documents and statistical databases of Poland | The Polish monitoring system for sustainable development is based on numerous strategic documents but, as there is no ad hoc strategy for sustainable development, this system is based on socio-economic indicators which hinder the monitoring of sustainable development and its implementation. There is a strong predominance of social indicators, which may indicate the main priority in Polish politics. In any case, the lack of a strategy makes any evaluation difficult in terms of the achievement of sustainable development goals, progress and stability of the chosen indicators. |
| *Multidimensional indicators* | Pulselli, Ciampalini, Tiezzi & Zappia (2006) | Gini index. Adjusted private consumption. | Province of Siena | The application of the Index of Sustainable Economic Welfare (ISEWI) at the local level has been achieved. The greatest difficulty was the lack of an adequate statistical source to support the construction of indicators other than purely economic or demographic ones. The results for the Province of Siena show a large gap between local GDP and ISEW (about 37 % of GDP). The analysis shows that ISEW could integrate GDP in a society where environmental and social problems are becoming relevant. |
| *Multidimensional indicators* | Ramos & Caeiro (2010) | Meta-evaluation: set of key factors and meta performance indicators | Portugal's National System of Sustainable Development Indicators (SIDS). | A conceptual framework has been developed to design and evaluate the effectiveness of sustainability indicators: it is based on a list of key factors of good practice and on the selection of meta-performance indicators that will allow a more objective and transparent evaluation of activities and of the overall performance monitoring results. The involvement of the public and stakeholders is an essential component of the proposed framework. Despite the advantages of these meta-evaluation tools, they also have some drawbacks: practical difficulties in |

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| SUB- CLUSTER | AUTHORS | METHODOLOGY | ANALYSIS UNITS | SEARCH RESULTS |
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| | | | | their implementation due to the complexity of the sustainability evaluation processes. |
| *Multidimensional indicators* | Davino, Dolce, Taralli & Esposito Vinzi. (2018) | Partial modelling | BES data of the 24 Italian provinces | All the provinces below the first quartile of the BES are in the South and in the islands; 85 % of the provinces in the first quartile of the BES distribution are in the north-east or north-west of Italy. Context domains seem to be less discriminating between northern and southern provinces than the outcome domains. |
| *Multidimensional indicators* | Chelli, Ciommi, Emili, Gigliarano & Taralli (2016) | Factor analysis. Cluster analysis. Construction of composite indicators. Gini concentration index. | 110 Italian provinces. Dataset of 70 indicators divided into 11 domains of well-being. | The factor analysis has enabled to synthesize the 70 BES elementary indicators into 28 factors, by facilitating the comparison of local performances. The indicator resulting from the combination of the factors is a useful tool for explaining and comparing the performance of the Italian provinces in relation to each domain and by highlighting in which BES domain a province reveals strengths or weaknesses. The output of the cluster analysis confirms the gap between central-northern and southern Italy in relation to the indicator of each BES domain. The differences and similarities in terms of welfare profiles between the Italian provinces clearly emerged. |
| *Multidimensional indicators* | Porreca, Rambaud, Scozzari & Di Nicola (2019) | Fuzzy k-mean algorithm. Principal component analysis | 20 Italian regions. BES report 2016 | There is a clear difference between the Northern and Southern regions (except for Lazio and Abruzzo, that are in an intermediate position). Trentino-Alto Adige and Valle d′Aosta have the best conditions, while Molise is the worst region. Some Italian regions are in a state of backwardness about health, environment, minimum economic conditions, subjective well-being, education, social relations and working conditions. Institutions should address these issues considering the local policies. This fuzzy approach provides policy makers with useful indications for planning targeted interventions to improve well-being conditions within the Italian regions and greater awareness of where to carry out these interventions to reduce costs and waste. |
| *Multidimensional indicators* | Jelinčić &Tišma. (2021) | Analysis of documents; interviews. focus group | 13 heritage projects from 6 countries as best practice examples | The projects have shown a positive correlation with different aspects of sustainability but not all the aspects of sustainability are present in all projects. The research confirmed the complexity of ensuring sustainability due to the wide range of aspects of sustainability and its socio-cultural, environmental and economic sublevels. Sustainability is politically important to justify investment. To measure the sustainability of an asset, it is needed a broad set of indicators, to ensure long-lasting and sustainable projects. The indicators are divided into three groups 1) socio-cultural, 2) environment, 3) economic. The identified indicators could be useful to policy makers to prioritize the funding of cultural heritage projects. |
| *Multidimensional indicators* | Mazziotta & Pareto (2016) | Correlation analysis. Principal Components Analysis. | Bes composite indices | Almost all composite indicators are positively correlated with each other with particularly high values, with the exception of the "safety" index. The results of the analysis confirm that the main synthetic well-being indices can be explained by GDP while others, such as those relating to safety and the environment, are almost completely unrelated to this indicator. |

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| SUB- CLUSTER | AUTHORS | METHODOLOGY | ANALYSIS UNITS | SEARCH RESULTS |
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| | | | | At the regional level, GDP fails to capture 30 % of information, i. e GDP does not explain well-being for a percentage of 30 % (in terms of variance). |
| *Multidimensional indicators* | Onori & Jona Lasinio (2020) | Use of Bayesian Networks | 21 Italian regions | Bayesian Networks can be considered as a class of models suitable for the study of multidimensional well-being as they are also able to incorporate geographic information. The analysis shows that almost all the domains are interconnected with geographic dependence (north / south). Only three areas (Health, subjective well-being, Safety) do not show a clear relationship with the geographic area. Furthermore, they are all directly connected with a number of areas between 0 and 4. Quality of work and environment are the most connected and play a central role in the BES system as they can influence many other aspects of well-being. |
| *Multidimensional indicators* | Braulio-Gonzalo, Bovea & Ruá (2015) | Literature review | 786 indicators included | Definition of 73 indicators divided into 14 sustainability categories and 69 specific sub-categories |
| *Multidimensional indicators* | Marszalek-Kawa & Siemiatkowski (2020) | Multidimensional taxonomic analysis methods: linear ordering method, Hellwig's method. | Districts of the Kuyavian-Pomeranian Province | To measure the level of local sustainable development, a synthetic indicator was developed that shows the degree of achievement of the SDGs objectives; this helps to show the differences in the implementation of development strategies between the districts. The relatively large taxonomic distances between the synthetic measures for the individual districts show a significant differentiation between the various parts of the analysed province in terms of local sustainable development. Although the examined parts belong to the same administrative unit, they do not develop at the same pace. The difference between the best and the worst district expressed in the value of a synthetic measure is 0.4165. As regards to the measurement of the level of sustainable development, the maximum value of the synthetic indicator is almost 0.48. This means that all the examined districts have a low or very low level of sustainable development. |
| *Multidimensional indicators* | Miola, Borchardt, Neher & Buscaglia. (2019) | Literature review. Linear regression (R) 2. | 220 papers analysed relating to the Sustainable Development Goals | The nature of interconnections often depends on the context of each country, the level of development, geographic characteristics and other specific policies that define whether a given interconnection constitutes a trade-off or a connection. In general, the SDGs have far more connections than trade-offs. The implementation of the SDGs cannot be treated separately; it should be contextualized in the specific political context that integrates the priorities of the SDGs into a broader context of political priorities. |
| *Multidimensional indicators* | Balaras, Droutsa, Dascalaki, Kontoyiannidis, Moro and Bazzan (2019) | Process of normalization, aggregation and attribution of a total sustainability score by building or district. | 14 EU projects and systems | The method, structured around the 17 SDGs, supports the efforts that municipalities must face to overcome the complexity of measuring urban sustainability; it helps throughout the process to initiate, organize, adapt, evaluate and identify the best sustainable renovation strategies for buildings or neighbourhoods and monitor progress towards achieving sustainability goals. It allows a diagnosis of local sustainability by selecting the most suitable indicators; it allows you to compare the assessments between cities, addresses 7 |

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**Table 8** (*continued*)

| SUB- CLUSTER | AUTHORS | METHODOLOGY | ANALYSIS UNITS | SEARCH RESULTS |
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| | | | | sustainability issues that are described and quantified with 178 sustainability criteria / indicators of which 16 KPIs. |
| *Multidimensional indicators* | Arbolino, De Simone,Carlucci, Yigitcanlar & Ioppolo (2017) | Normalization; Weighting (PCA); Aggregation; Standardization; Sensitivity analysis. | The original dataset is applied to 20 Italian regions. | The research developed an Industrial Environmental Sustainability Index (IESI), which is a composite index (CI), which includes both the activities of government institutions and those of the private sector. Two other sub-indices are also connected, which represent the strategy of public and private subjects and respond to the need of providing important information to the policy maker and represent a useful tool to contribute more to the achievement of the main green objectives in the industrial sector. The index represents the efforts of private and public actors in terms of financial / intellectual efforts related to ecological industrial policies; Subsequently, a comparative analysis between regions is presented that shows that the northern area ranks above the average of the country while the lowest positions are occupied by the southern regions. In general, the results show that in the regions where IESI shows a better performance, there is a connection between public and private action. |
| *Multidimensional indicators* | Bonnet, Coll-Martínez & Renou-Maissant (2021) | Construction of 6 variable selection indices; data normalization; weighting; aggregation. Spatial autocorrelation, multivariate analysis | 96 French metropolitan departments. Sources: various French official institutes | (1) 6 composite indices have been created, relating to 6 domains: environment, sustainable development, energy transition, economic dynamism, social cohesion, governance. (2) Each index was analysed using a cartographic support to compare the performance of each department (spatial analysis); the existence of a spatial dependence in the performance of sustainable development in the French departments between the various indices has been confirmed. A clustering of the various departments into 5 categories based on the level of performance was introduced. In general, given that nearly 50 % of the 96 French departments exhibit low performance in all dimensions of sustainable development, policy makers should make every effort to gradually adopt a new production system based on new modes of production and consumption. |
| *Multidimensional indicators* | Rösch, Bräutigam, Kopfmüller, Stelzer & Fricke. (2018) | Definition of a system of ad hoc indicators. linear projection (distance to target approach). Comparison (distance-goal approach). | 45 monitoring indicators | It has been developed the Sustainability Indicator System (SIS), consisting of 45 indicators to assess whether the policy measures implemented so far by the federal government are appropriate and sufficient to achieve the sustainability objectives defined for the German energy system. The results show that 24 % of the indicators are rated with green (no policy changes are required to achieve sustainability objectives), 45 % with red (political action required to achieve the objectives) and 24 % with a white traffic light (not data). This means that substantial changes in the policy strategies and measures implemented so far are needed to achieve the sustainability goals defined for the German energy system by 2020. |
| *Multidimensional indicators* | Bellantuono, Lagrasta, Pontrandolfo & Scozzi (2021) | Context analysis through Adjusted Mazziotta-Pareto Index and Adjusted Differences Mean Index. | Taranto BES indicators | The study shows that, although the BES framework detects some criticalities of the examined area, it does not identify a territory in crisis. In fact, the problematic situation is not always reflected in a lower territorial performance, neither at the level of individual indicators nor at the level of entire areas, with |

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**Table 8** (*continued*)

| SUB- CLUSTER | AUTHORS | METHODOLOGY | ANALYSIS UNITS | SEARCH RESULTS |
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| | | | | evidence in the economic sphere. The possible reasons can be traced back to the lack of data availability; the lack of specificity of some indicators; the low depth of available data. As proof of this, by comparing the regional data with that of the crisis area, no critical conditions emerge either at a indicators level or at domains level. |
| *Multidimensional indicators* | van Zeijl-Rozema & Martens (2010) | Qualitative analysis. | Limburg case study: ENSURE project | The ENSURE project model demonstrates the importance of linking science and technical expertise to policy for integrated sustainability assessment. For the evaluation of regional sustainability, a multidisciplinary team composed of different groups of stakeholders need to design a general understanding of sustainability and regional dynamics. The indicators alone do not say anything but their reading must be made in relation to the objectives set and interpreted in the context of the system. The model combines the political vision of sustainability (expressed by a framework of indicators) with the systemic vision of sustainability (represented by a map of the region showing the relationships between regional elements). |
| *SDGs* | Janoušková, Hák, Moldan. (2018) | Review of the literature; comparative analysis between the various monitoring reports on the SDGs | Analysis of 4 reports on sustainability monitoring | The analysis of the different reports suggests that two similar indices show very different results. Only experts are generally aware of conceptual and / or methodological differences and therefore understand the differences in results. A striking example of inconsistent results is the SDG index: the EC report places it in 24th place (out of 34) in the ranking of OECD countries evaluated, i.e. among the worst thirds, while a similar SDG index places the same country in fifth. place - very positive - in global competition (among 157 countries evaluated). The SDGs are firmly embedded in a policy framework and their operation has been mainly carried out by indicators: it is necessary for the community of experts to reach full consensus on the framework of indicators and its use. |
| *SDGs* | Coscieme, Mortensen & Donohue (2021) | Principal components analysis | 28 EU Member States | In the EU, environmental objectives are the most complex and least coherent of all SDGs, reflecting the disparate and often unrelated ways in which the environmental issue is defined. However, environmental goals show the fewest trade-offs between policy goals. This suggests that improving coherence within and between environmental objectives will have a very positive and rapid effect in terms of progress towards achieving the objectives versus the social and economic ones. |
| *SDGs* | Martínez-Córdoba, Amor-Esteban,Benito, García-Sánchez. (2021) | X-STATIS study technique with graphical representations in ADE-4 | 3480 observations referred to SDG11 relating to 58 Spanish municipalities | There is a positive trend for the achievement of SDG-11. Critical areas: urban safety, waste management, land use. The results show that there are important differences depending on whether the municipality is led by a mayor with a progressive ideology (more focused on inclusion, environmental issues and infrastructure) or conservative (focused on security and accessible housing). Finally, the impact of the ideological alignment of the local government with that of the Autonomous Community has been verified: the highest values of SDG 11 are obtained from those municipalities governed by the same political party at the regional level. |

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**Table 8** (*continued*)

| SUB- CLUSTER | AUTHORS | METHODOLOGY | ANALYSIS UNITS | SEARCH RESULTS |
|---|---|---|---|---|
| *SDGs* | Martínez-Córdoba, Raimo, Vitolla, Benito. (2020) | Malmquist index and truncated regression model. | Variables referred to SDG6 relating to 356 Spanish municipalities | The evolution of efficiency to achieve SDG-6 has decreased in recent years. The implementation of the SDGs began in 2016, a moment in which local governments showed the worst efficiency performance. The factors that can improve the evolution of the efficiency of Spanish local governments, to achieve SDG-6 in 2030, are: tax increases, introduction of private management of services, higher population density, increase the government budget revenues of local government, increase the income of the inhabitants of the municipality and prevent the fragmentation of local government. That would mean offering more with the same inputs. |
| *SDGs* | Ramos & Laurenti. (2020) | Correlation; Linear regression analysis | 34 indicators taken from the United Nations web page and related to the performance of the Spanish SDGs | Spain is conducting a major energy transition to greener and renewable sources, but its progress is slower than other northern countries. In general, almost 80 % of the significant interactions between SDGs are classified as synergies. SDG 4 (Quality Education), SDG 5 (Gender Equality) and SDG 7 (Affordable and clean energy) are those that contain the greatest number of positive interactions. Some inconsistencies and negative correlations have been found, for example between SDGs 1 and 4. |
| *SDGs* | Staszkiewicz (2019) | Regression | 159 research papers | There is no applied or theoretical model available for an integrated measurement of the sustainable development of all UN goals. So, without a common measurement method, there is no possibility to compare the values created between different sustainable areas and the management of global human activities is subject to decision-making bias. |
| *SDGs* | Koch & Krellenberg. (2018) | Analysis of documents | SDG 11 developed in the project "SDG Indicators for Municipalities", in the German National Strategy for Sustainable Development (GSDS) and defined by 2030-watch.de | From the assessment of the implementation of the UN indicators at the national level, it emerges that all the three initiatives analysed seem to share a common vision of the priorities for sustainable urban development in Germany, which differs widely from the original indicators for SDG 11 established by the United Nations. The limit of the approaches used relates to the international comparability of the progress made in sustainable urban development, based on the indicators of the United Nations. |
| *SDGs* | Spaiser,Ranganathan, Swain & Sumpter (2016) | Factorial analysis; models of dynamic systems | Transnational data relating to the SDGs provided by the World Bank | Economic growth and low debt meet socio-economic objectives (poverty; inclusion) but at the same time hinder the achievement of environmental goals. Moreover, it seems to be only a weak relationship between the various environmental indicators. The results of the analysis suggest that it will be difficult to achieve the SDGs if we continue using the current development model |
| *SDGs* | Ionescu, Firoiu, Tănasie, Sorin, Pîrvu and Manta (2020) | ETS model forecast statistical analysis: forecast analysis, dynamic indicators, trend definition | SDG indicators. Eurostat data | Major steps were taken towards the implementation of the 2030 Agenda in all EU Member States but no country is in the process of achieving all the goals relating to well-being and health. Research results indicate that, on average at EU level, no more than half of the proposed 2030 SDGs can be achieved if the same level of engagement is maintained. If we analyse the individual situation of each Member State, we can see how the percentage of achievement of the objectives varies. |

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**Table 8** (*continued*)

| SUB- CLUSTER | AUTHORS | METHODOLOGY | ANALYSIS UNITS | SEARCH RESULTS |
|---|---|---|---|---|
| *SDGs* | Strologo, D'Andrassi, Paoloni & Mattei (2021) | Quantitative analysis. FORECAST.ETS function. Dynamic index methodology. | Eurostat, Istat data. | As part of the analysis aimed at determining the state of implementation of the SDGs in Italy, it emerges that the country must take urgent measures to fulfil its commitment to the 2030 Agenda. It will have to adopt measures and reforms aimed at reversing the trend of the results of many indicators which, based on the projections, will present negative data by 2030. The analysis conducted in Italy show that strong inequalities still exist throughout the national territory, and this could lead to an increase in social conflicts. The policies adopted to date are, in many cases, worsening the performance in terms of sustainability. From the comparison on the degree of implementation of Italy's SDGs with Poland, Romania and Spain, it emerges that Poland is the best in terms of achieving SDGs, while Romania, Spain and Italy are in a similar situation despite the differences in terms of area of intervention. The analysis showed that it is not enough to analyse the SDGs at the national level, but also at the local level. |
| *SDGs* | Asadikia, Rajabifard, Kalantari (2020) | Boosted Regression Trees Regression Model (Machine Learning and Data Mining Technique) | BS-SDSN (Bertelsmann Stiftung and Sustainable Development Solutions Network) dataset. SDGs scores and SDGs index of 157 countries in 2017, 156 in 2018, and 161 in 2019 (474 total observations) | The ENSURE project model (to develop a framework of adaptable indicators for integrated monitoring of sustainable development) demonstrates the importance of linking science and technical expertise to policy for integrated sustainability assessment. For the evaluation of regional sustainability, it is necessary to have a multidisciplinary team composed of different groups of stakeholders, to design a general understanding of sustainability and regional dynamics. The indicators alone do not say anything but their reading must be made in relation to the objectives set and interpreted in the context of the system. The model combines the political vision of sustainability (expressed by a framework of indicators) with the systemic vision of sustainability (represented by a map of the region showing the relationships between regional elements). |
| *SDGs* | Biggeri, Clark, Ferrannini, Mauro (2019) | Aggregation method based on the Multidimensional Synthesis of Indicators (MSI) approach | Dataset for the 2018 SDG Index provided by Bertelsmann Stiftung and SDSN | The article proposes an "Integrated Sustainable Development Index" (I-SDI), to overcome the limits of the SDG index (it does not consider the integrated nature of the 2030 Agenda). The article draft is accompanied by the comparison between the results of the I-SDI and those generated by the SDG Index, from which significant differences in the results emerge, highlighting the need for a more flexible and integrated measure capable of guiding policy makers and monitoring the general progress. |
| *SDGs* | Schipper, Dekker, de Visser, Bolman & Lodder (2021) | Statistical analysis of variability (ANOVA). | 5 coastal and 5 sand strengthening cases (two groups of case studies) | Creation of the SDG-SIS assessment framework to support coastal policy starting from the 17 SDG. 4 Phases: Define the system characteristics related to the selected cases 2. Consider the 169 SDG targets based on the defined characteristics (selection of SDGs and targets that link to coastal characteristics). 3. Final and personalized selection of SDG-KPIs 4. evaluation based on numerical data, with the Sustainability Impact Score (SIS) as output. the Sustainability Impact Score is a percentage value which is then compared with the SIS "no impact" value, a fictitious benchmark that represents the ideal |

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**Table 8** (*continued*)

| SUB- CLUSTER | AUTHORS | METHODOLOGY | ANALYSIS UNITS | SEARCH RESULTS |
|---|---|---|---|---|
| | | | | and most sustainable state of a case study. SIS = total sum of the individual SDG-KPI results. Potential limit: not certain availability of publicly available data relating to KPIs (data accuracy is required). |
| *SDGs* | Pradhan, Prajal; Costa, Luis; Rybski, Diego; Lucht, Wolfgang; Kropp, Jürgen. (2017) | Non-parametric analysis of Spearman's rank correlation | Official SDG indicators for 227 countries | For each SDG, the positive correlations between the pairs of indicators exceed the negative ones in most countries, and that indicates a solid basis for the successful implementation of the SDG agenda. The analysis shows that SDGs 1 and 3 are the most synergistic and SDG 12 is the goal most associated with trade-offs. Policies that promote synergistic inter-sectoral and goal-related relationships will play a crucial role in the operationalization of the SDG agenda. Furthermore, it emerged that the interrelationships of the SDGs behave differently between various countries: some of them are synergistic, others are in opposition. |
| *SDGs* | Álvarez & García-Fernández (2020) | Comparative statistical analysis using the ETS model | SDG indicators. Eurostat data | Spain needs to take urgent regulatory and public policy measures to honor its commitment to the 2030 Agenda. Otherwise, most of the Spanish indicators will not reach European average values in most objectives, including relevant areas such as the struggle for education or the environment. |
| *SDGs* | Raszkowski & Bartniczak (2019) | Dynamic analysis methods. Individual dynamic indices. | 73 national sustainability indicators provided by Statistics Poland | There is an optimistic situation in terms of achieving the objectives of the 2030 Agenda in Poland. In the case of 57 indicators out of 73 in total, the direction of the expected changes was positive. |
| *SDGs* | Cling, Eghbal-Téhérani, Mathieu & Plateau. (2020) | Principal Component Analysis (PCA); hierarchical cluster analysis (HCA) | EU dashboard indicators - 2018 | The results of the analysis show that the interconnections between EU sustainable development indicators and the differences between EU countries for these indicators are both quite strong. There are strong interconnections between social and economic indicators, while the correlation between environmental indicators and the rest is weak. Finally, the clustering of European countries clearly reflects the differences between "rich" and "poor" countries. |
| *SDGs* | Guerrero, O. A., Castañeda, G., Trujillo, G., Hackett, L., & Chávez-Juárez, F. (2022) | agent-based computational model | Country of Mexico and its 32 states | achieving sustainable development relies on both subnational policy implementation and the effective allocation of resources across regions. It estimates the development gaps that are likely to persist in Mexico by the year 2030 and determines how these gaps can be minimized through an optimal distribution of federal transfers. Importantly, the distribution of these transfers depends on the specific development objectives set by the national government and on the interdependencies between the varying characteristics of the states. |

on the contrary, prefer the aggregation of a multitude of variables within a single index. This issue is particularly relevant concerning the location of the data: more fragile territorial areas coexist in the same State, characterized by specific/sectoral problems, concerning which the same indicators used to measure other territories could be more effective. Generic indicators should be declined or sub-segmented into more specific indicators to accurately detect the problems that affect a territory (i.e., we can think of the specific characteristics of coastal or mountain territories). In this way, territorial policies will be more calibrated, and there will be a more efficient use of public resources (Table 8).

#### *4.1.4. Fourth cluster analysis: public-private partnerships*

The fourth identified cluster includes studies on Public-Private Partnerships concerning three specific aspects: partnership policies, projects for sustainable development and Pay by Result (PbR) tools. In particular, the "partnership policies" sub-cluster includes a discussion of the role of the public sector, the private sector and other possible actors within the partnerships, including their respective advantages and benefits for the community; the "projects for sustainable development" category includes documents focused exclusively on the description of PPPs implemented in Europe; finally, the third sub-cluster contains the works relating to the topic of social impact bonds and pay by result instruments, their functioning and the definition of their characteristics.

The most evident proof of the analysis of this cluster lies in the actual lack of innovative systemic results. Most of the material collected is related to the analysis of case studies and best practices implemented in Europe in recent years.

In general, all authors agree that individual institutions (public and private) and alliances play an essential role in shaping and stimulating sustainable development; however, while there is consensus on the importance of partnerships for achieving shared goals, there are few practical cases of multi-stakeholder partnerships aimed at strengthening the partnership capacity of a wide range of relevant stakeholders.

Alongside the analysis of the roles assumed by the protagonists of the partnership, i.e., the public sector as a promoter of a project and the private sector as the contributor, the literature emphasizes the importance of the presence of a third figure who acts as an operational arm in sustainability projects: the third sector. The third sector is a crucial partner because it has necessary and specific skills, especially in interventions dedicated to inclusion and improving social well-being.

From an operational point of view, there is great interest in pay-by-result instruments and, in particular, in social impact bonds (SIBs); public-private partnerships very often work through SIBs. The strengths identified in the literature mainly concern the measurability of the impacts generated, the replication of projects and the ability to attract different types of investors.

Some authors, after analyzing and comparing the characteristics of social impact bonds and PPPs, have shown that SIBs and the PbR model can be perfectly overlaid on other partnership architectures based on SDGs. However, this topic of literature needs further investigation (Table 9).

### *4.2. Green economy and public spending: emerging trends*

The process that follows the clusterization of sustainability-related topics in the public sector in four categories was put into relation to semantic maps related to the environment.

The logic behind this analysis must be sought in the awareness that today, policymakers from all over the world are oriented toward the search for sustainable solutions mainly linked to environmental aspects, such as uncontrolled climate change (Zhang et al., 2021) because private capitals seem to be not enough to produce groundbreaking solutions (Wu et al., 2021).

In this context, researchers have shown that the development of green finance (Liu and Tang, 2022) and green financial policies and regulations (Lamperti et al., 2021) can promote the modernization of industrial structure and society by mitigating climate change.

The prevalence of green-focus words can shed light on the level of attention given to environmental issues in the literature on sustainability topics in the public sector.

Therefore, to understand the greenness of our sample, we develop a coverage per article analysis through the R software, with the packages "tm" and "quanteda" that provide functions useful for the preprocessing and analysis of text data, including the calculation of word counts and frequency distributions (Hart et al., 2020; Müller, 2020). The output allows an understanding of the intensity with which different thematic areas considered within each cluster are addressed. The R code is available upon request. Text mining approaches, aided by R software packages "tm" and "quanteda," were utilized to preprocess and analyze the text data, including calculating word counts and frequency distributions. The coverage scores were determined by counting the occurrences of specific green-related terms mentioned in each article. This approach enabled an understanding of the intensity with which different green thematic areas were addressed within each cluster.

To identify all topics related to green aspects in our sample, we followed the approach of Chinn et al. (2020), in which they defined some topic dictionaries (or topic areas) and some related words.

The total number of strings analyzed is 92, of which three simple strings cover environmental elements such as "environment", "emissions" and "green". These strings were further paired with other words to have greater semantic relevance, for instance, "green climate fund", "green investments", "green financing" and "carbon emissions". Single strings such as "green" could be used within a context not relevant to the analysis (such as the evaluation of a variable with color codes - green, yellow or red). Also, the word "environment" has a connotation related to "context" and not to "ecology".

Then, we resumed all 92 words in some thematic areas and listed every article in our sample in which at least one of the words from these topic areas occurs as belonging to that topic.

In particular, we defined six thematic areas related to the greenest trending topics analyzed by the literature:

**Table 9**
Cluster 4: PPP.

| SOTTO CLUSTER | AUTHORS | METHODOLOGY | ANALYSIS UNITS | SEARCH RESULTS |
|---|---|---|---|---|
| *Partnership policies* | Alińska, Filipiak & Kosztowniak (2018) | Linear Regression Model (CLRM). Vector Error Correction Model (VECM). | Poland | Individual institutions (public and private) and partnerships play an important role in shaping and boosting sustainable development, by using specific tools and funding. Economic growth is significantly influenced by government actions: research confirms that there is a public sector impact on sustainable economic growth through public policy tools aimed at GDP growth (significant factors are spending policy and investment spending). The policy of partnerships between financial institutions and the public sector can justify the need to integrate private and state spending. The model analysis indicates that in countries of systemic transformation, such as Poland, it is important to stimulate consumer spending, since it has a share of about 40 % of GDP and has a positive impact on sustainable development. |
| *Partnership policies* | Horan (2019) | Qualitative comparison between two partnership "portfolios" | PPPs registered on the UN Department of Economic and Social Affairs (UNDESA) online platform | It is important to implement partnerships between winners and losers, to create support and adopt appropriate policies, and to start the necessary transformation to achieve the SDGs. In addition, PPPs may be needed to facilitate transformation, for example to incentivize low-carbon technologies. Finally, long-term transnational partnerships may be needed, for example for wind and solar energy. An example of a partnership to support transformation is the Just Transition Fund, which aims to create economic opportunities for communities on the front lines and most affected workers by the transition from coal. |
| *Partnership policies* | Grotenbreg & Buuren (2018) | Semi-structured interviews; document analysis; direct observations | 40 stakeholders and public documents related to 4 Dutch PPPs | The degree of success of the 4 PPPs is different: The Oosterscheldekering case is the most successful one and all administrative capacities have been used. The capacities employed by public authorities to support innovation and projects are: Financial contributions (The availability of a large grant was a success factor in the Oosterscheldekering case and the lack of public funding is a major obstacle in the other cases); data sharing; coordination skills; regulatory power. |
| *Partnership policies* | Kamphof & Melissen (2018) | Collection of feedback and recommendations. interviews. multi-stakeholder seminar. | Professionals, experts, policy makers and international academics | SDG partnerships acquire a greater diplomatic and qualitative dimension, compared to 21st century PPPs, as they are co-creations of governments and companies working towards commonly understood global objectives with defined roles: governance for the public sector and enforcement for the private sector. The findings suggest that more public sector effort is needed to achieve the SDGs in terms of empathy, understanding of corporate sector identity, concerns, norms and habits. Furthermore, it is important to consider that companies have profit-oriented business models and therefore long-term sustainability goals should not hinder short-term business goals. Finally, the time factor for companies is more relevant than for the public so "too much governance" could discourage them. |
| *Sustainable development projects* | Bossink (2002) | Literature reviews, interviews, case studies | Interviews with 62 sustainable building experts; Case study on 6 sustainable building projects | The elements of a sustainable construction government policy are: environmental policy plans, performance-based laws and regulations: the government defines the level of performance; local authorities and individuals must work in line with the defined level; public-private arrangements (guarantees; financial incentives). Sustainable construction projects are developed by multidisciplinary teams who are activated at the start of the project and are stimulated to brainstorm their contributions to the sustainable innovation process. |

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**Table 9** (*continued*)

| SOTTO CLUSTER | AUTHORS | METHODOLOGY | ANALYSIS UNITS | SEARCH RESULTS |
|---|---|---|---|---|
| *Sustainable development projects* | Chaves-Avila, Gallego-Bono(2020) | Qualitative analysis | Key policy papers, experts, mail questionnaires and focus groups. 21 in-depth case studies of the "best public policy cases". | The new PPFSE policy model focuses on transformative change, it follows the governance approach of the public-community partnership, the mainstream approach in the sense of a broader political context, and it is innovative in terms of means and complex systematization of strategies. Differences in terms of different approach to the construction of ES policies, different policy tools used, different degree of integration of ES policies into general government policy. Critical factors in the implementation of these policies: difficulties in the implementation of the partnership approach; in the deployment of the policy-mainstreaming approach; in the acceptance of the SE by all policymakers. |
| *Sustainable development projects* | Moreno-Serna,Purcell, Sánchez-Chaparro, Soberón, Lumbreras, Mataix. (2020) | Analysis of documents; Interviews; workshop | Partnership "El dia despues" formed: Iberdrola, itdUPM, ISGlobal and SDSN Spain | El día después is defined as a partnership incubator. The results reveal that to foster sustainability-oriented PPPs and fuel impact-oriented projects aimed at advancing the SDGs, it is necessary to have a very flexible collaborative agreement, with all partners acting as facilitators. The strengths of the project are: Evolutionary logic and facilitation function distributed among all partners; No tendency to formalization: governance or contributions based on trust, common culture but non-permanent work structures, interaction of new flexible and agile organizations; active participation of the private sector and policy makers, combined with academia and civil society. |
| *Sustainable development projects* | Ferrer-Roca, Guia& Blasco (2020) | Interviews; Multistakeholder workshop | 51 Stakeholders in the cross-border region of the Cerdanya Valley | Cross-border partnerships for SDGs must be able to activate institutional similarities and they have to know the barriers created by institutional differences and the methodological nationalism of local administrations in border areas. SDG8 and SDG10 are prioritized by business-led partnership, which must seek collaborative extensions with other actors in both neighbouring countries (SDG17). |
| *Sustainable development projects* | Koscielniak & Gorka (2016) | Document analysis | 35 PPP projects implemented in the Silesia region | From the analysis of the implemented PPPs, it seems that most of the resources have been used for the sports, tourism and recreation sector. Urban regeneration projects rank second, while transport and communications are third. The main problem encountered relates to the bureaucratic procedures necessary to conduct the entire project selection protocol. Furthermore, it is extremely difficult to prepare PPP projects within the defined frameworks and times, such as the EU Calls. Regarding cities implementing PPP projects, Częstochowa presented 6 projects, Żory - 5 projects and Katowice - 4 projects. |
| *Sustainable development projects* | Stafford-Smith, Griggs, Gaffney, Ullah, Reyers, Kanie, Stigson, Shrivastava, Leach & O'Connell. (2017) | Qualitative analysis approach. | SDGs | The article presents an integrated approach on the means of implementation of the objectives identified by SDG 17. It provides a synthesis of the 7 main means of implementation by associating each with the key challenges, the necessary link with one or more of three areas (sectors, country, actors), and related global and national recommendations. The 7 categories of means of implementation must form a virtuous system (implemented in an integrated way), in which all address integration issues in a coherent and self-reinforcing way. Both the objectives and the means of implementation themselves (global governance challenge) need to be integrated. |

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**Table 9** (*continued*)

| SOTTO CLUSTER | AUTHORS | METHODOLOGY | ANALYSIS UNITS | SEARCH RESULTS |
|---|---|---|---|---|
| *PBR* | Kabli, Rizzello,Trotta. (2021) | Document analysis | 4 Impact Bonds: 1 DIB (Educate Girls) and 3 SIB launched in different geographical areas of the world such as USA, China, France and Russia | The paper analyses the opportunities related to the adoption of SIB in the field of education;<br>First, the ability to measure results makes it possible to attract financial support; secondly, the replicability of the SIB structure makes it possible to attract different types of investors. More generally, the role of IBs in attracting private capital for the education sector could be the main alternative to the public budget. For these reasons, in a post-COVID world, they represent an essential tool for communities in mitigating the negative impacts produced by the pandemic. |
| *PbR* | Rizzello & Kabli (2020) | Document analysis | 4 SIBs related to various social issues: London Homeless Social Impact Bond; DWP * Round II of the Innovation Fund; The Ashaninka DIB; Educating girls | The key processes through which SDG-based partnerships can create additional value are: defining and evaluating the collaborative advantage of the partnership; structuring of financing and implementation of the partnership; measurement and evaluation of the final value. The phases and activities of the SDG-based partnerships resulting from the literature match perfectly with those of each case study analysed. This allows SIBs to be included in the financial partnership schemes for the SDGs. |
| *PbR* | Fraser, Tan, Lagarde & Mays (2018) | Literature review | 101 documents relating to SIBs | Three main themes have been identified in the literature: the first concerns public and private values competing with each other, i.e. the extent to which the public sphere should be influenced by the values of the private sector and vice versa; the second theme concerns the introduction and the importance of measuring the results in the contracting of public services thanks to financing mechanisms such as SIBs; the third theme concerns the transfer and calculation of risk between the different actors through SIB mechanisms and the ideological and practical implications that this can have for specific services and policies more generally. |

- Green regulatory framework, in which words converge that refer to the semantic domain of policy or a specific regulatory framework, such as environmental policy (occurs 130 times) or UNEP (occurs 36 times);
- green project-specific, which includes all words that refer to specific projects aimed at promoting green change or mitigating and solving the most affected problems related to environmental issues, such as emissions (363 times) or energy (1621 times);
- green problem-oriented, in which all the more general terms related to environmental issues converge, such as climate change (which is used 211 times) or environmental (150 times);
- green accounting, budgeting and reporting, into which all terms related to operational, accounting and communication management of environmental issues fall, such as environmental reporting (used 87 times);
- green finance and products, in which all terms related to purely financial aspects are included, such as green investments (repeated 30 times);
- green indicators, in which all terms related to the evaluation and measurement of the adopted green solutions are grouped, such as environmental assessment (occurs 80 times) and environmental results (33 times).

Finally, we analyze the four main clusters through a green lens, trying to understand the relationship between each cluster and each green thematic area (Table 10).

The quantitative analysis identified the distribution of green focus in each cluster based on the frequency of specific green-related terms within the papers.

Papers that fall into cluster 1 have the most references related to the "green problem-oriented" thematic area since they first analyze and recognize problems related to the environment and then try to develop ad hoc policies. Cluster 1, focused on sustainable development planning, showed a higher emphasis on terms such as "environmental policies," "green economy," and "green policies" which underscores the commitment of these publications to finding solutions that balance economic growth with environmental protection. The authors discuss the need to prioritize green and sustainable policies that align with the SDGs, with particular attention to energy and climate change issues. Researchers have recognized the importance of integrating environmental policies and programs such as UNEP, the United Nations Environment Programme referenced in several studies, into planning processes to ensure effective measures to combat climate change and reduce emissions.

Cluster 2, which revolved around sustainability accounting, exhibited several publications discussing the allocation of resources and financial commitments by local authorities to address environmental issues. The studies explore the relationship between budgetary decisions and their impact on the environment, as well as the effectiveness of financial policies in mitigating climate change and reducing environmental impacts. Some researchers in this cluster have focused on analyzing greenhouse gas emissions and their connection to fiscal and budgetary measures. They investigate causal relationships between emissions and various fiscal tools, aiming to understand how countries can better address climate change through financial means (Florea et al., 2021). Moreover, several studies emphasize using social and environmental indicators to evaluate public spending. These indicators are often used to assess the effectiveness of budgetary allocations and to measure progress toward achieving sustainable development goals. One paper also provides a specific analysis of environmental accounting (De Matteis et al., 2021). Although insignificant in terms of frequency, Environmental accounting can offer valuable insights into the actual costs and benefits of policies and projects, leading to better-informed decision-making that supports environmental protection and renewable energy-related policies.

Cluster 3, dealing with measurement tools, showcased a prominence of green-focus words such as "energy", "green and public spaces", "renewable sources" and "environmental protection" highlighting the cluster's attention to green technologies and environmentally friendly projects. It suggests a commitment to finding solutions that support ecological balance, reduce emissions and minimize environmental degradation. Furthermore, the cluster's research encompasses comparative analyses between regions and countries, identifying variations in environmental project performance. Terms like "North/South divide" underscore the authors' interest in exploring regional disparities and proposing targeted interventions for achieving sustainable outcomes. In this cluster, references to the green indicators theme are present but not predominant: this means that the measurement tools developed by the public administration are mainly focused on the social pillar or comprehensive sustainability, not only the environmental aspect.

Cluster 4 centers the attention around sustainable partnerships and impact-oriented projects; it exhibits a higher prevalence of green-focus words such as "energy," "climate," "climate.change," "environmental.policies," "emissions," and "environmental.domain." The prominence of "energy" highlights the significance of sustainable energy solutions within the context of these partnerships and projects. The frequent mentions of "climate" and "climate.change" underscore the focus on addressing climate-related challenges and their impacts. Including "environmental.policies" and "emissions" emphasizes the integration of environmental considerations and efforts to measure and reduce emissions within the initiatives. These prevalent green-focus words align with the topics covered in this cluster's publications, indicating a strong commitment to addressing environmental and climate-related issues through collaborative and impact-driven approaches.

The observed emphasis on case studies related to stand-alone green projects may be attributed to their practicality and real-world applicability, making them more accessible for research purposes. Case studies provide tangible examples and outcomes of sustainability initiatives in public administrations. On the other hand, the relative lack of focus on financing methods such as green bonds or green finance could be due to challenges in obtaining detailed financial data, limited availability of case studies on such financing instruments in the public sector, or potential research interests that prioritize tangible project outcomes over financial mechanisms.

## 5. Conclusion

This work analyzed the main research trends on sustainable finance in the public sector, exploring the approaches and tools that

**Table 10**
Coverage per article summary.

| CLUSTER | GREEN REGULATORY FRAMEWORKS | GREEN PROJECT-SPECIFIC | GREEN PROBLEM-ORIENTED | GREEN ACCOUNTING, BUDGETING & REPORTING | GREEN FINANCE & PRODUCTS | GREEN INDICATORS | TOTAL |
|---|---|---|---|---|---|---|---|
| CLUSTER 1 | 87 | 123 | 147 | 11 | 17 | 33 | 418 |
| CLUSTER 2 | 80 | 227 | 242 | 36 | 8 | 85 | 678 |
| CLUSTER 3 | 74 | 1617 | 514 | 77 | 19 | 109 | 2410 |
| CLUSTER 4 | 54 | 197 | 127 | 2 | 17 | 14 | 411 |
| TOTAL | 295 | 2164 | 1030 | 126 | 61 | 241 | |

can be adopted and adopted by the public administration in the last 30 years, with specific reference to the European context. The analysis was developed using a systematic literature review relating to a final sample of 82 works, appropriately constructed by defining a series of inclusion criteria.

The descriptive analysis shows how the interest of researchers towards these issues is a relatively recent phenomenon, prompted by the actions and pressures of the international and European community: in fact, most of the collected works were published after 2015, with a trend exponential in recent years. Furthermore, much of the material is of a technical/applicative nature, and, for the most part, oriented towards the definition of new measurement tools or the adaptation of existing frameworks.

The main perspectives on which the literature focuses can be traced back to 4 clusters: measuring tools (46 %), planning for sustainable development (19 %), sustainability accounting (18 %), and PPP (17 %).

The analysis of unexplored or unsolved research questions represents the main contribution of this work, helpful in orienting future research in a functional way to meet the needs of policymakers.

The conducted systematic review shows that the research is currently at an early stage of exploration; a more significant effort of analysis is needed, both from the perspective of measuring the impact of public policies and in the budgeting of public spending, also from a public-private partnership perspective.

In particular, the strategic planning process of the public administration does not support the substantial integration of sustainability aspects in land management; furthermore, there is no link between strategic planning of sustainability and financial planning of public spending; however, some pilot initiatives have emerged, developed mainly at the local level, which could lead the way, and be replicated at multiple levels in an integrated way, within a more structured framework.

From the accounting point of view, research analyses the efficiency of public spending, especially concerning defined environmental policies; in fact, there is a lack of analysis that integrates environmental and social accounting with financial accounting; the perspective regarding the measurement of the impacts generated by the public investments made and the transparent disclosure methods is also limited.

The literature tends to focus more on the topic of measurement and the definition of sustainable development indicators - or some individual aspects of sustainability; the opinions on the set of "ideal" indicators to measure and monitor the sustainability reached and pursued by the P.A. are very discordant: there are those who lean towards the construction of a few synthetic indicators and those who, on the contrary, believe in the need to have a multitude of indicators specialized in a single sector. Some promote the adoption of a national framework to be applied to different territorial levels, and those, on the contrary, tend towards the definition of specific measurement tools capable of reflecting the characteristics of the individual territory. There is a need to continue the studies aimed at defining a model that can anchor tailor-made indicators to universal frameworks that are comparable in time and space.

Finally, the literature on the strategic role of public-private partnerships and pay-by-result financial architectures is still young: most of the literature is conceptual and focused on cost-benefit theories and analysis. At the same time, other specific works for experiments lack in formulating models of universal validity.

A transversal reading of the evidence that emerged can be helpful in the development of the literature that can combine research needs - towards less explored perspectives - with those of policymakers - interested in finding new models and tools to integrate sustainability in public policies.

In this perspective, the indications of this study converge in a natural synthesis, highlighting the vital interrelationships between the various research clusters that have been identified. The common thread can be traced to the need to adopt a strongly holistic and transversal approach to the various fields of investigation; it is not possible to implement correct sustainability strategies without considering the financial planning of public expenditure; this approach, however, requires integrated accounting models which, to date, are lacking in the public administration; these models are an indispensable condition for a correct measurement of the impact and the measurement frameworks influence them; public strategies of sustainability, accountability, measurement and disclosure are the levers to establish credible and effective public-private partnerships.

The systematic literature review revealed the prevalence of environmental aspects in each cluster, with energy and climate change prominently mentioned across all clusters. The emphasis on case studies indicates the practical significance of green projects in public administrations. At the same time, the relative lack of focus on specific financing methods calls for further research and attention to innovative green finance instruments. Addressing the identified research gaps is crucial for advancing sustainability efforts in

European public administrations, promoting green investments, and fostering informed decision-making for a greener and more sustainable future. Finally, the literature review revealed several research gaps and limitations. One significant gap is the need for more comprehensive investigations into the effectiveness and impact of specific green finance instruments, such as green bonds, in supporting sustainability initiatives in public administrations. Additionally, there needs to be more research on integrating sustainability into overall financial management practices within the public sector. Further studies are essential to understand the potential risks and challenges associated with green finance implementation and to develop practical guidelines for policymakers and practitioners.

## Conflict of interest

None.

## Data availability

Data will be made available on request.

## References


Allen, C., Metternicht, G., Wiedmann, T., 2018. Initial progress in implementing the Sustainable Development Goals (SDGs): a review of evidence from countries. Sustain. Sci. 13, 1453–1467.

Balaras, C.A., Droutsa, K.G., Dascalaki, E.G., Kontoyiannidis, S., Moro, A., Bazzan, E., 2019. Urban sustainability audits and ratings of the built environment. Energies 12 (22), 4243.

Barkemeyer, R., Figge, F., Hoepner, A., Holt, D., Kraak, J.M., Yu, P.-S., 2017. Media coverage of climate change: an international comparison. Environ. Plan. C: Polit. Space 35 (6), 1029–1054.

Biondi, L., Bracci, E., 2018. Sustainability, popular and integrated reporting in the public sector: a fad and fashion perspective. Sustainability 10 (9), 3112.

Bonnet, J., Coll-Martínez, E., Renou-Maissant, P., 2021. Evaluating sustainable development by composite index: evidence from french departments. Sustainability 13 (2), 761, 2021.

Chinn, S., Hart, P.S., Soroka, S., 2020. Politicization and polarization in climate change news content, 1985-2017. Sci. Commun. 42 (1), 112–129.

Crossan, M.M., Apaydin, M., 2010. A Multidimensional Framework of Organizational Innovation: A Systematic Review of the Literature. In: Journal of Management Studies, vol. 47. Wiley Blackwell, pp. 1154–1191 (September).

Dervi, U.D., Khan, A., Saba, I., Hassan, M.K., Paltrinieri, A., 2022. Green and socially responsible finance: past, present and future. Manag. Financ. 48 (8), 1250–1278.

European Commission, 2018. Action plan to finance sustainable growth, COM (2018) 97, 8 March 2018, p. 2: ⟨https://bit.ly/2xL9OrF⟩.

European Commission, 2020a. Plan for the recovery of Europe. ⟨https://ec.europa.eu/info/strategy/recovery-plan-europe_it⟩.

European Commission, 2020b. Investment Plan of the European Green Deal and Just Transition Mechanism, Brussels. ⟨https://ec.europa.eu/commission/presscorner/detail/it/qanda_20_24⟩.

Falagas, M.E., Pitsouni, E.I., Malietzis, G.A., Pappas, G., 2008. Comparison of PubMed, Scopus, Web of Science, and Google Scholar: strengths and weaknesses. FASEB J. 22 (2), 338–342.

Ferreira, G.V., Pié, L., Terceño, A., 2018. A systematic literature review of bio, green and circular economy trends in publications in the field of economics and business management. Sustainability vol. 10 (11), 4232.

Florea, N.M., Meghisan-Toma, G.M., Puiu, S., Meghisan, F., Doran, M.D., Niculescu, M., 2021. Fiscal and budgetary policy efforts towards climate change mitigation in Romania. Sustainability vol. 13 (issue 5), 1–18, 2021.

Hart, P.S., Chinn, S., Soroka, S., 2020. Politicization and polarization in COVID-19 news coverage. Sci. Commun. 42 (5), 679–697.

Hoang, Y.H., Ngo, V.M., Vu, N.B., 2023. Central bank digital currency: a systematic literature review using text mining approach. Res. Int. Bus. Financ. Vol. 64 (2023), 101889.

Ionescu, G.H., Firoiu, D., Tănasie, A., Sorin, T., Pîrvu, R., Manta, A., 2020. Assessing the achievement of the SDG targets for health and well-being at E.U. Level by 2030. Sustainability 2020 12 (14), 5829.

Joint Research Centre, 2021. European SDG voluntary local reviews.

Karami, A., Lundy, M., Webb, F., Dwivedi, Y.K., 2020. Twitter and research: a systematic literature review through text mining. IEEE Access vol. 8, 67698–67717.

Keathley-Herring, H., Van Aken, E., Gonzalez-Aleu, F., Deschamps, F., Letens, G., Cardenas Orlandini, P., 2016. Assessing the maturity of a research area: bibliometric review and proposed framework. Scientometrics 109 (2), 927–951.

Khan, A., Hassan, M.K., Paltrinieri, A., Dreassi, A., Bahoo, S., 2020. A bibliometric review of takaful literature. Int. Rev. Econ. Financ. 69, 389–405.

Kitchenham, B., 2004. Procedures for Performing Systematic Reviews. Technical Report TR/SE-0401, Department of Computer Science, Keele University, U.K.

Lamperti, F., Bosetti, V., Roventini, A., Tavoni, M., Treibich, T., 2021. Three green financial policies to address climate risks. J. Financ. Stab. Volume 54, 100875.

Liu, Q., Tang, L., 2022. Research on the accelerating effect of green finance on the transformation of energy consumption in China. Res. Int. Bus. Financ. 63, 101771.

Lozano, M.B., Martínez-Ferrero, J., 2022. Do emerging and developed countries differ in terms of sustainable performance? Analysis of board, ownership and country-level factors. Res. Int. Bus. Financ. 62, 101688.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G., The PRISMA Group, 2009. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLOS Med. 6 (7), e1000097.

Müller, S., 2020. Media coverage of campaign promises throughout the electoral cycle. Political Commun. 37, 696–718.

Niñerola, A., Ferrer-Rullan, R., Vidal-Suñé, A., 2020. Climate change mitigation: application of management production philosophies for energy saving in industrial processes. Sustainability vol. 12 (2), 717.

OECD, 2019. Managing sustainable development goals and guiding principles.

Paltrinieri, A., Hassan, M.K., Bahoo, S., Khan, A., 2023. A bibliometric review of sukuk literature. Int. Rev. Econ. Financ. 86, 897–918.

Puglisi, R., Snyder Jr, J.M., 2011. Newspaper coverage of political scandals. J. Polit. 73 (3), 931–950.

Ren, Y.-S., Ma, C.-Q., Chen, X.-Q., Lei, Y.-T., Wang, Y.-R., 2023. Sustainable finance and blockchain: a systematic review and research agenda. Res. Int. Bus. Financ. 64, 101871.

Tommasetti, A., Mussari, R., Maione, G., Sorrentino, D., 2020. Sustainability accounting and reporting in the public sector: towards public value co-creation? Sustainability 12 (5), 1–19.

Tranfield, D., Denyer, D., Smart, P., 2003. Towards a methodology for developing evidence: informed management knowledge by means of systematic review. Br. J. Manag. vol. 14 (3), 207–222.

Venkatesh, V., Davis, F.D., Morris, M.G., 2007. Dead or alive? The development, trajectory and future of technology adoption research. J. Assoc. Inf. Syst. vol. 8 (4), 267–286.

Vieira, E.S., Gomes, J.A.N.F., 2009. A comparison of Scopus and Web of science for a typical university. Scientometrics 81 (2), 587–600.
Wu, M., Wu, J., Zang, C., 2021. A comprehensive evaluation of the eco-carrying capacity and green economy in the Guangdong-Hong Kong-Macao Greater Bay Area, China. J. Clean. Prod. Volume 281, 124945.
Zhang, D., Mohsin, M., Rasheed, A.K., Chang, Y., Taghizadeh-Hesary, F., 2021. Public spending and green economic growth in BRI region: Mediating role of green finance. Energy Policy Volume 153, 112256.

## Web references

EndNote. Available at: ⟨https://endnote.com/⟩.
OECD (2021) Measuring the distance to the SDGs in regions and cities. Available at: ⟨https://www.oecd-local-sdgs.org/⟩.
Rayyan. Available at: ⟨https://www.rayyan.ai/⟩.

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# Sommario n. 2/2020

# Un Modello di Impact Finance per i Comuni: il Piano Strategico di Mandato BES-Oriented[1]

Mario La Torre[*], Lorenzo Semplici[**],
Jenny Daniela Salazar Zapata[***]

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**Sommario**

Il presente lavoro propone un modello di Impact Finance per i Comuni italiani, utile a coniugare le politiche di bilancio delle amministrazioni locali con gli obiettivi sociali ed ambientali riconducibili agli indicatori di Benessere Equo e Sostenibile. Nello specifico, il Piano Strategico di Mandato BES-Oriented prevede: (i) un'analisi di contesto utile a definire il posizionamento BES del Comune, (ii) un'analisi di bilancio pubblico BES-Oriented, utile a definire l'impatto diretto delle politiche di bilancio sui temi sociali ed ambientali (iii) una matrice che consente una lettura combinata del posizionamento e del bilancio, (iv) l'utilizzo delle interazioni fra domini BES per valutare gli impatti indiretti delle politiche di bilancio sugli aspetti sociali ed ambientali. Il modello proposto consente alle Amministrazioni locali di definire priorità strategiche ed obiettivi di impatto ed in particolare di: adottare delle strategie di welfare in relazione ad un benchmark; collegare l'attivazione di specifiche progettualità in maniera sinergica, riferendole ad una o più voci di spesa pubblica ed al relativo dominio BES che ad esse viene associato; valutare l'impatto diretto che la pianificazione comunale ed i singoli progetti hanno sui conti pubblici; individuare

[1] Il paper è realizzato nell'ambito del progetto di ricerca "Finanza sostenibile e Amministrazioni locali: dalla teoria all'azione", co-finanziato dalla SNA - Scuola Nazionale dell'Amministrazione, nel quadro del programma di ricerca "Progetti per una nuova Pubblica Amministrazione - Raccolta di idee per orientare il cambiamento delle amministrazioni pubbliche" (2020-2021). www.sna.gov.it

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ulteriori dimensioni di benessere sulle quali un investimento impatterà indirettamente, offrendo un quadro complessivo dell'impatto in termini di miglioramento delle condizioni di vita dei cittadini; calcolare gli impatti diretti ed indiretti sulla spesa pubblica (effetto moltiplicatore).

*Parole chiave: bilancio dei comuni, BES, impatto sociale e ambientale*

**Abstract**

*An Impact Finance Model for Municipalities: the BES-Oriented Strategic Mandate Plan*

This paper proposes an Impact Finance model for Italian Municipalities, useful for combining the budget policies of local administrations with social and environmental objectives attributable to the Fair and Sustainable Wellbeing (Benessere Equo e Sostenibile, BES) indicators. Specifically, the BES-Oriented Strategic Mandate Plan provides: (i) a context analysis useful for defining the BES positioning of the Municipality, (ii) a BES-Oriented public budget analysis, useful for defining the direct impact of fiscal policies on social and environmental issues (iii) a matrix that allows a combined reading of the positioning and the budget, (iv) the use of interactions between BES domains to evaluate the indirect impacts of fiscal policies on social and environmental aspects. The model allows local administrations to define strategic priorities and impact objectives and in particular to: adopt welfare strategies in relation to a benchmark; connect the activation of specific projects in a synergistic manner, referring them to one or more public expenditure items and to the related BES domain that is associated with them; evaluate the direct impact that municipal planning and individual projects have on public accounts; identify additional dimensions of well-being on which an investment will indirectly impact, offering an overall picture of the impact in terms of improving the living conditions of citizens; calculate the direct and indirect impacts on public spending (multiplier effect).

*Key words: balance sheet of municipalities, BES, social and environmental impact*

## 1. Introduzione

Le Amministrazioni Pubbliche, per loro mandato, hanno come *mission* prioritaria quella di migliorare il benessere della collettività; un compito complesso ed articolato, in continua evoluzione, che necessita di una pluralità di competenze tecniche, gestionali e di visione. L'attività di un'amministrazione locale deve rispondere ad una serie di interrogativi utili ad impostare la propria offerta di beni, servizi e progettualità in coerenza con la domanda dei cittadini. Quali sono le emergenze del contesto locale di riferimento? A quali aree del *ben-essere* delle persone, possono essere ricondotte?

Quali risorse sono destinate alle diverse dimensioni del benessere? Esistono emergenze peculiari del territorio, o vi sono esigenze diffuse anche in altri contesti? Quali servizi e/o progettualità sono state intraprese in relazione alle esigenze individuate? Con quali risultati ed impatti osservabili e misurabili? È possibile attivare delle sinergie fra diverse aree amministrative, generando effetti moltiplicativi in termini di investimenti e d'impatto diretto-indiretto?

Per rispondere a tali domande, le Amministrazioni Pubbliche devono dotarsi di un modello di business capace di coniugare l'efficacia e l'efficienza gestionale con l'attivazione di processi socio-economici di medio-lungo periodo. Ciò è ancora più vero in ragione della urgente necessità di coniugare crescita e welfare con azioni sostenibili, ad impatto ambientale e sociale positivo. Una necessità, questa, rafforzata anche dalle nuove politiche europee[2] che, tramite i governi nazionali, impattano anche sulle amministrazioni locali.

Il presente lavoro propone un modello utile ad orientare le politiche delle amministrazioni pubbliche, e le conseguenti politiche di bilancio, in accordo a principi di sostenibilità ambientale e sociale. Nello specifico, si propone un modello di "Piano Strategico Comunale *BES-Oriented*" strutturato a valere su due componenti: (i) Il piano strategico di mandato, riferito all'aspetto gestionale; (ii) gli indicatori BES (Benessere Equo e Sostenibile), utili a verificare la capacità generativa di bene comune.

## 2. Il Piano Strategico di Mandato

Il *Piano Strategico di Mandato (PSM)*, già noto alle amministrazioni[3], è una declinazione, rivolta al settore pubblico, del modello *Balanced Score Card* (BSC) di Kaplan e Norton (1996). Come evidenziato da Melchiorri et al. (2011)[4], il *PSM* apre le classiche prospettive di valutazione della performance d'impresa a nuove dimensioni[5] ed assume tre finalità principali:

[2] Ci si riferisce, in particolare, al *The European Green Deal* (https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_it) ed alla promozione della finanza sostenibile promossa dall'Action Plan: *Financing Sustainable Growth* (https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance_it).

[3] La Provincia di Milano, ad esempio, ha adottato un Piano Strategico di Mandato 2004-2009, intitolato "Un quinquennio di scelte per l'ambiente". Roma Capitale ha presentato nel 2011 il suo primo Piano Strategico.

[4] Il modello di Piano Strategico di Mandato è stato ripreso anche da Borsa Italiana per la definizione del proprio piano industriale.

[5] Un Piano Strategico di mandato si basa su quattro specifiche prospettive: (1) prospettiva della comunità o degli utenti: come dovremmo apparire ai nostri cittadini e agli utenti dei nostri servizi?; (2) prospettiva dei processi interni: per soddisfare i cittadini, quali attività e processi dobbiamo migliorare, sviluppare, innovare? (3) prospettiva dell'apprendimento e

– consente agli amministratori di esprimere in modo strutturato la propria visione di lungo periodo;
– favorisce lo sviluppo di un indispensabile processo di condivisione con il management, i capi intermedi e tutto il personale;
– orienta le risorse economiche alle priorità strategiche del mandato.

Per tali ragioni, è possibile affermare che il *Piano Strategico di Mandato* sia un piano orientato alla sostenibilità (realizzabilità finanziaria e organizzativa delle scelte strategiche e dei progetti attuativi), alla coerenza fra le scelte strategiche dell'amministrazione e le esigenze della comunità, all'attendibilità, cioè definizione di strategie e progetti basati su ipotesi fondate e concretizzabili, e alla comunicabilità del piano stesso, onde consentire di tenere alto il coinvolgimento di tutti gli stakeholder istituzionali, privati e del terzo settore.

Il contenuto del *PSM* viene, poi, tradotto ed articolato in un *Piano Operativo di Realizzazione (POR)* che, prevedendo modalità attuative (pianificazione e controllo), obiettivi personali (quello che ciascuno deve fare), risultati attesi (prospettiva della comunità e degli utenti, dei processi interni, del capitale umano e finanziario) ed elementi di comunicazione (piano di comunicazione verso l'interno e verso l'esterno), è «in grado di declinare le strategie in progetti attuativi e ispirare le attività istituzionali dell'ente» (Melchiorri et al., 2011). La realizzazione di un *PSM* richiede un processo di implementazione che la letteratura (Melchiorri et al., 2011) declina in 6 specifici step (Box 1).

*Box 1 – Gli Step del Piano Strategico di Mandato*

1. **Focalizzare la strategia→**espressione da parte del soggetto che rappresenta l'Ente della visione che guiderà il Piano Strategico di Mandato e declinazione della stessa in finalità strategiche (aree e linee strategiche di intervento).
2. **Condividere i principi di base→**confronto con organi direttivi, stakeholder e management sul contenuto delle linee guida strategiche.
3. **Scegliere i progetti strategici attuativi→**individuazione dei progetti strategici attuativi che connoteranno in modo distintivo il mandato, ovviamente in riferimento alle linee guida strategiche.
4. **Strutturare il Piano Operativo di realizzazione→**sviluppo del Piano Operativo di realizzazione che consiste nella capacità "di allocare le risorse economiche e umane, di definire il timing e gli indicatori di risultato per i progetti strategici e le attività istituzionali". Tale piano agirà su tre leve fondamentali: il potenziamento delle performance e l'ottimizzazione dei processi in una prospettiva impact-oriented; la crescita professionale delle persone (aspetti motivazionali e di soddisfazione nel lavoro); l'equilibrio finanziario (aumento entrate e diminuzione dei costi). Ogni progetto selezionato dovrà essere articolato in: sintesi degli interventi e dei risultati; obiet-

della crescita: come potenziare la capacità di miglioramento e la motivazione delle risorse umane? (4) prospettiva finanziaria: come reperire le risorse necessarie a realizzare i servizi e i progetti strategici?

tivi operativi; opportunità e rischi; agenda di breve termine; pianificazione a medio lungo termine; risorse umane ed economiche necessarie.

5. **Impostare i cruscotti di controllo→**formulazione degli strumenti di controllo identificati nel cruscotto di controllo gestionale (per ogni progetto strategico e per ogni attività istituzionale dovranno esserci i KPIs – key performances indicators –, che rappresentano il livello raggiunto dell'obiettivo prefissato, e i KPAs – key performances actions -, che sono gestite utilizzando la metodologia del project management) e nel cruscotto politico istituzionale (focalizzato sul monitoraggio degli indicatori quantitativi dei risultati raggiunti – KPIs -). È bene sottolineare come, in questo secondo cruscotto, "gli indicatori di performances rappresentano anche gli argomenti di dialogo e comunicazione con la comunità, gli utenti e i cittadini. Per questo devono essere collegati direttamente alle finalità strategiche e alle attività istituzionali".
6. **Elaborare e realizzare il piano di comunicazione →**costruzione di un bilancio di mandato. Altri strumenti possono essere: il bilancio sociale, il bilancio ambientale, il bilancio di sostenibilità.

È bene sottolineare come il *PSM* debba essere caratterizzato da sette "qualità"; ossia deve essere: 1) di forte impatto sulla vita delle persone; 2) chiaro e coerente; 3) fortemente voluto e 4) condiviso da tutti gli stakeholder; 5) una sintesi di tutte le competenze istituzionali dell'ente – lanciando pochi ed emblematici progetti strategici; 6) attuato e attentamente monitorato e controllato; 7) comunicato costantemente all'interno e all'esterno.

Infine, data la natura di medio-lungo periodo del *PSM*, e la qualificazione di processo costruito dal basso, lo sviluppo di un PSM deve prevedere tre fasi: la prima, di analisi del sistema socio-economico locale e di prima interlocuzione con gli stakeholder necessari per far emergere le priorità; la seconda fase, di rafforzamento delle reti da implementare e di costruzione del piano; la terza, di attuazione, monitoraggio e costante aggiornamento (Figura 1).

*Figura 1 – Fasi del Piano strategico di Mandato*


Fonte: elaborazione propria su Melchiorri et al. (2011).

## 3. Il Framework BES

Nel 2011 l'Istat e il CNEL hanno avviato un iter articolato, partecipato da tutte le componenti della società civile, per giungere alla definizione di un nuovo modello di misurazione del benessere degli italiani, che ha visto la

luce nel 2013, anno di pubblicazione del Primo Rapporto BES. Come evidenziato[6], «il progetto per misurare il benessere equo e sostenibile nasce con l'obiettivo di valutare il progresso di una società non soltanto dal punto di vista economico, ma anche sociale e ambientale», sviluppando un approccio capace di offrire una lettura multidimensionale della qualità delle nostre vite. Oltre alla visione multidimensionale, già ampiamente diffusa in lettura, soprattutto a partire dal Rapporto della Commissione Stiglitz-Sen-Fitoussi del 2009 "Beyond GDP"[7], l'originalità del BES risiede nella sua intenzionalità di declinare il benessere, sia in senso intra-generazionale (concetto di equità), sia in senso inter-generazionale (sostenibilità).

Il BES (Figura 2) è articolato in 12 dimensioni (domini), strutturate in una serie di sotto-dimensioni, declinate in 130 indicatori elementari[8]. Tali indicatori sono rivolti, sia ad offrire delle misure di *outcome* (indicatori di livello), sia di *equity* (indicatori di distribuzione), sia ancora di vulnerabilità e resilienza (indicatori che guardano al futuro ed esprimono nel primo caso fattori di rischio e, nel secondo caso, capacità e/o risorse su cui far riferimento per il futuro).

I principi di multidimensionalità, equità e sostenibilità, propri del BES, a partire dal 2016[9], sono stati recepiti all'interno del processo di programmazione economica dell'Italia: «per un set ridotto di indicatori è previsto un allegato del *Documento di Economia e Finanza* che riporti un'analisi dell'andamento recente e una valutazione dell'impatto delle politiche proposte. Inoltre, a febbraio di ciascun anno vengono presentati al Parlamento il monitoraggio degli indicatori e gli esiti della valutazione di impatto delle policy»[10].

Le potenzialità di un simile strumento, sia in termini di misurazione, sia in termini di programmazione sociale, politica ed economica, sono state ampiamente condivise anche dagli amministratori locali, che, insieme all'Istat, hanno dato vita ad una serie di iniziative volte a declinare l'esperienza nazionale e regionale a livello provinciale e comunale.

[6] https://www.istat.it/it/benessere-e-sostenibilit%C3%A0/la-misurazione-del-benessere-(bes)

[7] https://www.oecd.org/publications/beyond-gdp-9789264307292-en.htm

[8] https://www.istat.it/it/files//2018/04/12-domini-commissione-scientifica.pdf

[9] Con la legge 163/2016 (art. 14), e poi con il successivo decreto del Ministero dell'Economia e delle Finanze, pubblicato in Gazzetta Ufficiale il 25 Novembre 2017, si prescrive l'utilizzo dei 12 domini del BES per misurare l'impatto delle politiche economiche sul benessere degli italiani.

[10] https://www.istat.it/it/benessere-e-sostenibilit%C3%A0/la-misurazione-del-benessere-(bes)/il-bes-nel-def

*Figura 2 – La struttura del BES*


Fonte: elaborazione su base Istat.

Nascono così il progetto "*Bes delle Province*"[11] e "*UrBes*"[12], entrambi iniziative sviluppatesi su base volontaria tramite l'accordo fra Istat e Amministrazione Pubblica. La prospettiva è quella di riuscire ad estendere tali accordi a tutti gli enti locali, sistematizzando la pluralità di informazioni statistiche in loro possesso e permettendo, quindi, di arrivare ad una base di indicatori provinciali e comunali ben strutturata e condivisa su tutto il territorio nazionale. Ad oggi, l'adesione è ancora molto bassa: nel Bes delle Province 2019, le Province che hanno aderito risultano pari a 27 (20 province e 7 città metropolitane), mentre il Rapporto UrBes è fermo al 2015, anno in cui avevano aderito 29 città.

Sulla base di queste esperienze, nel 2018, l'Istat pubblica, per la prima volta, un sistema di indicatori del Benessere equo e sostenibile nelle province e città metropolitane italiane, o più sinteticamente il BES dei Territori[13]. Data la difficoltà di raccogliere e sistematizzare i dati a livello locale, ad oggi il

[11] http://www.besdelleprovince.it/pubblicazioni/2019/

[12] https://www.istat.it/it/archivio/92375

[13] Come evidenziato sul sito di riferimento: «Si tratta del primo risultato del progetto "Misure del benessere equo e sostenibile dei territori" avviato per costruire e alimentare regolarmente un sistema di indicatori utili a soddisfare la domanda di informazione statistica territoriale, coerenti e integrati con il framework Bes adottato a livello nazionale».

BES dei Territori conta 11 domini (rimane escluso il "Benessere Soggettivo"), articolati in 55 indicatori (Figura 3); un numero sicuramente di molto inferiore rispetto ai 130 del dettaglio regionale, ma comunque sufficiente per consentire un'analisi dei territori, sia verticale che comparativa, nella triplice prospettiva del BES (multidimensionalità, equità e sostenibilità).

*Figura 3 – Articolazione del BES dei Territori*


Fonte: elaborazione su base Istat.

Un ultimo elemento da sottolineare è quello relativo al fondamento costituzionale del BES (Tabella 1) e, conseguentemente, alla possibile funzione di utilizzare tale *framework* come nuovo linguaggio di misurazione, progettazione e valutazione di tutti gli attori del sistema sociale ed economico.

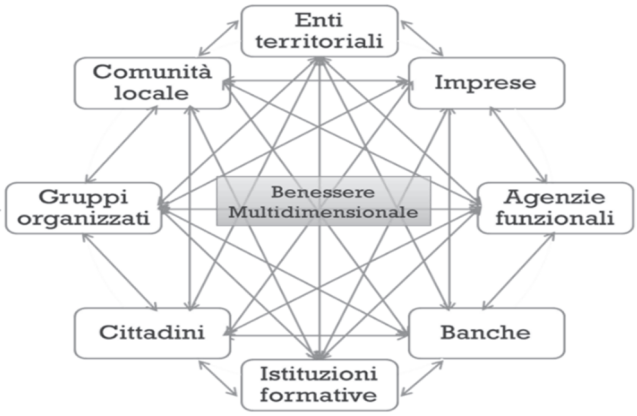
*Tabella 1 – Il Fondamento Costituzionale del BES*

| DOMINIO BES | TEMA COSTITUZIONALE | ARTICOLO COSTITUZIONE |
|---|---|---|
| **Ambiente** | Diritto a vivere in un ambiente sano | Lettura combinata dell'art. 9, dell'art. 32 e dell'art. 117s |
| **Benessere economico** | Diritto alla retribuzione | Art. 36.1 |
| | Diritto ad una abitazione decente | Sentenze 217 del 1988, 119 del 1999 e 520 del 2000 della CC |
| **Istruzione e formazione** | Diritto all'istruzione | Art. 33.2 e Art. 34 |
| **Lavoro e conciliazione dei tempi di vita** | Parità di genere | Art. 37 |
| | Gioventù e formazione famiglia | Art. 31 |
| | Partecipazione economica | Art. 1; art. 3; art. 4; art. 35 |
| **Politica e istituzioni** | Partecipazione politica | Art. 48 |
| **Paesaggio e patrimonio culturale** | Promozione della cultura e dell'arte | Art. 9; art. 33 |
| **Qualità dei servizi** | Diritto a servizi pubblici essenziali | Art. 43 |
| | Diritto a vivere in una casa decente | Sentenze 217 del 1988, 119 del 1999 e 520 del 2000 della CC |
| | Diritto alla salute e livelli essenziali | Art. 32; Art. 117m |
| **Ricerca e innovazione** | Diffusione della tecnologia | Art. 9; art. 33 |
| | Promozione della ricerca scientifica e tecnica | Art. 9; art. 33 |
| **Relazioni sociali** | Diritto alla famiglia | Art. 29; art. 31 |
| | Funzione sociale della cooperazione | Art. 45 |
| | Partecipazione civile | Art. 17; art. 18; art. 19 |
| **Salute** | Diritto alla salute | Art. 32 |
| | Diritto alla salute e livelli essenziali | Art. 32; Art. 117m |
| **Sicurezza** | Diritto alla libertà di circolazione | Art. 16 e Sentenza della CC n. 2 del 1956 |
| | Diritto all'inviolabilità del domicilio | Art. 14 |
| | Diritto all'incolumità fisica | Art. 13; Art. 16 |

Fonte: Becchetti, Pisani e Semplici (2018).

Dalle istituzioni alle imprese, dalla comunità locale ai cittadini, dalle banche agli enti di terzo settore, si dà vita ad una nuova forma di Responsabilità Sociale del Territorio (Figura 4), partecipata e condivisa, perché orientata al miglioramento del benessere dei territori, al quale tutti, ciascuno per la propria parte, devono contribuire.

*Figura 4 – La Responsabilità Sociale del Territorio BES-Oriented*




Fonte: adattato da Peraro e Vecchiato (2007).

## 4. Il Modello di Piano Strategico Comunale Bes-Oriented

Il modello proposto nel presente lavoro si inserisce in una direzione, sempre più condivisa, rappresentata dall'utilizzo del framework BES, declinato a misura di Comune, per la costruzione, la definizione e la misurazione d'impatto delle politiche messe in campo dalle amministrazioni locali. In Italia, già da diversi anni, ed in parallelo al percorso istituzionale promosso dall'Istat, gli indicatori BES sono sempre più associati alle policy degli enti territoriali, e dei Comuni nello specifico; alcuni casi di letteratura e ricerca applicata rientrano in tale percorso. In particolare, Collevecchio (2019)[14] propone un percorso metodologico per estendere anche ai Comuni la previsione normativa che inserisce gli indicatori BES nel DEF. L'elemento più interessante è dato dalla proposta di elaborare il "Documento unico di programmazione (DUP) nel rispetto delle procedure, dei tempi e dei contenuti previsti dalla normativa vigente in cui, sia nella sezione strategica che in

[14] Pubblicato al seguente link: http://www.utilitalia.it/dms/file/open/?e28da668-4a7f-46c9-aeeb-5a9b6345fa1c

quella operativa, vengano evidenziati e misurati con idonei indicatori gli obiettivi BES da raggiungere".

Per altro verso, l'esperimento "Il BES nel Dup", in atto presso IFEL, e coordinato dall'Università di Ancona, è volto a costruire una relazione sistematica fra il Documento Unico di Programmazione, il Bilancio ed il BES. La logica che muove il progetto è quella di orientare i Comuni verso politiche in grado di produrre benessere per il loro territorio. Secondo questa prospettiva, gli indicatori di benessere possono diventare una misura con cui i Comuni definiscono e descrivono gli effetti dei loro indirizzi e obiettivi strategici. Perché questo sia possibile, occorre preliminarmente associare gli indicatori BES alle missioni che caratterizzano sia il DUP che il Bilancio, secondo la logica funzionale dei centri di costo[15].

Bova (2019) propone una guida che orienta i Comuni verso la dotazione di un sistema di indicatori, provenienti da una molteplicità di fonti amministrative diverse, (orientati al BES), utili per la programmazione strategica di sviluppo equo e sostenibile e, quindi, per il benessere della propria comunità[16]. Il modello sviluppato propone uno schema di correlazioni fra le diverse dimensioni del BES, e tra i suoi indicatori[17], finalizzato a mettere in evidenza la natura multidimensionale, gli effetti leva e i possibili trade-off, sia delle strategie politico-progettuali da implementare, sia degli impatti multidimensionali che da esse si originano in termini di miglioramento del benessere equo e sostenibile dei cittadini.

Tenendo presente questa duplice prospettiva, e mettendo insieme i due elementi costitutivi – *Piano Strategico di Mandato* e Framework BES – abbiamo definito le fasi operative, gli step e gli strumenti del *Piano Strategico di Mandato - BES Oriented* (Figura 5).

Le fasi operative del modello sono cinque e si ispirano a quanto proposto da *SDGs Compass* nella guida costruita per allineare le attività imprenditoriali agli Obiettivi di Sviluppo Sostenibile[18], pur se declinate nella specifica prospettiva del modello. In ciascuna delle fasi, sono presenti uno o più step necessari per passare a quella successiva e completare la costruzione del modello.

[15] Per un maggior dettaglio si veda la presentazione al seguente link: https://www.comune.roma.it/web-resources/cms/documents/Rapporto_BES_Fiorillo_A.pdf

[16] https://www.francoangeli.it/Ricerca/scheda_libro.aspx?Id=25705

[17] Un approccio simile è stato ampiamente studiato, con una pluralità di metodologie, per quanto concerne la costruzione di *interlinkages* fra gli SDGs (gli Obiettivi di Sviluppo Sostenibile contenuti nell'Agenda 2030 delle Nazioni Unite, emanata nel 2015). Fra i principali riferimenti in letteratura si ricordano i lavori di: Pradhan et al. (2017), Interlinkages Working Group of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (2019), Miola et al. (2019), Istat (2019).

[18] https://sdgcompass.org/wp-content/uploads/2015/12/019104_SDG_Compass_Guide_2015.pdf

**Fase A - Comprendere il contesto BES** (funzionale alla comprensione del contesto in cui l'amministrazione si trova ad operare, prendendo in esame, tanto il quadro in termini di benessere multidimensionale, quanto quello relativo all'andamento della spesa pubblica). Tale fase prevede due step:

1. *Analisi di contesto e posizionamento del Comune*, realizzata sugli indicatori del BES dei Territori (si veda Tabella 2), sia in termini di livello corrente, sia in termini di trend temporale a cinque anni e ad un anno;
2. *Analisi del Bilancio del Comune*, sia in termini di livello corrente per voce di spesa, sia in termini di serie storica (almeno cinque anni), realizzata dopo aver collegato i domini del BES dei Territori alle aree del Bilancio.

*Tabella 2 – Il Framework BES dei Territori*

| ***Dominio*** | ***Indicatore*** | ***Unità di misura*** | ***Serie storica*** | ***Polarità*** |
|---|---|---|---|---|
| *Salute* | Speranza di vita alla nascita | numero medio di anni | 2004-2017 | + |
| | Mortalità infantile | per 1.000 nati vivi | 2004-2016 | - |
| | Mortalità per incidenti stradali (15-34 anni) | tassi standardizzati per 10.000 residenti | 2004-2017 | - |
| | Mortalità per tumore (20-64 anni) | tassi standardizzati per 10.000 residenti | 2004-2016 | - |
| | Mortalità per demenze e malattie del sistema nervoso (65 anni e più) | tassi standardizzati per 10.000 residenti | 2004-2016 | - |
| *Istruzione e Formazione* | Partecipazione alla scuola dell'infanzia | valori percentuali | 2008-2017 | + |
| | Persone con almeno il diploma (25-64 anni) | valori percentuali | 2004-2018 | + |
| | Laureati e altri titoli terziari (25-39 anni) | valori percentuali | 2004-2018 | + |
| | Passaggio all'università | tasso specifico di coorte | 2014-2017 | + |
| | Giovani che non lavorano e non studiano (Neet) | valori percentuali | 2004-2018 | - |
| | Partecipazione alla formazione continua | valori percentuali | 2004-2018 | + |
| | Competenza alfabetica degli studenti | punteggio medio | 2018 | + |
| | Competenza numerica degli studenti | punteggio medio | 2018 | + |
| *Lavoro e Conciliazione dei Tempi di Vita* | Tasso di occupazione (20-64 anni) | valori percentuali | 2004-2018 | + |
| | Tasso di mancata partecipazione al lavoro | valori percentuali | 2004-2018 | - |
| | Tasso di infortuni mortali e inabilità permanente | per 10.000 occupati | 2008-2016 | - |
| | Tasso di occupazione giovanile (15-29 anni) | valori percentuali | 2004-2018 | + |

| | | | | |
|---|---|---|---|---|
| | Tasso di mancata partecipazione al lavoro giovanile (15-29 anni) | valori percentuali | 2004-2018 | - |
| | Giornate retribuite nell'anno (lavoratori dipendenti) | valori percentuali | 2009-2017 | + |
| *Benessere Economico* | Reddito medio disponibile pro capite | euro | 2012-2016 | + |
| | Retribuzione media annua dei lavoratori dipendenti | euro | 2009-2017 | + |
| | Importo medio annuo pro-capite dei redditi pensionistici | euro | 2011-2017 | + |
| | Pensionati con pensione di basso importo | valori percentuali | 2011-2017 | - |
| | Patrimonio pro capite | euro | 2012-2016 | + |
| | Tasso di ingresso in sofferenza dei prestiti bancari alle famiglie | valori percentuali | 2004-2017 | - |
| *Relazioni Sociali* | Organizzazioni non profit | per 10.000 abitanti | 2016 | + |
| | Scuole accessibili | valori percentuali | 2018 | + |
| *Politica e Istituzioni* | Partecipazione elettorale (elezioni europee) | valori percentuali | 2004-2014 | + |
| | Partecipazione elettorale (elezioni regionali) | valori percentuali | Dipende dalla regione | + |
| | Amministratori comunali donne | valori percentuali | 2004-2018 | + |
| | Amministratori comunali con meno di 40 anni | valori percentuali | 2004-2018 | + |
| | Affollamento degli istituti di pena | valori percentuali | 2004-2018 | - |
| | Comuni: capacità di riscossione | valori percentuali | 2007-2016 | + |
| | Amministrazioni provinciali: capacità di riscossione | valori percentuali | 2007-2016 | + |
| *Sicurezza* | Omicidi | per 100.000 abitanti | 2004-2017 | - |
| | Altri delitti violenti denunciati | per 10.000 abitanti | 2004-2017 | - |
| | Delitti diffusi denunciati | per 10.000 abitanti | 2008-2017 | - |
| | Mortalità stradale in ambito extraurbano | valori percentuali | 2004-2017 | - |
| *Paesaggio e Patrimonio Culturale* | Densità e rilevanza del patrimonio museale | num. ponderato per 100 kmq | 2015-2017 | + |
| | Diffusione delle aziende agrituristiche | per 100 kmq | 2010-2017 | + |
| | Densità di verde storico | mq per 100 mq di superficie dei centri abitati | 2011-2017 | + |
| *Ambiente* | Dispersione da rete idrica comunale | valori percentuali | 2015 | - |
| | Conferimento dei rifiuti urbani in discarica | valori percentuali | 2004-2017 | - |
| | Qualità dell'aria urbana - PM10 | valori percentuali | 2013-2017 | - |
| | Qualità dell'aria urbana - Biossido di azoto | valori percentuali | 2013-2017 | - |
| | Disponibilità di verde urbano | mq per abitante | 2011-2017 | + |
| | Energia da fonti rinnovabili | valori percentuali | 2013-2017 | + |
| | Raccolta differenziata dei rifiuti urbani | valori percentuali | 2004-2017 | + |
| | Impermeabilizzazione del suolo da copertura artificiale | valori percentuali | 2016-2017 | - |

| | | | | |
|---|---|---|---|---|
| *Ricerca, Innovazione e Creatività* | Addetti nelle imprese culturali | valori percentuali | 2008-2016 | + |
| | Mobilità dei laureati italiani (25-39 anni) | per 1.000 laureati residenti | 2012-2017 | - |
| *Qualità dei Servizi* | Bambini che hanno usufruito dei servizi comunali per l'infanzia | valori percentuali | 2004-2016 | + |
| | Irregolarità del servizio elettrico | numero medio per utente | 2004-2016 | - |
| | Posti-km offerti dal Tpl | posti-km per abitante | 2004-2016 | + |
| | Emigrazione ospedaliera in altra regione | valori percentuali | 2004-2016 | - |

Fonte: elaborazione propria su base Istat.

**Fase B - Definire le priorità** (funzionale all'individuazione delle priorità d'intervento condivise che emergono in misura oggettiva dalla lettura combinata degli step della fase A, ed in misura partecipata dal coinvolgimento degli stakeholder). La fase B si articola su tre step:

3. *Processo di stakeholder engagement* (elaborazione di un questionario sulle aree del BES ritenute prioritarie);
4. *Costruzione di una matrice di materialità*, ponderata con il peso degli stakeholder, che metta in relazione i dati dell'analisi di contesto e i dati di bilancio tramite i domini BES (dalla matrice emergeranno le aree di benessere nelle quali è necessario intervenire, sia perché ritenute prioritarie dagli stakeholder, sia perché presentano dati di contesto e di bilancio che fra loro non sono in linea);
5. *Scelta delle priorità strategiche e degli obiettivi d'impatto* ad esse collegate (da articolare sempre con l'utilizzo del framework BES). In particolare, in questo step, è di fondamentale importanza l'utilizzo dei risultati delle interazioni fra le diverse dimensioni del BES, in quanto, grazie a queste, sarà possibile valutare (tramite simulazioni) le potenzialità multidimensionali, dirette ed indirette, derivanti dal raggiungimento di un determinato obiettivo che insiste su uno specifico dominio, sia in termini di impatto sul benessere (indicatori dell'analisi di contesto), sia in termini di impatto sul bilancio comunale (indicatori dell'analisi di bilancio).

**Fase C - Definire il Piano di Attuazione** (funzionale alla progettazione degli interventi necessari per la realizzazione degli obiettivi ritenuti prioritari nella fase precedente). Tale fase si sostanzia in due step:

6. *Condivisione interna ed esterna* delle priorità scelte;
7. *Definizione e scelta dei progetti strategici attuativi*, nei quali dovranno essere evidenziati chiaramente, sia il collegamento con le priorità di intervento legate all'analisi di contesto e di bilancio, sia l'impatto atteso in

termini di costi-benefici sulla spesa pubblica, mantenendo sempre, in entrambi i casi, il raccordo con i domini del BES[19]. Ciascuna progettazione dovrà essere accompagnata da un *Modello di Analisi di Fattibilità*.

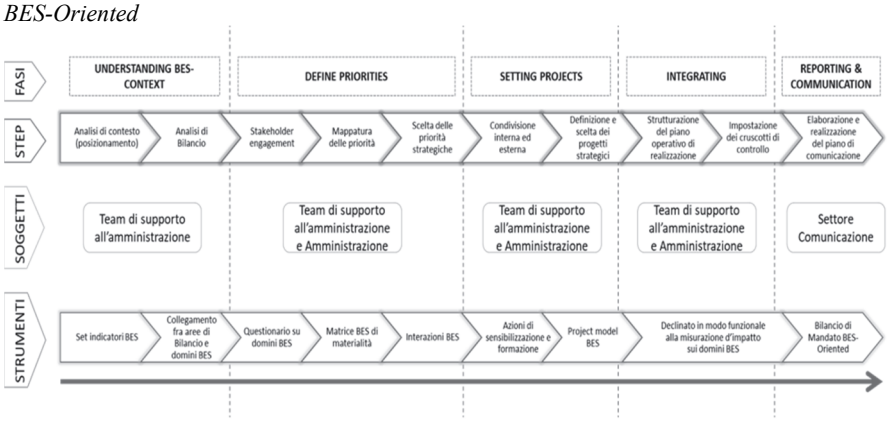
**Fase D - Integrare** (funzionale a mettere a sistema l'intero Piano Strategico di Mandato *BES-Oriented* da un punto di vista operativo, prevedendo azioni di management, di coordinamento e di monitoraggio delle diverse progettualità attivate in risposta alle priorità scelte). In tale fase sono previsti due step:

8. *Strutturare il Piano Operativo di Realizzazione*;
9. *Impostare i cruscotti di controllo*, che in questo caso dovranno essere ancorati al framework BES.

**Fase E - Comunicare**[20] (funzionale a dar conto di quanto realizzato, rispetto a quanto progettato attraverso un'azione di reporting e comunicazione):

10. Costruire, presentare e diffondere il *Bilancio di Mandato BES-Oriented.*

*Figura 5 – Le fasi, gli step, i soggetti coinvolti e gli strumenti del Piano Strategico di Mandato BES-Oriented*




Fonte: elaborazione propria.

[19] NeXt – Nuova Economia per Tutti, ha elaborato un suo schema di *Project Model* che per caratteristiche e completezza potrebbe essere adottato come modello ufficiale da seguire per l'elaborazione di progettazioni *BES-Oriented*. Tale modello è stato, per esempio, utilizzato anche in occasione della fase di emersione delle progettualità al Forum dei Giovani Soci BCC, tenutosi a Cosenza nel mese di settembre 2019.

[20] Ulteriore sviluppo della fase *communication* sono l*a dissemination* ed *exploitation* che richiamano la metodologia europea H2020.

## 5. Gli Strumenti del Modello

Il modello di *impact finance* per i comuni si articola in 3 strumenti principali:

- *Il posizionamento BES*. Il vantaggio per la PA è rappresentato dalla possibilità di adottare delle strategie di welfare in relazione ad un benchmark ed al posizionamento della pubblica amministrazione rispetto alla media nazionale;
- *L'analisi BES del bilancio*. Grazie al collegamento fra gli indicatori BES e le voci di bilancio, l'amministrazione può valutare la coerenza delle proprie politiche di spesa in ragione del proprio posizionamento BES e delle strategie di crescita sostenibile;
- *La lettura combinata dell'analisi BES, del posizionamento e del bilancio*. Da questo strumento emerge, ad esempio, quali sono i domini nei quali si sono registrate performance negative in termini di spesa pubblica, che possono aver già generato, o potranno generare, un peggioramento nei livelli e nell'andamento degli indicatori del benessere equo e sostenibile.

### *5.1. Il posizionamento BES*

In questa fase, il modello consente di implementare un'analisi capace di mappare i domini del BES nei quali il posizionamento dell'amministrazione presenta delle criticità nei confronti della media nazionale e/o di un'altra amministrazione di pari natura giuridica ma *best in class* in quella specifica area, sia in termini assoluti (livelli), sia in termini di trend temporale (variazioni di breve e lungo periodo).

I dettagli metodologici per la costruzione del posizionamento BES sono riportati nel Box 2, mentre la Figura 6 propone una matrice per visualizzare la sintesi dei risultati che emergono dall'analisi condotta, classificando i domini nei quali si rilevano criticità in base alla natura stessa di quest'ultime.

*Box 2 – Il posizionamento BES: Obiettivi, Dati Utilizzati e Metodologia*

**Obiettivi**

- Individuare le dimensioni del Benessere Equo e Sostenibile nelle quali sono presenti delle criticità, sia in termini di livello (confronto spaziale con la media italiana), sia in termini temporali (variazioni nel tempo di breve e lungo periodo).

**Dati utilizzati**

- La base dati utilizzata è costituita dagli indicatori del BES dei Territori per i quali c'è disponibilità di una serie storica di cinque anni.

**Metodologia**

- L'analisi si articola in quattro fasi:
  - La prima fase si basa sulla definizione di tre indici statistici per ciascun indicatore di ciascun dominio:
    - il livello di performance dell'ultimo anno disponibile per ciascun indicatore;
    - la variazione percentuale fra il livello dell'ultimo anno disponibile e il penultimo per ciascun indicatore
    - la variazione percentuale fra il livello dell'ultimo anno disponibile e il livello di cinque anni prima, sempre per ciascun indicatore.
  - Nella seconda fase si sviluppa un confronto, in tutti i tre elementi descritti, con i dati delle altre città metropolitane italiane, delle regioni di riferimento e dell'Italia (come termini sintetici di paragone).
  - Nella terza fase viene rilevata la percentuale di indicatori che, dominio per dominio, e per tutti gli indici statistici di cui sopra, presenta un livello/trend di performance inferiore a quello della media nazionale.
  - Nella quarta fase si opera una sintesi, costruendo una matrice di emersione delle dimensioni del BES nei quali si registrano criticità (Figura 6), cioè un posizionamento peggiore rispetto al dato italiano. I domini presi in considerazione sono quelli per i quali si registrano performance negative in almeno il 50% degli indicatori di riferimento.

*Figura 6 – Matrice di Emersione delle Dimensioni BES e Posizionamento*

| | Livello | Trend di lungo periodo | Trend di breve periodo |
|---|---|---|---|
| **Livello** | Domini nei quali deve essere implementato un processo di convergenza verso la media nazionale | | |
| **Trend di lungo periodo** | Domini nei quali è necessario implementare politiche per interrompere il trend recessivo dato dalla compresenza di un livello sotto la media e da una performance di lungo periodo negativa | Domini nei quali devono essere implementate politiche per invertire il trend in termini assoluti e/o relativi | |
| **Trend di breve periodo** | Domini nei quali è necessario implementare un monitoraggio attento, perché potrebbe, negli anni successivi, verificarsi un fenomeno recessivo (livello sotto la media nazionale + performance negativa di breve periodo che si cronicizza) | Domini nei quali, pur partendo da un dato di livello sopra la media nazionale, si registra la necessità di politiche per arrestare un processo di convergenza negativa | Domini nei quali è necessario implementare un monitoraggio attento perché se il trend negativo persiste negli anni successivi possono diventare aree di criticità |

Fonte: elaborazione propria.

## *5.2. L'analisi BES del bilancio*

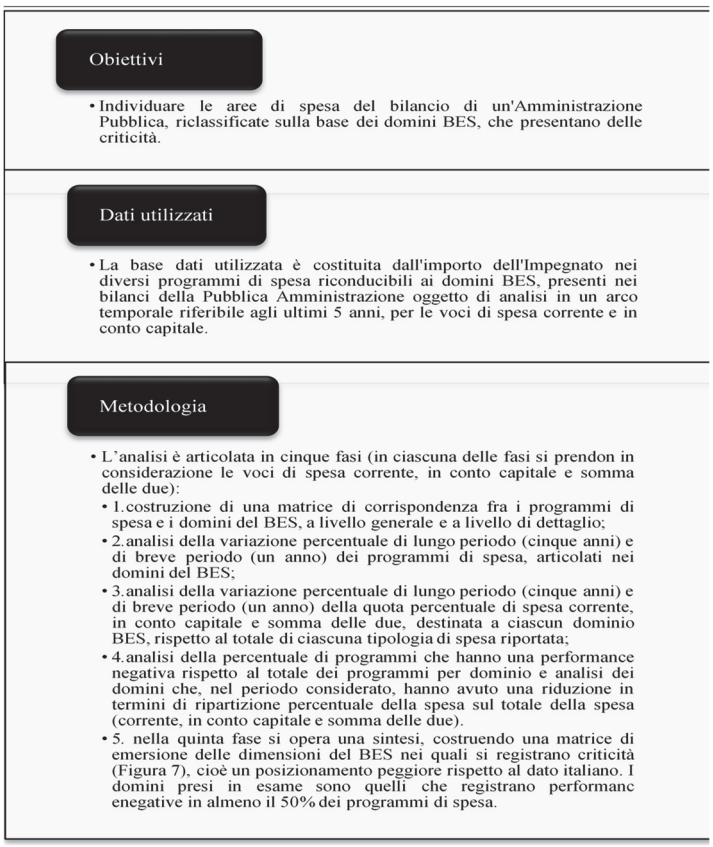
Lo strumento economico-finanziario principale che le amministrazioni pubbliche hanno per cambiare le priorità di intervento, raccordandole con l'analisi di posizionamento BES, e quindi con le criticità del territorio, rispondendo concretamente ai bisogni multidimensionali dei propri cittadini, è costituito dalle variazioni di spesa nei diversi programmi che compongono il loro bilancio. Per tale ragione, il modello proposto, classifica i programmi di spesa in ragione dei diversi domini del BES, al fine di individuare, dominio per dominio, le dimensioni nelle quali, in termini di investimenti, sono presenti delle criticità, sia di breve che di lungo periodo. I dettagli metodologici per la costruzione dell'analisi BES di bilancio sono riportati nel Box 3, mentre la Figura 7 offre una matrice per visualizzare la sintesi dei risultati che emergono dall'analisi condotta, classificando i domini nei quali si rilevano criticità in base alla natura stessa di quest'ultime.

*Figura 7 – Matrice di Emersione per Aree di Spesa e Domini BES del Bilancio Comunale*

| | **Ripartizione spesa (LP)** | **Trend di lungo periodo** | **Trend di breve periodo** |
|---|---|---|---|
| **Ripartizione spesa (LP)** | Domini nei quali si registra una costante diminuzione in termini di priorità dovuta alla diminuzione della quota percentuale destinata ai programmi di spesa ad essi collegati. | | |
| **Trend di lungo periodo** | Domini nei quali è necessario implementare politiche di bilancio per interrompere il trend recessivo dato dalla compresenza di una performance di lungo periodo negativa sia in valori assoluti, sia in valori relativi. | Dominio nel quale devono essere implementate politiche di bilancio per invertire il trend legato a una performance negativa nel lungo periodo in termini assoluti. | |
| **Trend di breve periodo** | Domini nei quali è necessario implementare un monitoraggio attento della spesa di bilancio, perché potrebbe, negli anni successivi, verificarsi un fenomeno recessivo dato dalla compresenza di una performance di lungo periodo negativa sia in valori assoluti, sia in valori relativi. | Domini nei quali devono essere implementate politiche di bilancio per invertire il trend legato a una performance negativa nel lungo e nel breve periodo in termini assoluti. | Domini nei quali è necessario implementare un monitoraggio attento della spesa di bilancio, perché potrebbe, negli anni successivi, verificarsi una cronicizzazione della performance negativa di breve periodo. |

Fonte: elaborazione propria.

*Box 3 – L'Analisi BES del Bilancio: Obiettivi, Dati Utilizzati e Metodologia*




### *5.3. La lettura combinata dell'analisi BES: posizionamento e politiche di bilancio*

Una volta costruita l'analisi di posizionamento BES e l'analisi BES del bilancio è necessario mettere a sistema i risultati e le informazioni che da esse provengono (Box 4). In particolare, occorre mappare, secondo lo schema proposto nella Figura 8 le relazioni e la coerenza fra i domini del BES che presentano delle criticità nella prima analisi e quelli che le presentano nella seconda. Dalla lettura combinata di questi due elementi sarà possibile individuare le arre prioritarie di intervento. È bene specificare, in ogni caso, che anche i domini che da quest'ultimo passaggio rimarranno esclusi dovranno essere monitorati, poiché in essi sono stati comunque riscontrati elementi di performance negativa in una delle due analisi condotte.

*Box 4 – Lettura Combinata dell'Analisi BES*

**Obiettivi**

- Sistematizzare le analisi precedenti, per far emergere sinergicamente le priorità di intervento tramite una lettura combinata, in relazione ai Domini BES, dell'analisi di posizionamento e delle spese di bilancio.

**Dati utilizzati**

- La base dati utilizzata è costituita dai risultati delle analisi BES di posizionamento e di bilancio

**Metodologia**

- Costruzione della "matrice di intersezione per l'emersione delle priorità sulle quali intervenire" (Figura 8), con la quale si costruisce un'intersezione fra le criticità messe in luce dall'analisi di posizionamento e dall'analisi di bilancio BES-oriented. La lettura dello strumento, come indicato dalla freccia nera, si opera da destra a sinistra e risponde alla seguente logica: i domini nei quali si sono registrate performance negative in termini di spesa di bilancio possono aver già generato o potranno generare un peggioramento nei livelli e nell'andamento degli indicatori del benessere equo e sostenibile. Ad esempio, a un processo di disinvestimento di risorse negli ultimi cinque anni nel programma "Rifiuti", dominio Ambiente, potrà corrispondere un risultato negativo nell'indicatore "Raccolta differenziata", dominio Ambiente, già in essere o potenziale. Questo elemento di incertezza deterministica-temporale, eliminabile solo con l'applicazione sistematica nel tempo dell'approccio proposto, fa emergere un livello di collegamento differenziato fra le performance negative delle due analisi, a secondo della sezione di riferimento, come evidenziato dal colore dello sfondo e dai riquadri definiti in grigio scuro e grigio chiaro.

## 6. Le Interazioni tra Domini BES

La prospettiva introdotta dall'adozione di un *framework* di benessere multidimensionale impone, in termini di valutazione d'impatto degli interventi politico/progettuali a valere su rimodulazioni delle spese di bilancio, lo sviluppo di un sistema di interazioni fra le dimensioni nelle quali è articolato il BES. Ciò, per due ragioni.

*Box 5 – Le Interazioni fra i Domini BES: Obiettivi, Dati Utilizzati e Metodologia*

**Obiettivi**

- 1.individuare le correlazioni, e la loro intensità, fra gli indicatori compositi di ciascun dominio del BES dei Territori;
- 2.individuare le correlazioni, e la loro intensità, fra gli indicatori elementari e gli indicatori compositi di ciascun dominio del BES dei Territori;
- 3.individuare l'intensità dei legami fra gli indicatori elementari e gli indicatori compositi di ciascun dominio del BES dei Territori.

**Dati utilizzati**

- La base dati è costituita dall'ultimo anno disponibile degli indicatori del "BES dei Territori" per tutte e 107 le province italiane. Il BES dei Territori è un'indagine dell'Istat che replica in misura sistematica, dal 2018, il framework BES al livello territoriale delle Province e delle Città Metropolitane italiane. Nel BES dei Territori si passa dai 12 domini del BES nazionale a 11 (non è presente il dominio Benessere Soggettivo) e da 130 indicatori elementari a 55 (per un dettaglio si veda la Tabella 1). Ad oggi, tale dataset è quello, che mantenendo le caratteristiche di ufficialità statistica e di comparabilità nel tempo (fra anni diversi) e nello spazio (fra unità statistiche differenti), offre il livello di dettaglio territoriale più piccolo.

**Metodologia**

- Costruzione degli indicatori compositi di Dominio per mezzo del Mazziotta-Pareto-Index (Appendice 1)
- Costruzione delle matrici di correlazione con indice di correlazione di Pearson (Appendice 1) tra:
- indicatori compositi di Dominio
- indicatori elementari e indicatori compositi di Dominio
- Definizione dell'intensità dei legami fra indicatori elementari e indicatori compositi :
- Legami forti: correlazione (indice di correlazione maggiore di +0,3 o minore di – 0,3) del dominio X con più del 70% di indicatori per ciascuno degli altri domini.
- Legami medi: correlazione del dominio X con una percentuale comprese fra il 30% e il 70% di indicatori per ciascuno degli altri domini.
- Legami leggeri: correlazione del dominio X con meno del 30% di indicatori per ciascuno degli altri domini.
- Costruzione di visualizzazioni di sintesi

La prima è che le varie ripartizioni del benessere si influenzano reciprocamente, direttamente e indirettamente; un miglioramento in una specifica area determina una variazione, non necessariamente proporzionale, in una o più aree diverse da quella focus dell'intervento; un elemento, questo, che deve essere preso in considerazione per realizzare una valutazione d'impatto coerente con la multidimensionalità.

La seconda è che, applicando il modello proposto agli interventi delle amministrazioni pubbliche, la scelta di investire maggiori risorse in un determinato programma di spesa collegato a un dominio BES può determinare, sempre per il principio di multidimensionalità, un effetto leva su altri programmi di spesa, per esempio riducendo l'ammontare di risorse necessarie e, quindi, conseguendo un risparmio. Lo strumento delle interazioni permette di tenere in considerazioni, e far emergere, il valore di queste due dinamiche (Box 5).

*Matrice 1 – Presenza e intensità di correlazione fra gli indicatori compositi costruiti a partire dai dati del BES dei Territori*

| | Salute | Istruzione e Formazione | Lavoro e Conciliazione dei Tempi di Vita | Benessere Eocnomico | Relazioni Sociali | Politica e Istituzioni | Sicurezza | Ambiente | Ricerca e Innovazione | Qualità dei Servizi | Paesaggio e Patrimonio Culturale |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Salute | 1 | | | | | | | | | | |
| Istruzione e Formazione | 0,4385 | 1 | | | | | | | | | |
| Lavoro e Conciliazione dei Tempi di Vita | 0,3762 | 0,8856 | 1 | | | | | | | | |
| Benessere Eocnomico | 0,3325 | 0,8802 | 0,9031 | 1 | | | | | | | |
| Relazioni Sociali | 0,133 | 0,6928 | 0,7233 | 0,715 | 1 | | | | | | |
| Politica e Istituzioni | 0,1058 | 0,3262 | 0,4524 | 0,4449 | 0,3748 | 1 | | | | | |
| Sicurezza | -0,001 | 0,1128 | 0,1551 | 0,0404 | 0,1905 | -0,0139 | 1 | | | | |
| Ambiente | -0,0771 | 0,1894 | 0,1662 | 0,1411 | 0,3186 | 0,0368 | 0,1302 | 1 | | | |
| Ricerca e Innovazione | 0,0191 | 0,0816 | 0,0535 | 0,0663 | 0,0923 | 0,0132 | 0,0948 | 0,0296 | 1 | | |
| Qualità dei Servizi | 0,3048 | 0,732 | 0,7491 | 0,7709 | 0,6165 | 0,4666 | -0,1627 | 0,05 | 0,0947 | 1 | |
| Paesaggio e Patrimonio Culturale | 0,2475 | 0,3961 | 0,3178 | 0,3647 | 0,1675 | 0,0996 | -0,1528 | -0,0685 | 0,2762 | 0,5073 | 1 |

Fonte: elaborazione propria su dati Istat.

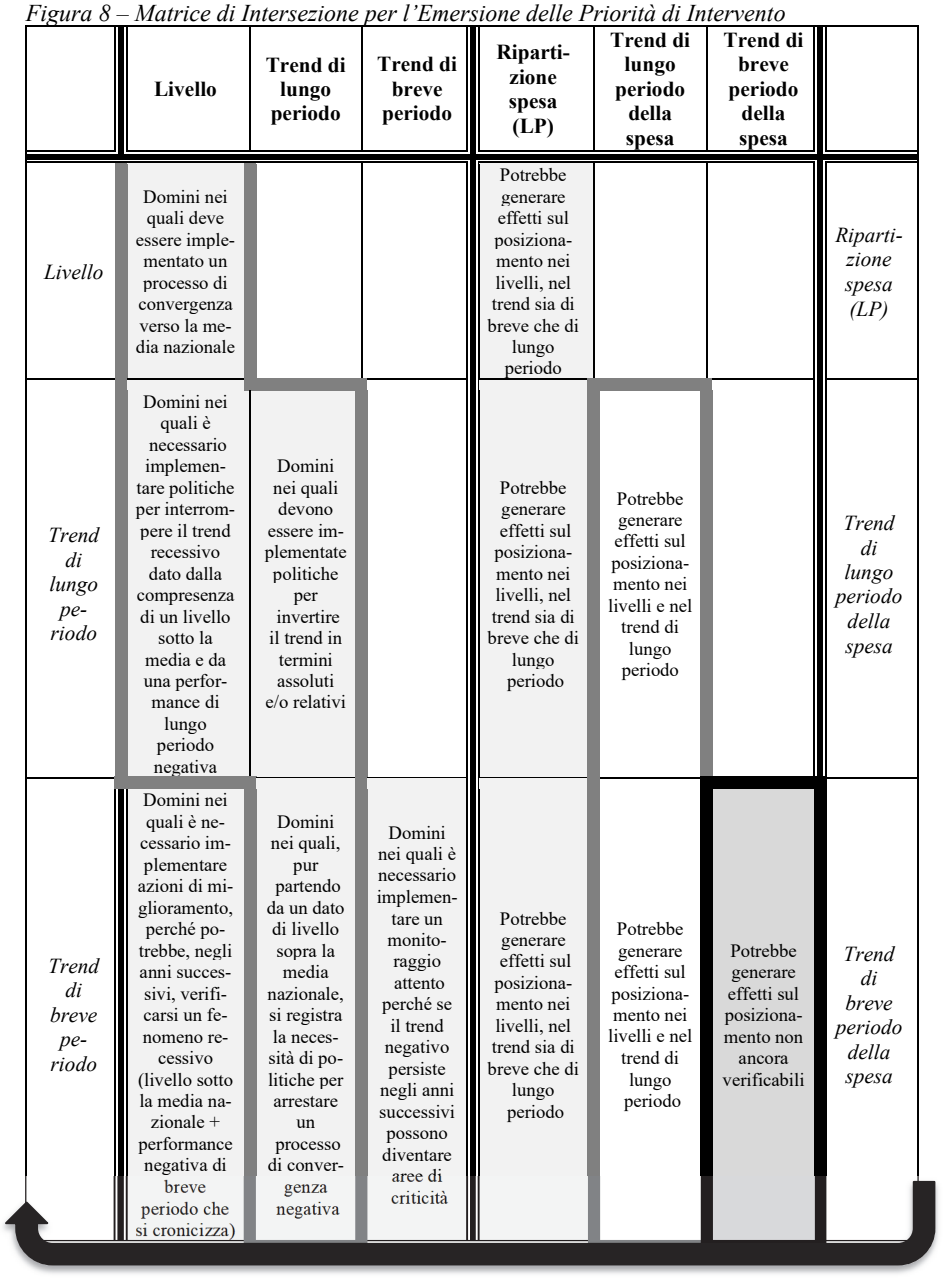
Per implementare l'analisi di cui all'obiettivo 1 e 2 (Box 5), è stata costruita una matrice di correlazione fra tutti gli indicatori compositi di ciascun dominio del BES dei Territori (Matrice 1) e una matrice di correlazione tra gli indicatori elementari e gli indicatori compositi di ciascun dominio del BES dei Territori (Matrice 2).

*Matrice 2 – Presenza e intensità di correlazione fra gli indicatori elementari del BES dei Territori e i relativi indicatori compositi*

| | Dominio | Salute | Istruzione e Formazione | Lavoro e Conciliazion e dei Tempi di Vita | Benessere Eocnomico | Relazioni Sociali | Politica e Istituzioni | Sicurezza | Ambiente | Ricerca e Innovazione | Qualità dei Servizi | Paesaggio e Patrimonio Culturale |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Speranza di vita alla nascita | Salute | | 0,6968 | 0,688 | 0,6183 | 0,536 | 0,4102 | 0,0474 | 0,0617 | 0,0585 | 0,6978 | 0,2916 |
| Mortalità infantile | | | *-0,4422* | *-0,4209* | *-0,3382* | -0,2276 | -0,1209 | 0,1309 | -0,048 | 0,0348 | *-0,3243* | -0,2008 |
| Mortalità per incidenti stradali (15-34 anni) | | | 0,0822 | 0,0183 | 0,0713 | 0,233 | 0,0995 | -0,1058 | 0,3114 | -0,0259 | -0,0294 | -0,0532 |
| Mortalità per tumore (20-64 anni) | | | *-0,3114* | -0,2147 | -0,1725 | -0,1234 | -0,1069 | -0,0934 | -0,0961 | -0,0325 | -0,0908 | -0,0833 |
| Mortalità per demenze e malattie del sistema nervoso (65 anni e più) | | | 0,4529 | 0,549 | 0,4645 | 0,5305 | 0,3747 | 0,1518 | 0,1992 | 0,1155 | 0,4489 | 0,0312 |
| Partecipazione alla scuola dell'infanzia | Istruzione e Formazione | 0,1324 | | 0,4543 | 0,4091 | 0,5346 | 0,2151 | 0,1381 | 0,3986 | -0,0208 | 0,3167 | 0,188 |
| Persone con almeno il diploma (25-64 anni) | | 0,4035 | | 0,6665 | 0,7208 | 0,4936 | 0,2204 | 0,0391 | 0,1351 | 0,1079 | 0,6222 | 0,4264 |
| Laureati e altri titoli terziari (25-39 anni) | | 0,3386 | | 0,642 | 0,7075 | 0,4639 | 0,1694 | -0,0366 | 0,0372 | 0,1628 | 0,6714 | 0,4356 |
| Passaggio all'università | | 0,3904 | | 0,4597 | 0,4662 | 0,4117 | 0,1327 | 0,0594 | 0,0541 | 0,0675 | 0,3655 | 0,1001 |
| Giovani che non lavorano e non studiano (Neet) | | *-0,4434* | | -0,9202 | -0,8262 | *-0,6919* | *-0,3721* | -0,1625 | -0,1894 | -0,11 | *-0,6938* | *-0,3165* |
| Partecipazione alla formazione continua | | 0,3374 | | 0,5934 | 0,7158 | 0,5258 | 0,2273 | -0,0139 | 0,0881 | 0,0989 | 0,6992 | 0,4279 |
| Competenza alfabetica degli studenti | | 0,3598 | | 0,8779 | 0,7913 | 0,6074 | 0,3312 | 0,1622 | 0,1674 | 0,026 | 0,5992 | 0,2573 |
| Competenza numerica degli studenti | | 0,4027 | | 0,8887 | 0,7905 | 0,6207 | 0,37 | 0,1598 | 0,1893 | -0,0105 | 0,6183 | 0,2574 |
| Tasso di occupazione (20-64 anni) | Lavoro e Conciliazione dei Tempi di Vita | 0,3877 | 0,9043 | | 0,9015 | 0,7559 | 0,4895 | 0,088 | 0,196 | 0,0572 | 0,7801 | 0,335 |
| Tasso di mancata partecipazione al lavoro | | *-0,4123* | -0,9006 | | -0,8851 | -0,7476 | *-0,4562* | -0,1161 | -0,2355 | -0,0532 | *-0,7435* | *-0,315* |
| Tasso di infortuni mortali e inabilità permanente | | 0,0451 | -0,226 | | *-0,3369* | -0,1168 | -0,0161 | 0,0382 | 0,0718 | -0,0982 | -0,2455 | -0,2146 |
| Tasso di occupazione giovanile (15-29 anni) | | 0,3463 | 0,8034 | | 0,8174 | 0,7001 | 0,4355 | 0,1943 | 0,202 | 0,0191 | 0,6719 | 0,2149 |
| Tasso di mancata partecipazione al lavoro giovanile (15-29 anni) | | *-0,4304* | -0,8629 | | -0,8429 | -0,7308 | *-0,4543* | -0,1577 | -0,2099 | -0,0482 | *-0,7028* | -0,2768 |
| Giornate retribuite nell'anno (lavoratori dipendenti) | | 0,2969 | 0,7236 | | 0,8118 | 0,5427 | 0,4687 | 0,2041 | 0,0199 | 0,0386 | 0,6508 | 0,2983 |
| Reddito medio disponibile pro capite | Benessere Economico | 0,363 | 0,8834 | 0,8905 | | 0,6892 | 0,4528 | 0,0368 | 0,1428 | 0,0723 | 0,7898 | 0,3774 |
| Retribuzione media annua dei lavoratori dipendenti | | 0,2942 | 0,7848 | 0,8622 | | 0,5702 | 0,4126 | 0,0372 | 0,0528 | 0,0436 | 0,7663 | 0,3473 |
| Importo medio annuo dei redditi pensionistici | | 0,3155 | 0,7863 | 0,7432 | | 0,588 | 0,3984 | -0,0203 | 0,0323 | 0,1632 | 0,7652 | 0,4838 |
| Pensionati con pensione di basso importo | | *-0,3722* | -0,8574 | -0,9069 | | -0,7564 | *-0,4931* | -0,1052 | -0,1557 | -0,0003 | *-0,6929* | -0,2972 |
| Patrimonio pro capite | | 0,2611 | 0,8122 | 0,8667 | | 0,6639 | 0,4452 | -0,0157 | 0,1802 | 0,0165 | 0,6889 | 0,2775 |
| Tasso di ingresso in sofferenza dei prestiti bancari alle famiglie | | -0,0943 | *-0,5862* | *-0,5814* | | *-0,6122* | -0,1479 | -0,0576 | -0,2836 | -0,1106 | *-0,5428* | -0,176 |
| Organizzazioni non profit | Relazioni Sociali | 0,1399 | 0,6397 | 0,6026 | 0,5807 | | 0,1812 | 0,3011 | 0,4363 | 0,1067 | 0,4373 | 0,2011 |
| Scuole accessibili | | 0,0933 | 0,5673 | 0,647 | 0,666 | | 0,48 | 0,045 | 0,0961 | 0,0357 | 0,6231 | 0,1099 |
| Partecipazione elettorale (elezioni europee) | Politica e Istituzioni | 0,3939 | 0,7136 | 0,7593 | 0,6744 | 0,4672 | | -0,0352 | 0,1114 | -0,0621 | 0,4713 | 0,2156 |
| Partecipazione elettorale (elezioni regionali) | | -0,1564 | *-0,3075* | 0,0492 | -0,1766 | *-0,3322* | | -0,0991 | -0,0101 | -0,1498 | *-0,3147* | *-0,6176* |
| Amministratori comunali donne | | 0,0636 | 0,1974 | 0,2572 | 0,3491 | 0,3188 | | -0,1078 | -0,2296 | -0,0082 | 0,5299 | 0,214 |
| Amministratori comunali con meno di 40 anni | | -0,1774 | *-0,5783* | *-0,5931* | *-0,6215* | *-0,438* | | -0,0094 | -0,04 | 0,0036 | *-0,4321* | *-0,3397* |
| Affollamento degli istituti di pena | | 0,0712 | 0,1624 | 0,1827 | 0,1247 | -0,0469 | | -0,0753 | -0,2196 | -0,0361 | 0,1176 | 0,0952 |
| Comuni: capacità di riscossione | | 0,0846 | 0,3632 | 0,4681 | 0,4537 | 0,3687 | | -0,0223 | 0,1379 | -0,0277 | 0,3783 | 0,1847 |
| Amministrazioni provinciali: capacità di riscossione | | -0,0869 | 0,2389 | 0,37 | 0,3559 | 0,3663 | | 0,1205 | -0,0297 | 0,127 | 0,3362 | 0,3054 |
| Omicidi | Sicurezza | 0,0045 | *-0,3232* | *-0,3585* | *-0,3122* | -0,2906 | -0,1883 | | 0,0265 | -0,0241 | -0,2829 | -0,1739 |
| Altri delitti violenti denunciati | | -0,0726 | -0,1647 | -0,1527 | -0,03 | -0,2231 | -0,0073 | | -0,1749 | -0,0979 | 0,1582 | 0,2967 |
| Delitti diffusi denunciati | | 0,2564 | 0,3161 | 0,3123 | 0,4081 | 0,1497 | 0,3352 | | -0,1301 | -0,0129 | 0,6188 | 0,357 |
| Mortalità stradale in ambito extraurbano | | *-0,3517* | *-0,3328* | *-0,3781* | *-0,3459* | -0,2637 | -0,2132 | | 0,0647 | -0,1681 | *-0,3776* | *-0,3007* |
| Dispersione da rete idrica comunale | Ambiente | -0,1193 | *-0,4138* | *-0,4685* | *-0,5107* | *-0,3856* | *-0,3219* | 0,1785 | | 0,0519 | *-0,375* | -0,1313 |
| Conferimento dei rifiuti urbani in discarica | | -0,1228 | *-0,3738* | *-0,3794* | *-0,3798* | -0,2886 | -0,204 | 0,0779 | | -0,1422 | *-0,337* | -0,2538 |
| Qualità dell'aria urbana - PM10 | | 0,3414 | 0,4555 | 0,7005 | 0,4825 | 0,4292 | 0,4991 | 0,1563 | | 0,1294 | 0,3391 | -0,0917 |
| Qualità dell'aria urbana - Biossido di azoto | | 0,0818 | 0,1406 | 0,0467 | 0,1523 | -0,1397 | -0,0158 | -0,1964 | | 0,1645 | 0,1908 | 0,5369 |
| Disponibilità di verde urbano | | 0,1143 | 0,0929 | 0,0149 | -0,0062 | 0,0455 | -0,0774 | 0,1501 | | -0,0104 | -0,0601 | 0,0718 |
| Energia da fonti rinnovabili | | -0,2447 | -0,121 | -0,1065 | -0,1496 | 0,0357 | -0,1486 | 0,1427 | | -0,0431 | -0,2727 | -0,1569 |
| Raccolta differenziata dei rifiuti urbani | | 0,2722 | 0,593 | 0,6987 | 0,6061 | 0,5472 | 0,3409 | 0,2083 | | -0,0632 | 0,4848 | 0,1096 |
| Impermeabilizzazione del suolo da copertura artificiale | | 0,1887 | 0,2531 | 0,2668 | 0,3059 | -0,0591 | 0,1278 | -0,2029 | | -0,0146 | 0,3893 | 0,5017 |
| Addetti nelle imprese culturali | Qualità dei Servizi | 0,2539 | 0,4689 | 0,4107 | 0,5286 | 0,2716 | 0,2333 | -0,1767 | -0,0251 | | 0,5946 | 0,4687 |
| Mobilità dei laureati italiani (25-39 anni) | | 0,3809 | 0,8281 | 0,7844 | 0,8338 | 0,5681 | 0,4272 | -0,1211 | 0,0714 | | 0,7996 | 0,3988 |
| Bambini che hanno usufruito dei servizi comunali per l'infanzia | | 0,3165 | 0,6598 | 0,626 | 0,7065 | 0,6558 | 0,4915 | -0,128 | 0,117 | 0,0052 | | 0,4081 |
| Irregolarità del servizio elettrico | | *-0,34* | -0,7681 | -0,7659 | -0,7573 | *-0,6495* | *-0,3568* | 0,0377 | -0,1135 | -0,0327 | | *-0,3532* |
| Posti-km offerti dal Tpl | | 0,2272 | 0,3503 | 0,2941 | 0,4341 | 0,1088 | 0,1062 | -0,2337 | -0,0362 | 0,1707 | | 0,3579 |
| Emigrazione ospedaliera in altra regione | | -0,0666 | -0,2594 | *-0,4368* | *-0,3858* | *-0,3033* | *-0,4334* | 0,0498 | 0,1112 | -0,0405 | | -0,2898 |
| Densità e rilevanza del patrimonio museale | Paesaggio e Patrimonio Culturale | -0,0045 | 0,1172 | 0,0528 | 0,1646 | -0,0816 | -0,0735 | *-0,3175* | -0,1801 | 0,2733 | 0,3509 | |
| Diffusione delle aziende agrituristiche | | 0,2221 | 0,3621 | 0,3256 | 0,3119 | 0,3439 | 0,1129 | 0,0204 | 0,1097 | 0,1452 | 0,3932 | |
| Densità del verde storico | | 0,1964 | 0,1909 | 0,1407 | 0,1477 | -0,0074 | 0,0614 | 0,1076 | -0,0884 | 0,0894 | 0,049 | |

Fonte: elaborazione propria su dati Istat.

*Figura 8 – Matrice di Intersezione per l'Emersione delle Priorità di Intervento*



| | **Livello** | **Trend di lungo periodo** | **Trend di breve periodo** | **Ripartizione spesa (LP)** | **Trend di lungo periodo della spesa** | **Trend di breve periodo della spesa** | |
|---|---|---|---|---|---|---|---|
| *Livello* | Domini nei quali deve essere implementato un processo di convergenza verso la media nazionale | | | Potrebbe generare effetti sul posizionamento nei livelli, nel trend sia di breve che di lungo periodo | | | *Ripartizione spesa (LP)* |
| *Trend di lungo periodo* | Domini nei quali è necessario implementare politiche per interrompere il trend recessivo dato dalla compresenza di un livello sotto la media e da una performance di lungo periodo negativa | Domini nei quali devono essere implementate politiche per invertire il trend in termini assoluti e/o relativi | | Potrebbe generare effetti sul posizionamento nei livelli, nel trend sia di breve che di lungo periodo | Potrebbe generare effetti sul posizionamento nei livelli e nel trend di lungo periodo | | *Trend di lungo periodo della spesa* |
| *Trend di breve periodo* | Domini nei quali è necessario implementare azioni di miglioramento, perché potrebbe, negli anni successivi, verificarsi un fenomeno recessivo (livello sotto la media nazionale + performance negativa di breve periodo che si cronicizza) | Domini nei quali, pur partendo da un dato di livello sopra la media nazionale, si registra la necessità di politiche per arrestare un processo di convergenza negativa | Domini nei quali è necessario implementare un monitoraggio attento perché se il trend negativo persiste negli anni successivi possono diventare aree di criticità | Potrebbe generare effetti sul posizionamento nei livelli, nel trend sia di breve che di lungo periodo | Potrebbe generare effetti sul posizionamento nei livelli e nel trend di lungo periodo | Potrebbe generare effetti sul posizionamento non ancora verificabili | *Trend di breve periodo della spesa* |

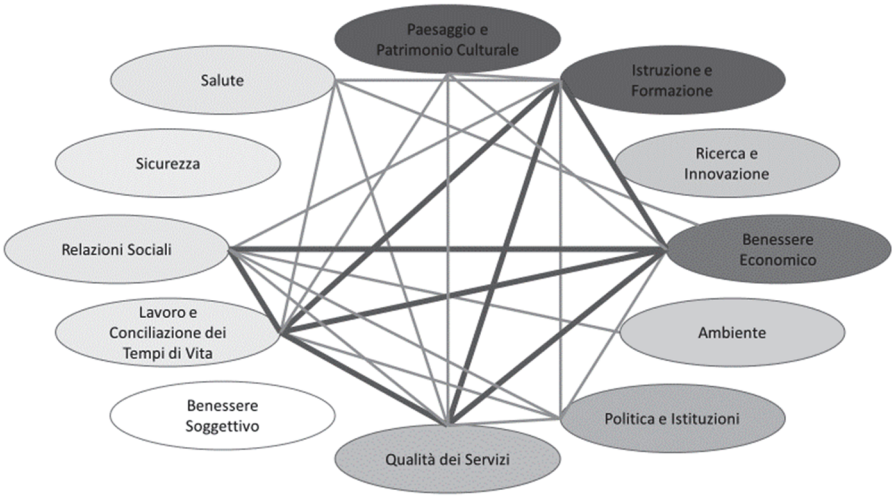
Fonte: elaborazione propria.

A partire dai risultati di tale matrice si è proceduto a porre in evidenza:

– le correlazioni forti e positive (corr>=0,7), evidenziate con un colore grigio scuro;
– le correlazioni positive (0,3<=corr<0,7), evidenziate con un colore grigio chiaro;
– le correlazioni negative (-0,7<corr<=-0,3), evidenziate con un colore nero e testo bianco in corsivo;
– le correlazioni forti e negative (corr<=-0,7), evidenziate con un colore nero e testo bianco;
– i valori compresi fra -0,3 e +0,3 sono stati interpretati come assenza di correlazione e non sono stati evidenziati.

La Figura 9 sintetizza la mappa dei legami di correlazione che intercorrono fra gli indicatori compositi di dominio (Matrice 1).

*Figura 9 – Il Grado di Correlazione fra i Compositi di Dominio*

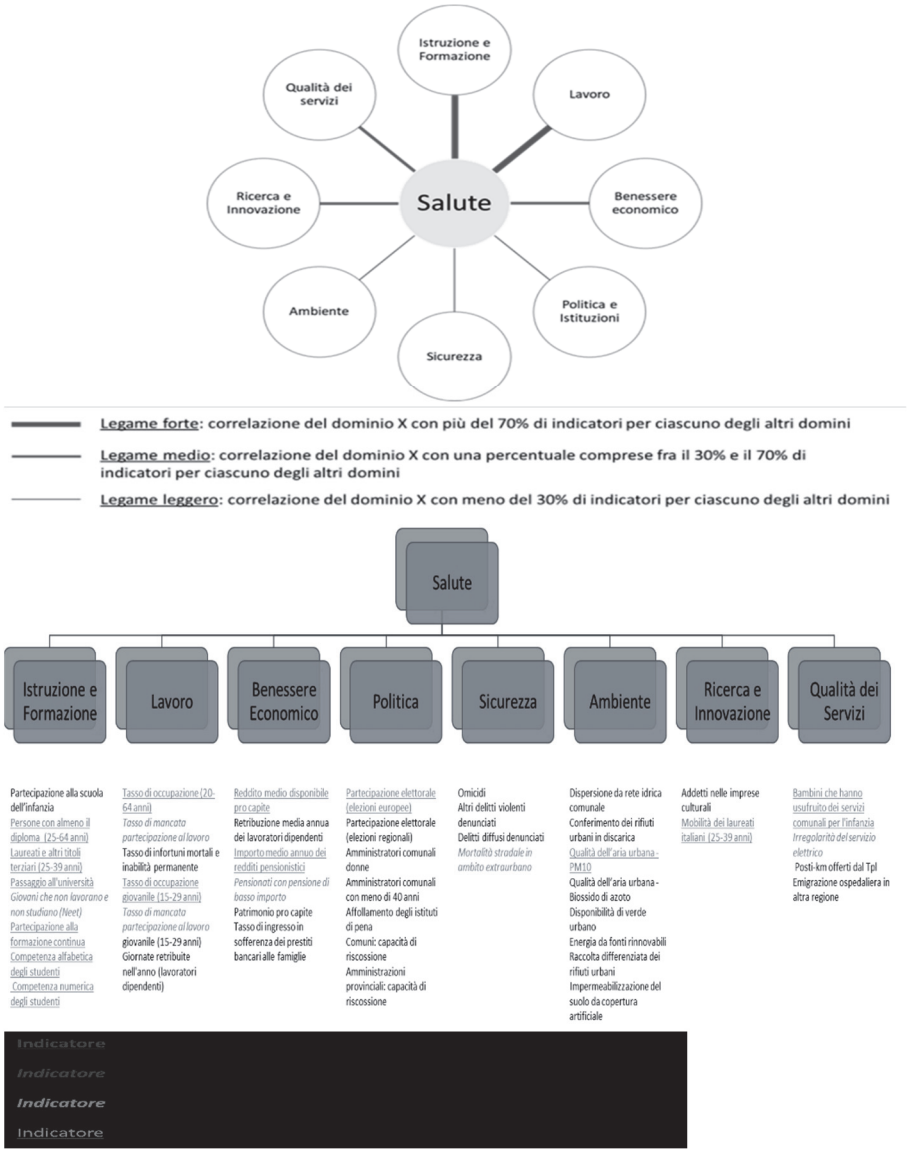



Fonte: elaborazione propria.

Le correlazioni più forti (indice di correlazione maggiore di +0,7) si registrano fra i seguenti domini: Istruzione e Formazione, Lavoro e Conciliazione dei Tempi di Vita, Benessere Economico, Relazioni Sociali e Qualità dei Servizi. Tali domini hanno anche un grado di correlazione più basso (indice di correlazione compreso fra +0,3 e +0,7) con altri aspetti del benessere, quali la Salute, le Relazioni Sociali, la Politica e Istituzioni e il Paesaggio e

Patrimonio Culturali. Non si registrano correlazioni con altri domini per Ricerca e Innovazione e Sicurezza, mentre l'Ambiente risulta essere leggermente correlato con le Relazioni Sociali.

*Figura 10 – Correlazioni e Legami fra Domini: Esempio per il Dominio Salute*




Fonte: elaborazione propria.

La Figura 10 riporta, a titolo esemplificativo per il dominio Salute, i risultati dell'analisi della correlazione e dell'intensità dei legami fra domini, intermediata dagli indicatori elementari. L'obiettivo 3 (Box 5) riguarda l'intensità dei legami che intercorrono fra gli indicatori di ciascun dominio e i compositi di domini (Matrice 2). La tipologia di legame è stata definita come segue:

– Legami forti: correlazione del dominio X con più del 70% di indicatori per ciascuno degli altri domini.
– Legami medi: correlazione del dominio X con una percentuale comprese fra il 30% e il 70% di indicatori per ciascuno degli altri domini.
– Legami leggeri: correlazione del dominio X con meno del 30% di indicatori per ciascuno degli altri domini.

Una simile impostazione consente di individuare agilmente l'impatto sul benessere multidimensionale, in termini di effetti diretti e indiretti, di natura (positiva o negativa) e di intensità (forte, media o leggera), di una politica o di una singola progettualità che insiste direttamente su un solo indicatore del BES. In altri termini, per rimanere sull'esempio riportato in Figura 7, un programma di inclusione lavorativa per i giovani avrà un impatto diretto, forte e positivo sul dominio "Lavoro e Conciliazione dei Tempi di vita" (di cui gli indicatori occupazione giovanile e mancata partecipazione al lavoro giovanile fanno parte) ed un impatto indiretto e positivo sul dominio "Salute". Grazie all'utilizzo di questi gradi di interazione fra dimensioni diverse del benessere, è possibile stimare come un intervento di politica del lavoro possa contribuire, non solo a ridurre i costi associati ai sussidi per la disoccupazione e ad incrementare le entrate derivanti dalla tassazione, ma, nel lungo periodo, anche a ridurre i costi legati alla spesa sanitaria.

## 7. Conclusioni

Le politiche di crescita "a venire" saranno sempre più caratterizzate da un orientamento alla sostenibilità ambientale e sociale. In Europa, tale processo ha subito una decisa accelerazione a seguito, in particolare, del *Green Deal* e dell'*Action Plan* sulla finanza sostenibile. Governi centrali ed amministrazioni locali dovranno, pertanto, ispirare le loro politiche ai principi della sostenibilità. È, questa, una nuova direzione che deve essere supportata da strumenti decisionali innovativi.

Il presente lavoro propone un modello di *Piano Strategico di Mandato Bes-oriented* per i Comuni italiani, utile a coniugare le politiche di bilancio delle amministrazioni locali con gli obiettivi sociali ed ambientali riconducibili agli indicatori di Benessere Equo e Sostenibile.

Nello specifico, il modello – estendibile alle Città Metropolitane ed alle Regioni – prevede un'analisi di contesto, un'analisi di bilancio ed una matrice di materialità che consentono alle Amministrazioni locali di definire priorità strategiche ed obiettivi di impatto.

L'*Analisi di contesto e di posizionamento del Comune/Città Metropolitana/Regione* rispetto al BES, per il tramite di un'analisi comparata basata sugli indicatori del BES (BES dei Territori, nel caso di Comuni e delle Città metropolitane; indicatori del BES delle Regioni, nel caso delle Regioni), permette alle PA di adottare delle strategie di welfare in relazione ad un benchmark ed al posizionamento della pubblica amministrazione rispetto alla media nazionale.

L'*Analisi del bilancio del Comune* rispetto al BES permette all'amministrazione di valutare la coerenza delle proprie politiche di spesa in ragione del proprio posizionamento BES e delle strategie di sviluppo sostenibile.

La *Costruzione di una matrice di materialità*, che mette in relazione i dati dell'analisi di contesto e i dati di bilancio tramite i domini BES, consente di far emergere le aree di benessere nelle quali è necessario intervenire prioritariamente, poiché queste ultime presentano dati di contesto e di bilancio che non sono in linea fra di loro. Dalla matrice emerge, ad esempio, quali sono i domini nei quali si sono registrate performance negative in termini di spesa pubblica, che possono aver già generato, o potranno generare, un peggioramento nei livelli e nell'andamento degli indicatori del benessere equo e sostenibile.

La *Scelta delle priorità strategiche e degli obiettivi d'impatto,* utilizzando le interazioni fra le diverse dimensioni del BES, consente di individuare le aree del benessere direttamente ed indirettamente collegate ai progetti di sostenibilità, e di misurare il loro impatto diretto ed indiretto. A titolo esemplificativo, l'investimento in un programma di riduzione della recidiva carceraria impatterà direttamente sul dominio BES "Sicurezza" ed indirettamente sul dominio "Relazioni Sociali". Grazie allo studio delle interazioni tra domini BES, ed al collegamento di quest'ultimo con le voci di bilancio, il modello consente di calcolare, non solo gli impatti diretti sulla spesa pubblica, ma anche quelli indiretti (effetto moltiplicatore).

In definitiva, l'adozione del modello *Bes-oriented* proposto, consente ai Comuni, ed in generale alla pubblica amministrazione, di promuovere processi e progetti di sviluppo sostenibile, coniugando il miglioramento delle condizioni di benessere multidimensionale dei propri cittadini con una migliore gestione delle risorse pubbliche.

## Appendice

*Il Mazziotta-Pareto Index*

Il processo di aggregazione segue la metodologia del Mazziotta-Pareto Index (MPI)[21] e trova le sue ragioni nel fatto che esso penalizza con variabilità orizzontale la media semplice. Questa impostazione è di assoluta rilevanza nel momento in cui si affrontano le questioni legate al benessere multidimensionale, che per sua natura è la combinazione di una serie di domini, che devono essere quanto più omogenei fra di loro per garantire condizioni equilibrate di ben-vivere. In particolare si è proceduti con:

- la normalizzazione degli indicatori elementari in un range compreso fra 70 (minimo) e 130 (massimo) secondo la seguente formula:

$$I_{ij} = \begin{cases} \frac{(x_{ij} - Min_{x_j})}{(Max_{x_j} - Min_{x_j})} 60 + 70 & se\ l'indicatore\ j\_esimo\ ha\ polarità\ positiva \\ \frac{(Max_{x_j} - x_{ij})}{(Max_{x_j} - Min_{x_j})} 60 + 70 & se\ l'indicatore\ j\_esimo\ ha\ polarità\ negativa \end{cases}$$

  Dove:
  - $I_{ij}$ è l'indicatore j_esimo dell'unità statistica i_esima normalizzato
  - $x_{ij}$ è l'indicatore j_esimo dell'unità statistica i_esima prima della normalizzazione
  - $Min_{x_j}$ è il valore minimo registrato per il j_esimo indicatore fra le n unità statistiche
  - $Max_{x_j}$ è il valore massimo registrato per il j_esimo indicatore fra le n unità statistiche
- il calcolo del Mazziotta-Pareto Index secondo la seguente formula: $CID_i = M_i - S_i cv_i$

  Dove:
  - $M_i = \frac{\sum_{j=1}^{m} I_{ij}}{m}$ è la media aritmetica fra gli indicatori di uno stesso dominio per l'i_esima unità statistica;
  - $S_i = \sqrt{\frac{\sum_{j=1}^{m} (I_{ij} - M_i)^2}{m}}$ è la deviazione standard fra gli indicatori di uno stesso dominio per l'i_esima unità statistica;
  - $cv_i = \frac{S_i}{M_i}$ è il coefficiente di variazione dell'i_esima unità statistica;
  - $CID_i$ è l'indicatore composito del dominio per l'i_esima unità statistica

[21] Mazziotta, Pareto, 2018, 967-976.

Il Mazziotta-Pareto Index è stato calcolato per ciascuno degli 11 domini del BES dei Territori, per tutte le 107 province italiane.

*Le matrici di correlazione*

L'indice di correlazione utilizzato per l'analisi è quello di Pearson. Esso assume sempre valori compresi fra -1 e +1 ed è definito come: $r = \frac{\sigma_{xy}}{\sigma_x \sigma_y}$

Dove:

- $\sigma_{xy}$ è la covarianza fra X e Y
- $\sigma_x$ è la deviazione standard di X
- $\sigma_y$ è la deviazione standard di Y

## Riferimenti bibliografici


Becchetti L., Pisani F., Semplici L. (2018). *La ricchezza delle Regioni*. Soveria Mannelli (Cz): Rubbettino Editore.

Bova D.M. (2019*). Guida per il rapporto del Bes (Benessere Equo e Sostenibile) organico per comuni*: manuale applicativo. Milano: Franco Angeli.

Collevecchio M. (2019). Indicatori Bes anche nei comuni. *Italia Oggi*, 43.

Interlinkages Working Group of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (2019). *Interlinkages of the 2030 Agenda for Sustainable Development*. Disponibile al seguente link: https://unstats.un.org/unsd/statcom/50th-session/documents/BG-Item3a-Interlinkages-2030-Agenda-for-Sustainable-Development-E.pdf

Istat (2019). *Rapporto SDGs 2019. Informazioni statistiche per l'Agenda 2030 in Italia*.

Kaplan R., Norton D. (1996). *Using the balanced scorecard as a strategic management system*. Harvard Business Review.

Mazziotta M., Pareto A. (2018). Measuring Well-Being Over Time: The Adjusted Mazziotta-Pareto Index Versus Other Non-compensatory Indices. *Social Indicators Research*, 136, 967-976. DOI:10.1007/s11205-017-1577-5

Melchiorri C., Brembilla B., Manzoni P. (2011). *Dalla Politica alla Buona Amministrazione. Come realizzare il programma elettorale ed innovare la Pubblica Amministrazione*. Milano: Franco Angeli.

Miola A., Borchardt S., Neher F., Buscaglia D. (2019). *Interlinkages and policy coherence for the Sustainable Development Goals implementation: An operational method to identify trade-offs and co-benefits in a systemic way*. EUR 29646 EN, Publications Office of the European Union, Luxembourg, 2019. DOI: 10.2760/472928, JRC115163.

Peraro F., Vecchiato G. (2007). *Responsabilità Sociale del Territorio. Manuale operativo di sviluppo sostenibile e best practices*. Milano: Franco Angeli.

Pradhan P., Costa L., Rybski D., Lucht W., Kropp J.P. (2017). *A Systematic Study of Sustainable Development Goal (SDG) Interactions,* Earth's Future, 5, 1169–1179. DOI: 10.1002/2017EF000632

**Sitografia**

BES: http://www.besdelleprovince.it/pubblicazioni/2019/
UrBES: https://www.istat.it/it/archivio/92375
BES dei Territori: https://www.istat.it/it/benessere-e-sostenibilit%C3% A0/ la-misurazione-del-benessere-(bes)/il-bes-dei-territori
EC: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_it
EC: https://ec.europa.eu/info/business-economy-euro/banking-and-finance/ sustainable-finance_it
ISTAT: https://www.istat.it/it/benessere-e-sostenibilit%C3%A0/la-misurazione-del-benessere-(bes)
ISTAT: https://www.istat.it/it/files//2018/04/12-domini-commissione-scientifica.pdf
ISTAT: https://www.istat.it/it/benessere-e-sostenibilit%C3%A0/la-misurazione-del-benessere-(bes)/il-bes-nel-def
SDGs Compass: https://sdgcompass.org/wp-content/uploads/2015/12/019104_SDG_Compass_Guide_2015.pd

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# Public Spending and Sustainable Development: a Pay by Result Model for the Public Administration


## Abstract

Sustainable development policies are a hot topic on the policy makers' agenda; their implementation requires the definition of strategies, frameworks for measuring impacts, and economic models oriented towards sustainable finance, which are currently being investigated by national and international researchers and institutions. This work defines a theoretical model useful to support the public administration (PA) in identifying financial strategies and architectures aimed at environmental and social sustainability. Specifically, the model guides public decision makers in orienting public expenditure in favor of sustainable development processes, inspired by three specific perspectives: the positioning strategy that the PA assumes with respect to various sustainable development indicators, the maximization of impact in terms of multidimensional well-being, the efficiency in the use of public resources thanks to public-private schemes. The model proposed in this work is flexible and can be declined on the different levels of the PA, from a central level to a local one, and calibrated on different frameworks for measuring environmental and social sustainability.

The work contributes to advancing the literature regarding sustainable finance by laying the foundations for a modeling that is not limited to supporting the analysis of the positioning of the PA with respect to sustainability objectives, but connects the positioning itself to the public spending trend and to its more efficient management, in a partnership context with the private sector.



*Keywords*: sustainable regional planning, public expenditure, sustainable policies, SDGs.

# 1. Introduction

Sustainable development policies are currently a top priority for policy makers' agenda; their implementation requires the definition of strategies, frameworks for measuring impacts, and economic models that are oriented towards sustainable finance. The young, and still limited, literature exploring the relationship between public policies, economic choices, and environmental and social sustainability has yet to advance, especially for integrated accounting systems, i.e., systems combining economic decisions with decisions related to sustainability, and financial models inspired to foster partnerships with private investors and an efficient use of public resources.

On the other hand, governments and the public administration (hereinafter: "PA") have become fully aware of their role in the process of reaching environmental and social sustainability objectives. This role is carried out, not only at central administrations level, but also along the whole chain of the territorial public administration. To this end, central and local administrations have recently begun to develop tools to evaluate, monitor, and implement their policies in order to comply with Sustainable Development Goals (hereinafter: "SDGs") set by the United Nations in the 2030 Agenda. This is even more urgent for countries like Italy, which counts more than 8,000 municipalities providing social and environmental impact services[1].

Under this framework, our work proposes a theoretical model aimed to support the PA in identifying strategies for environmental and social sustainability and in supporting financial choices that make the public budget economically sustainable. Specifically, the model guides public decision makers' choice in the allocation of expenditure, orienting it towards investments in line with positioning objectives aligned with the SDGs framework, and defines economic variables useful for implementing forms of partnership with private investors according to a pay by result (PbR) mechanism.

The model relies on three different strands of literature: public planning for sustainable development, the use of multidimensional and accountability indicators for the impact assessment of public policies, and public private partnership (hereinafter: PPP) inspired by a PbR logic typical of sustainable finance and more specifically of impact finance.

This work advances the literature on sustainable finance by laying foundations for a model which defines the PA positioning analysis, with respect to sustainability goals, and connects it to the public spending in the context of public-private partnerships. The current literature on the link between SDGs, accounting, and PPP has been recently developed and often investigates dataset empirically. For instance, Garcia-Amate (2022) have investigated how supporting the environmental transition within public programs helps attracting private investment. However, this literature lacks a theoretical background that may serve to explain

[1] In Italy, this process is supported both by the Alliance for Sustainable Development and the "Fair and Sustainable Wellbeing" (Benessere Equo e Sostenibile, hereinafter: "BES") framework. The former is an organization monitoring the SDGs progress for the country. The latter is a multi-dimensional index composed by a series of indicators grouped into 12 domains particularly relevant for Italy. Thus, BES complements the SDGs for monitoring sustainability in Italy. Furthermore, the "National Strategy for Sustainable Development" has given further impetus to the PA alignment with sustainability objectives, even if this path seems to entail, net of a few virtuous examples, greater slowness (Bova, 2019; Collevecchio, 2019).

empirical results and guide policy-makers in understanding how to move from SDGs reporting to building up a PPP, and our analyses fills this gap.

The rest of this work is structured as follows: section 2 contextualizes the reference literature; section 3 clarifies the proposed model; section 4 concludes and summarizes some key takeaways.

## 2. Theoretical Background that Inspired the Model

The literature analyzing the relationship between public policies and environmental and social sustainability is relatively recent and is limited to some specific dimensions. As highlighted by La Torre et al. (2022), the majority of these studies has been published since 2017, and can be gathered into four main areas: public planning for sustainable development, integrated accounting systems for sustainability, impact measurement public policies, and sustainable finance and public-private partnership tools.

In general, the processes of integrating sustainability into the strategic planning of the PA represent single case attempts, rather than robust conceptual systematization (Figueira et al., 2018; Tommasetti et al., 2020). Several authors note, for example, the lack of a systemic approach that limits, among other things, the ability to conduct integrated analyses across sectors (Allen et al., 2018) and planning levels - i.e. local, regional, and national (Zolin et al., 2020). Other studies complain about the absence of paths and tools aimed at defining priorities among actions (Cherp et al., 2004). In this direction, several scholars suggest promoting a bottom-up approach to define and evaluate sustainable development policies. This approach would enhance the ability to restore awareness in the link between resources and results, helping policy makers identify the most suitable policies for a given place.

Literature on "planning and accounting of public expenditure" points out that the PA, especially local authorities, allocate financial commitments for social purposes based on a traditional budget item classification; in addition, decisions are based on historical social expenditures, rather than on future social objectives, thus decreasing the effectiveness of sustainability policies (Tafuro et al., 2019; Sisto et al., 2020).

The broader strand of literature investigates "impact measurement frameworks applied in the public sector". Due to the absence of universal reporting standards, some tools tend to overlap each other, increasing the effort to comply on current regulation, and making the comparison between inter- and intra-territorial entities more difficult (Hege & Brimont, 2018; Biondi & Bracci, 2018). For this reason, there is a widespread practice captured by literature of considering the SDGs as a reference framework. Moreover, most countries use the SDGs indicators as a measurement and monitoring framework for public policies; consequently, a large body of literature deals with monitoring the progress of certain countries according to the SDGs and 2030 targets. However, in Europe, some countries, like Italy and Poland, have developed a series of indicators to measure territorial sustainability (Bellantuono, Lagrasta, Pontrandolfo & Scozzi, 2021; Raszkowski & Bartniczak, 2019). This allows to compare local results within the countries, even though a domestic framework creates an obstacle to international comparison.

From a PA perspective, the financial dynamics supporting sustainable growth are linked with the need to find private sources that can amplify the impact of increasingly reduced public financial resources. Moreover, the strong disparities in financial autonomy between central PAs and local administrations are reflected in a different capacity of the administrative territorial units to fulfill their responsibilities to ensure sustainable territorial development (Suditu et al., 2014).

In this perspective, the last field retrieved from academic literature concerns "impact finance models". These models are also known as “Pay by Result” (PbR) mechanisms, and include social impact bonds (OECD, 2016), and recent forms of public-private partnerships (PPPs). The partnerships’ objective is to attract private funds and highly specialized skills to reduce the economic and managerial financial burden that the PA should bear for certain investments (McHugh et al., 2013; Sinclair et al., 2014; Nicholls & Tomkinson, 2015). However, the main feature of impact finance tools in general, and PbR tools in particular, is that they attract traditional investors together with "patient" investors, that is, investors who are willing to link their economic return with the level of social or environmental impact reached, and this return is likely to be the market value (OECD, 2016; Gustafsson-Wright et al., 2015). This makes PbR and social impact bonds (SIBs) contracts different from traditional partnerships, precisely because of the intrinsic motivations of their agents that might have positive and negative consequences for adverse selection issues (Gerhart and Fang, 2015). The use of these financial instruments for public utility services involves risks and opportunities that still need to be explored (Warner, 2013; Edmiston and Nicholls, 2018; Fraser et al., 2018). Most of the studies on PbR tools are qualitative, and are mainly case studies (Broccardo et al., 2020). A few papers analyze PbR models from a business models perspective (La Torre et al., 2019; 2020) useful for partnerships (Rizziello et al., 2020). In this perspective, an interesting work is proposed by Becchetti et al. (2021): the authors identify the necessary and sufficient conditions for the PA to use a SIB.

What we have summarised so far suggests a few solutions to effectively integrate sustainability factors into public policies. The above-mentioned literature highlights the need for models allowing to inspire public spending choices, not only for positioning analyses, with respect to sustainability indicators, but also for targeting specific objective values. The positioning analysis, and the definition of medium and long-term targets, must also serve as a first step before financial choices; this calls for a renewed budget policy, which cannot be separated from new integrated accounting models, able to combine accounting and impact metrics. Finally, the increasingly reduced quantity of public resources available should prompt the PA to consider new forms of partnership with private individuals, especially PbR-type models.

Our analysis contributes to the existing literature by offering the PA a theoretical model that can be applied according to different target needs and perspectives. In fact, our model (i) is conceived to be implemented both at the local level and at central administration level, and to be applied transversally to all the PA sectors; (ii) connects the traditional accounting, i.e., an economic-financial characteristic, to the accounting of environmental and social sustainability, reclassifying the budget of the PA according to the sustainability framework; (iii) adopts the framework of the SDGs, but can be adapted to any measurement framework, where significant

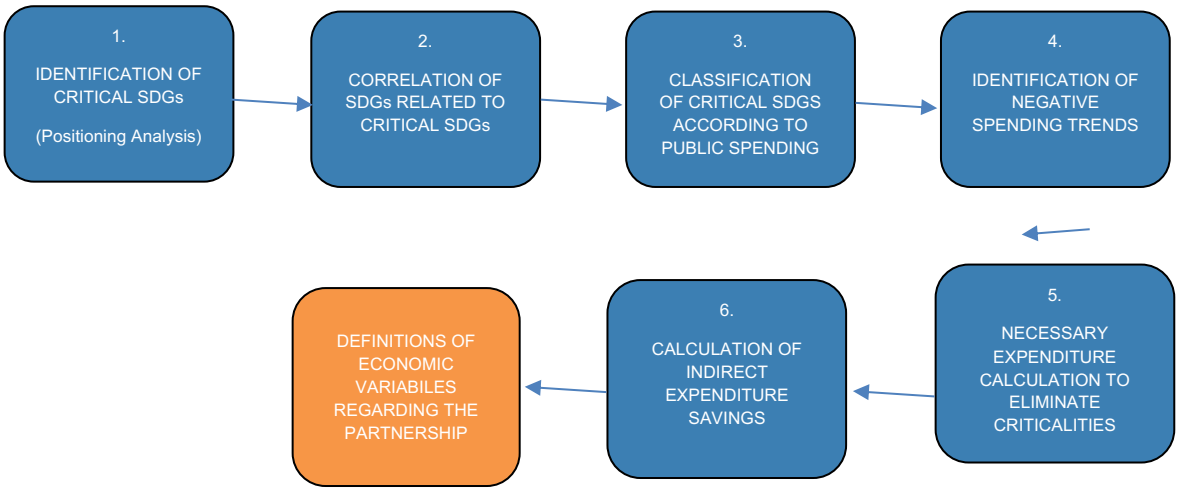
historical series of the related indicators exist; (iv) estimates the economic variables useful for defining PPPs using PbR models.

## 3. The Model

Our theoretical model relies on the SGDs as a sustainability framework; depending on the context, however, the model can be calibrated using different multidimensional well-being and sustainable development frameworks, i.e., at international and national level, and can be applied to the different levels of the PA, i.e., regions, metropolitan cities, and central administrations.

The model follows a building block approach based on 7 components: the first two develop a positioning analysis by identifying sustainability indicators defined as “critical” with respect to a given benchmark; more specifically, we identify critical indicators (component 1) and indicators related to the critical ones (component 2); in this analysis, SDGs indicators are our reference framework. Components 3, 4, 5 refer to the reference PA budget structure, and classify expenditure items according to the sustainability indicators (component 3), derive the expenditure trends (component 4), and set the gap expenditure necessary to make critical indicators and expenditures no longer critical and achieve a benchmark positioning (component 5). Components 6 and 7 define the economic variables for a partnership with private investors using a PbR logic; these variables refer to the indirect spending savings achieved by the PA, due to investments aimed at improving critical sustainability indicators (component 6), and to the level of economic return ensured by private capital, given the public budget constraint and the cost savings arising from the generated impact (Figure 1).

**Figure 1**. The Model Building Block Approach




**Source**: authors elaboration.

## 3.1. Positioning Analysis and Identification of Critical SDGs

The positioning analysis identifies critical SDGs in three phases. The first identifies, for each indicator *i* of the SDG *j* at time *t*, $I_{ijt}$, three indices:

- the level of performance of the last available year *T,* $I_{ijT}$;

- the percentage change between the levels of the last two years,

$$\text{DELTA1}I_{ijT} = (I_{ijT} - I_{ijT-1}) / I_{ijT-1};$$

- the percentage change between the levels of the last year and five years before,

$$\text{DELTA5}I_{ijT} = (I_{ijT} - I_{ijT-5}) / I_{ijT-5}.$$

The second phase compares these indices with reference benchmarks; depending on the objectives of the analysis and the context, the benchmark can be represented by the average of the three indices at municipal or metropolitan city (respectively, **MC$I_{jT}$, MCDELTA1$I_{ijT}$** and **MCDELTA5$I_{ijT}$**), regional (respectively, **REG$I_{jT}$, REGDELTA1$I_{ijT}$** and **REGDELTA5$I_{ijT}$**), or national (respectively, **ITA$I_{jT}$, ITADELTA1$I_{ijT}$** and **ITADELTA5$I_{ijT}$**) level.

In the third phase, the critical SDGs are identified through quantitative and qualitative assessments. In this analysis, our quantitative criterion defines a critical goal as that with its indicators $I_{ijT}$ such that all the indices (**$I_{ijT}$, DELTA1$I_{ijT}$** and **DELTA5$I_{ijT}$**) are lower than their respective benchmark averages; we will call this percentage Dj%.

For the sake of simplicity, in this paper we take national averages as our benchmark, even though the model might be applied to any local PA perspectives. Similarly, the 50% threshold for Dj% to be critical has been arbitrarily set, and can be qualitatively assessed, as well as modified based on the available dataset or political priorities of the PA.

After our positioning analysis, we are now able to classify the SDGs into two categories: critical and non-critical goals. The set of critical goals (CRITj) will therefore be composed of those SDGj for which all three positioning indices are lower than their respective average benchmarks: in our case, national averages.

More formally, we can identify critical SDGs as follows:

CRITj = SDGj if

$$I_{iDjT} < \textbf{MC}I_{iDjT}$$

$$\text{DELTA1}I_{iDjT} < \textbf{MCDELTA1}I_{iDjT}$$

$$\text{DELTA5}I_{iDjT} < \textbf{MCDELTA5}I_{iDjT}$$

for at least half of *i* belonging to SDGj.

Then, CRIT represents the set of critical goals CRITj, that is, the js that satisfy the three positioning constraints. Note that some indicators may be expressed differently; that is, some indicators increase as the indicator itself improves (i.e., life expectancy), while others decrease (i.e., number of road accidents). In this case, the evaluator should adjust the interpretation of the signs accordingly.

## 3.2. Correlations among SDGs

The model considers the possible correlation among SDGs in order to capture the effect that an intervention on a critical SDG has on other SDGs. Consider, for example, SDG 13 "Climate actions" and SDG 8 "Decent work and economic growth"; we can assume (and empirically test) that an improvement in one of these SDGs may also have positive effects on other SDGs, such as, for example, SDG 3 "Good health and well-being".

We therefore assume that this interaction among goals can be written using the following linear model:

$$SDGi = \mathrm{SUM}_{j \neq i}\, b_{ij}\, SDGj + c_i$$

where $b_{ij}$ are the parameters capturing the link between SDGs *i* and *j*, and $c_i$ is a constant term. Each goal *i* can be expressed as the sum of other goals *j* plus a fixed parameter characteristic of that goal. The terms $b_{ij}$ represent correlation among goals and can be estimated through an econometric model using minimum least squares or fixed or variable effects models, depending on available data. Once the parameters $b_{ij}$ are estimated, we define a strong link between SDGi and SDGj if $b_{ij}$ is statistically significant at 5% (i.e., p-value < 0.05), and we assume $b_{ij} = 0$ otherwise.

This econometric analysis may follow a simpler correlation analysis among goals for the sake of including only relevant goals. This step could be particularly useful if the number of observations is not enough to obtain sufficiently robust results and to avoid an incorrectly specified model. Even in this case, to obtain consistent and reliable results, a qualitative assessment by the evaluator in the choice of variables and the model is essential.

## 3.3. Relationship between Expenditure and SDGs

After having identified critical goals and their correlated goals, we analyse the SDG-oriented budget of the PA and identify the critical expenditure items.

First, we classify all expenses items according to the SDGs. Then, we identify the items that show negative trends over time, which could potentially explain the critical positioning in terms of SDGs, and which represent areas of potential further improvement for the PA budget and critical SDGs.

Similarly to what we have done with the SDG positioning analysis, this analysis also consists of four steps. The first links budget spending programs and SDGs; for our purpose, we assume

an expense item $m_{it}$ for each SDGi in year $t$. More precisely, we assume that $m_{it}$ expenditure and sustainable development indicators are linked through the following linear relationship:

$$SDGi_t = \alpha_i \, m_{it-1} + k_i, \text{ with } \alpha_i > 0$$

where sustainable development goal SDGi is a function of a fixed value $k_i$ and a variable value proportional to a parameter $\alpha_i$. The term $k_i$ is equivalent to the value that would be obtained if the PA did not invest any expenditure for that budget program associated to SGDi; for this reason, we assume negative $k_i$, meaning that we always need a positive expense to obtain a positive target value. The coefficient $\alpha_i$, on the other hand, captures the effect that a monetary investment (for example, 1 euro) has on the value of the goal.

This model can be used to analyse historical data of the targeted PA budget, with expenditure items that refer to each goal, to determine the values of $k_i$ and $\alpha_i$. Also, for the budget analysis, the correlation between expenditure and goals can be estimated through an econometric model using the minimum least squares model or fixed or variable effects models, depending on the available data. Once the $\alpha_i$ parameters have been estimated, we define a strong link between SDGi and its expenditure, if $\alpha_i$ is statistically significant at 5% (i.e., p-value < 0.05).

In the second step, we analyze the change in the expenditure between the two last years (i.e., $DELTA1m_{iT} = m_{iT} - m_{iT-1}$), or the expenditure of five years earlier ($DELTA5m_{iT} = m_{iT} - m_{iT-5}$).

In the third step, we compute the benchmark averages changes in expenditure for the last two years; in our model, these are the national averages (respectively, $\mathbf{DELTA1M}_{iT}$ and $\mathbf{DELTA5M}_{iT}$). As for the previous steps, a qualitative assessment is also necessary for this step. For example, in some contexts it may be appropriate to assume a longer period of distance, such as 8 or 10 years, to better reflect the adjustment time each indicator needs.

In the fourth and last step, we define the critical spending items as those in which both short- and long-term variations are lower than their respective national averages, i.e., $DELTA1m_{jT} < \mathbf{DELTA1M}_{jT}$ and $DELTA5m_{jT} < \mathbf{DELTA5M}_{jT}$. As in previous steps, a qualitative evaluation is necessary to assess a criterion that qualifies expenditure trends as critical.

## 3.4. Choosing Expenditure Items to Improve

The public administration has now all the information to assess expenditure items and making choices to correct the most critical ones, in order to improve its positioning with respect to the critical SDGs. The model has identified the critical SDGs, those related to them, and the SDGs with expense items displaying negative trends.

More formally, critical goals to be improved, and expenditure items to be changed, next year are defined as follows:

$INT\_SDG_{it} = SDG_{it}$ if

$SDG_{it} \in CRITj$ or $b_{ji} \neq 0$ for some $j \neq i$,

$DELTA1m_{jT} < \mathbf{DELTA1M}_{jT}$

$DELTA5m_{jT} < \mathbf{DELTA5M}_{jT}$

= 0 otherwise

Assuming the total budget of the administration at time *t*, $M_t$, as the sum of the individual expenditure items for each goal *i*, $m_{it}$, we obtain that the initial budget is $M_0 = SUM\_i\ m_{i0}$. Therefore, having identified the SDGs to improve in period *t*, the expenditure relating to those SDGs can be increased in the following period, i.e., *t +1*, as follows:

$$m_{it+1} > m_{it} \text{ if } INT\_SDG_{it} \neq 0.$$

Intuitively, the expenditure referring to the SDGs that need improving must be greater at time *t +1* than at time *t*.

## 3.5. Indirect Improvement of Related SDGs

The decision to increase expenditure on some specific budget items has two implications. First, there is a potential improvement in the positioning analysis which is directly connected to the expense items. Thanks to the relationship between expenditure and SDGs objectives described above, this direct DELTASDGi improvement can be written as

$$DELTASDGi = \alpha_i (m_{it+1} - m_{it}) > 0$$

Second, there is an "indirect" positioning improvement arising from the SDGs that are not linked to the improved expenditures, but that are still correlated with directly improved SDGs. More formally, we have:

$$SDGj_{t+1} \geq SGDj_t \text{ if } b_{ij} \neq 0 \text{ and } i \text{ is in CD and } j \neq i,$$

that is, SDGj, different from the critical SDGi and linked to *i* through $b_{ij}$, increases from period *t* to period *t* + 1. We denote this increase as:

$$DELTASDGj_i = b_{ij}\ \alpha_i (m_{it+1} - m_{it}) > 0$$

## 3.6. Savings in Public Spending Created by the Impact on the SDGs

With the increase in expenditure related to the critical SDGs, the PA can, therefore, obtain a direct improvement in positioning on the goals themselves, and an indirect improvement in positioning compared to other SDGs related to critical ones. This indirect increase, if any, is an unsolicited increase, which, in theory, the administration can disregard; in accounting terms, this waiver can translate into a reduction in the items of expenditure related to the SDGs indirectly impacted by the improvement of critical SDGs, obtaining cost savings. In summary, the administration will be able to achieve savings on some items of expenditure without penalizing its positioning on related SDGs.

For each goal *j* correlated with goal *i* through interactions between objectives described above, the amount of expenditure that the administration can save is equivalent to the indirect increase obtained on goal *j*, thanks to the increase in expenditure on goal *i*, DELTASDGji.

The total savings that the administration can obtain will therefore be given by the difference between the amount of expenditure increased, or invested, on the items of expenditure related to the critical SDGs

$X: = SUM\_i\ (m_{it+1} - m_{it})$ if CRITi ≠ 0

and the amount of expenditure saved on the items of expenditure attributable to the SDGs related to the critical ones

$Y: = SUM\_(i, j)\ \alpha_j^{-1}$ DELTASDGji

where $\alpha_j^{-1}$ is the inverse of the coefficient that relates goal j and monetary expenditure, as described above.

Note that, from a financial perspective, the amount of expenditure invested X refers to a certain increase in expenditure and accounted for in the period of the intervention, while the amount of saved expenditure Y refers to future expected savings as a result of the investment.

Based on these hypotheses, the administration either chooses to invest X at time *t* to obtain savings Y at time *t+1* with probability *s*, or no gain (with probability *s* – 1). This last scenario can happen if the increase in expenditure does not generate a positive impact on the administration's SDG positioning in relation to critical SDGs.

## 3.7. The Pay by Result Logic and the Financing of Expenditure

The potential cost savings calculated by the model can be used to implement a partnership with private investors using a PbR approach. These investors are willing to finance the increase in public spending, taking part of the indirect expenditure savings achieved by the administration as their expected gain. According to this mechanism, which characterize impact bonds, the private investor pays for the investment to improve the SDGs positioning of the PA, and gets back part of the indirect expense savings as payoff. As this payoff represents expected gains, the private investor also needs to be guaranteed by the government of a minimum gain in case the investment does not return the expected profits.

Following Becchetti et al. (2021), in our model we formalize the PbR scheme assuming that the private investor and the local administration agree upon a contract (g,f) as long as the expected outcome Y is greater than the initial investment X, where g is the guaranteed amount paid back to the investor in case of failure, and f is the share of profits the investor gains in case of success.

The administration, therefore, will assess whether such a partnership is convenient and financially sustainable.

More specifically, following Becchetti et al. (2021), the administration solves the following constrained maximization problem:

$$\max_{g,f}\ s\ (1-g)\ (Y-X) - (1-s)\ fX$$

$$\text{s.t. } sg\ (Y-X) + (1-s)\ (fX–X) \leq h\ (C1)$$

$$sg\,(Y\text{-}X) + (1\text{-}s)\,(fX\text{–}X) \geq X\,(a_0 + a_1\sigma^2\,(g,f)) \quad (C2)$$

where $a_0 + a_1\sigma^2\,(g,f)$ represents the efficient investment frontier (i.e., how much the investment would have made if committed elsewhere, on average) and *h* represents the risk attitude of the administration. The two constraints C1 and C2 represent, respectively, the participation requirements of the PA, which is assumed to be sufficiently risk averse, and of the private investor, who is assumed to gain at least as much as it would gain with another investment. This latter condition is a conservative condition, as it does not consider patient investors, altruistic investors who may be willing to give up some of their profits for the social or environmental benefit of the project. On this point, the coefficient *h* can also represent the time preferences of the administration - more exposed to moral hazard in the short-term, more prudent in the long-term. Moreover, the *h* term can capture other elements that affect the administration choice, such as bureaucratic friction, that jeopardize the ability to implement investment projects efficiently and at limited costs.

Solving the maximisation problem, the optimal solution of the PbR partnership described above can be written as

$(g\,*, f\,*) = ((a_0\,X) / (Y\text{-}X), ((X+Xa_0) / X)$

which exists if and only if $0 \leq (1+a0)\,X \leq Y$ (Becchetti et al., 2021).

This condition must be read in two directions. On the one hand, the quantity $(1+a_0)X$ must be positive in order to guarantee greater earnings to the private investor; on the other hand, the same amount must be less than the expected gain in case of success, to minimize the losses of the administration compared to the case in which they had not activated the partnership.

# 4. Discussion

The proposed model is a useful tool available to the PA that wants to systematically direct its policies towards environmental and social sustainability objectives. The model integrates the positioning analysis with respect to the sustainability framework with the budget analysis of the PA, in an integrated accounting perspective, and defines the economic variables for partnerships with impact-oriented private investors.

Our results have strong policy implications. First, public administrations at local and national government may adopt quantitative tools to make their expenses more efficient if they become aware of the link among SDGs. Second, policy makers may propose joint policies that aim at improving two or more SDGs while keeping the budget constant. For instance, environmental and health taxes are usually distinct and designed by different authorities; both may improve public health, though such spillovers are usually not accounted for. Our model proposes a systematic approach to consider the link between health and environment and design a joint tax that collects money to reinvest for both environmental and health purposes. This would simplify the policy structure, gather funds collaboratively and efficiently, while improving two (or more) SDGs. Third, public expenditure can be directly linked to SDGs both for sustainable reasons and economic purposes. As a result, national and supranational institutions may easily enforce governments to report and monitor activities, expenses, and SDGs indicators more

systematically, rather than leaving these activities to the most sustainable policy-makers. Fourth, systematic, quantified expenses and indicators can facilitate the set up of new PPP, whose conditions for the implementation have been highlighted in the section above. This would increase attractiveness of social projected managed by public bodies that need private funds and want to incentivise private investors.

In the proposed version, the model adopts the SDGs sustainability framework. However, as clarified, the model can be extended to any framework, with both an international and a domestic focus. The perspective of the PA that is adopted will determine the choice of the framework; from an application point of view, it should be noted that the availability of a long and detailed historical series of SDGs data for the PA - both with respect to the targeted administration and the reference benchmark - represents a necessary condition for the significance of the analysis.

The same observation also applies to the accounting data that can be obtained from the PA's financial statements; in this case, not only the availability of the data is relevant, but also their correct classification, based on the chosen framework of indicators.

Consequently, to make the proposed model more extensible and relevant, the PA needs to implement an integrated accounting system, both from a financial and non-financial perspective - which is oriented to one or more measurement frameworks.

Since the quality of the data is essential, it is advisable to promote a uniform system of indicators as reference for different levels - central, regional, and provincial - of the PA; this, of course, should be combined with the specific local needs or challenges each PA may face with. In this direction, our model relies on both internationally recognized indicators, such as SGDs, and domestic indicators used at national level.

The model also requires a constant update of the data, as this will make estimates on correlations among goals and budget items more accurate.

A further observation concerns the qualitative assessment of the model. In each step, we highlighted that the expert analysts and the policy maker needs to qualitatively assess what quantitative methods define and produce. The qualitative intervention allows the model to be calibrated according to the context, considering specific features of the territory and the environmental, social, and economic setting. For this reason, it is extremely important to enhance the transparency of each criterion and to ground the analysis on multiple parameters; this would better inform external evaluators about how the political and financial decisions has been made.

## 5. Conclusion

Increasing pressure on social and environmental responsibility stimulates national governments and local administrations to constantly monitor their policies, to implement, with innovative methods, policies that are sustainable from an environmental, social, economic, and financial perspective. In this process, the PA may practically cope with many challenges, and local PA often lack specific guidelines tailored for local settings.

This study proposes a theoretical model that the PA can apply to position its policies based on sustainability frameworks, and more specifically on the SDGs. The model allows PAs, not only to make economic choices oriented towards sustainability on the basis of a positioning analysis, but also to identify the optimal conditions for using a partnership with private investors, according to the PbR mechanism, typical adopted in the field of impact finance.

The application of the model calls all the PAs, such as those at municipalities, regional, and central level, to gather a series of economic and sustainability data within an integrated accounting schemes. According to this perspective, our model can act as a useful stimulus for PA experiments, also to enhance consistent data collection along the territorial chain of the PA, to efficiently assess policies through the lens of sustainability criteria.

## References


Becchetti L., Pisani F., Salustri F., and Semplici L. (2022). The frontier of Social Impact Finance in the public sector: Theory and two case studies*. Annals of Public and Cooperative Economics*, 93(4), 887-912.

Bova D.M. (2019). *Guida per il rapporto del BES (Benessere Equo e Sostenibile) organico per comuni: manuale applicativo*. Milano: Franco Angeli.

Collevecchio M. (2019). *Indicatori Bes anche nei comuni*. Italia Oggi, 43.

Edmiston, D. and Nicholls, A. (2018). Social Impact Bonds: The role of private capital in outcome-based commissioning. *Journal of Social Policy*, 47(1), 57-76.

Figueira, I., Domingues, A. R., Caeiro, S., Painho, M., Antunes, P., Santos, R., ... & Ramos, T. B. (2018). Sustainability policies and practices in public sector organisations: The case of the Portuguese Central Public Administration. *Journal of Cleaner Production*, 202, 616-630.

Fraser A., Tan S., Lagarde M., and Mays, N. (2018). Narratives of promise, narratives of caution: A review of the literature on Social Impact Bonds. *Social Policy & Administration*, 52(1), 4-28.

Garcia-Amate, A., Ramírez-Orellana, A., & Rojo Ramirez, A. A. (2022). Is it attractive to invest in alternative energy? Evidence from a five-factor Fama-French model for regional DJSI and renewable stock indexes. *Sustainability Accounting, Management and Policy Journal*, 13(1), 273-296.

Gerhart, B. e Fang, M. (2015). Pay, intrinsic motivation, extrinsic motivation, performance, and creativity in the workplace: Revisiting long-held beliefs. *Annual Review of Organizational Psychology and Organizational Behavior,* 2(1), 489-521.

Gustafsson-Wright, E., S. Gardiner e V. Putcha (2015). Potential and limitations of impact bonds: Lessons from the first five years of experience worldwide, *Global Economy and Development Program, Brookings Institution.*

La Torre M., Semplici L., & Zapata J. D. S. (2020). Un Modello di Impact Finance per i Comuni: il Piano Strategico di Mandato BES-Oriented. *Corporate Governance and Research & Development studies-Open Access*, (2).

La Torre M., Trotta A., Chiappini H., Rizzello A. (2019) Business Models for Sustainability: The Case of Study of Social Impact Bond, *Sustainability*, 11(7): 1-23. ISSN: 20711050

La Torre M. et al. (2022). *Sustainable finance in public administration in Europe: a Systematic Literature Review*. Mimeo.

McHugh N., Sinclair S., Roy M., Huck_eld, L. and Donaldson, C. (2013). Social impact bonds: a wolf in sheep's clothing?. *Journal of Poverty and Social Justice*, 21(3), 247-257.

Nicholls A. and Tomkinson, E. (2015), *The Peterborough Pilot Social Impact Bond*. In Nicholls, A., Paton, R. and Emerson, J. (eds.), “Social Finance”, Oxford: Oxford University Press.

OECD (2016). *Understanding Social Impact Bonds*. OECD Working Papers, Parigi, Francia.

Warner, M. E. (2013). Private finance for public goods: social impact bonds. *Journal of Economic Policy Reform*, 16(4), 303-319.