

Are SDGs being translated into accounting terms? Evidence from European cities

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IMPACT

The challenge launched by the United Nations (UN) on the achievement of SDGs requires local governments to rethink how to devote their resources and report on their results regarding SDGs. The article analyses how existing frameworks communicate, through financial indicators, the efforts done towards sustainable development. The Voluntary Local Reviews (VLR) published by European cities and made available on the UN website can stimulate further reflection and actions toward making SDGs an accounting issue.

ABSTRACT

As the tier closest to citizens, local governments should significantly operate toward the achievement of Sustainable Development Goals (SDGs) by mobilizing their resources, as well as involving several stakeholders. The article analyses how frameworks and praxis are making use of accounting systems information to assess and report on SDGs' achievements. Results show that accounting systems are not yet utilized to their full potential, and therefore scholars and policy-makers need to work towards integrating accounting into the service of the SDGs.

KEYWORDS

Accounting for sustainable development; SDG costing; SDG frameworks; SDG indicators; SDG measurement; SDG reporting; Sustainable Development Goals (SDG); Sustainability reporting

Introduction

Public sector organizations (PSOs) play an important role in global sustainable development and their contribution toward the achievement of the United Nations (UN) Sustainable Development Goals (SDGs) is fundamental. In fact, SDGs are being integrated into the sustainability strategies of PSOs. This involvement in sustainability practices has introduced a new challenge in accountability, extending the traditional financial perspective to social and environmental areas (Ball & Grubnic, 2007). Hopper (2019) has called for accounting to become more involved with society and its needs, especially for PSOs (Sobkowiak et al., 2020). In this context, PSOs are slowly adopting reporting practices to disclose environmental-related actions and performance measures (Guerrero-Gómez et al., 2021).

As a result, sustainability reporting, integrated reporting, environmental reporting and other similar communication tools are being increasingly used by PSOs for communication purposes (Manes Rossi et al., 2020, 2021). In these reports, the presentation is mostly made with either quantified or non-quantified measures, which, in most cases, are non-monetary. This is not surprising, as assigning monetary values to sustainability-related issues, apart from being extremely difficult, is in several cases inappropriate (Cohen, 2022). Lately, PSOs have been reporting specifically about SDGs or including SDG information within sustainability reports.

Frameworks and tools have been developed at the national and international levels to guide the assessment of PSOs' contribution to SDGs, especially for local governments (LGs). LGs are acknowledged by the Organization for Economic Cooperation and Development (OECD) as significant contributors to SDG achievement and their engagement (as well as that of regional governments) is required for most SDGs to be met (OECD, 2020). These

frameworks mainly include key performance indicators to quantify particular achievements, following the proposal of the Global Indicator Framework for SDGs and the targets of the 2030 Agenda for Sustainable Development (UN, 2017, 2020).

Although SDGs are not designed by or for LGs and regional governments, they provide a valuable framework for all levels of government to align global, national and sub-national priorities with sustainability policies (OECD, 2020). At the micro-level of LGs, a major challenge in using these indicators is the availability of information to measure them. Necessary information is often unavailable, especially information related to input and output volume or statistical information about LGs, such as local Gross Domestic Product or income per inhabitant. To address this shortcoming, external data sources are often used, coming, for example, from national statistics or other national databases which are difficult to process because they are rarely related to LGs or regional governments. In this context, the role of accounting is vital, as accounting provides the information necessary for accountability and decision-making purposes, as well as the performance measures that are relevant to SDG achievement. Consistent with extant literature (Ball & Grubnic, 2007; Manes Rossi et al., 2020; Guerrero-Gómez et al., 2021), we recognize the pivotal role of non-financial information in ensuring accountability for SDG-related policies and actions; however, it is also important to focus on the role played by accounting information in the traditional sense (for example financial accounting, management accounting and budgeting) to assess the value of input resources, as well as output volume information, to inform indicators. In this case, the European Union (EU) taxonomy (EU, 2020) sets a common framework and classification system that defines environmentally sustainable economic activities, mainly for large private sector

entities. The EU's Disclosures Delegated Act (EU, 2021) requests information about the percentage of company turnover, capital expenditure and operating expenses originating from or allocated to environmentally sustainable activities that are taxonomy eligible to be reported. This clearly constitutes accounting-based information.

This article analyses whether the indicators used to report on SDG achievement, in (1) international and European frameworks addressing LGs and (2) actual SDG reports prepared by European LGs, are making use of accounting information. In other words, we examine whether the translation of SDGs from the macro-perspective of the UN to the micro-perspective of LGs builds on accounting information.

To do this, we look into several frameworks dealing with SDG reporting at the national and international levels for LGs and compare them to assess whether SDG performance indicators are accounting-related. We split the indicators into two groups: financial and non-financial. Furthermore, we analyse all available Voluntary Local Reviews (VLR) published by European cities on the UN website for 2021 (<https://sdgs.un.org/topics/voluntary-local-reviews>). We selected the UN database as the source of LG SDG information disclosure because cities preparing a specific report on SDG strategies and actions will have an interest in publishing it there due to greater (international) visibility. In analysing the reports retrieved, we searched for accounting-related metrics with respect to SDGs.

The remainder of this article is structured as follows: the next section summarizes extant literature and reveals the relations between SDGs and accounting. Then we explain the methodology adopted, followed by a comparative analysis of the documents and frameworks proposed for assessing the achievements of LGs in terms of SDGs. After presenting our results, we conclude by offering a number of proposals to bring accounting and SDGs closer together and suggesting potential directions for future research.

SDGs and accounting: A literature review

In 2015, the UN approved the 2030 Agenda, which 193 countries have subscribed to. Governments are expected to drive the challenge by designing policies and frameworks supporting sustainable development. The achievement of the 17 goals—and the related 169 targets, connected to 231 unique indicators—requires the efforts of governments, civil society and companies to be joined. LGs, being the governmental tier closest to citizens, are expected to coordinate the efforts of different actors within the same community (UN-SDSN, 2016). However, the 2030 Agenda is often perceived as a burden imposed by higher governmental levels, rather than an opportunity, and it remains detached from local policies due to a lack of adequate resources (European Committee of the Regions [ECR], 2019). Furthermore, reports on policies and actions undertaken toward the achievement of SDGs—and output/outcomes achieved—are seldom available on PSO websites.

Accounting scholars have underlined the lack of accounting-related research on SDGs; however, a number of studies has investigated environmental and sustainability issues in PSOs extensively (for example Bebbington & Unerman, 2020). Furthermore, scholars have emphasized that accountability mechanisms are essential for governments (at all levels) to account, through specific

measures, for how and whether targets are met (Abhayawansa et al., 2021; Bowen et al., 2017). However, the uptake of sustainability accounting and accountability is highly reliant on the development of tangible measures to guide, encourage and legitimize practice (Ball & Grubnic, 2007).

Accountability is essential for several reasons. First and foremost, governments should be accountable to their citizens (as well as to other actors involved in achieving the same goals) for the successful implementation of interventions at multiple levels (Jackson, 2011; Kramarz & Park, 2016). Accountability for SDGs is also pivotal for good governance. Scholars have claimed that a lack of systemic governance and accountability mechanisms was one of the major flaws in the Millennium Development Goals and thus the use of specific outcomes settled by the SDG framework can provide a base for monitoring and reporting at the national and local levels (UN, 2015; Lauwo et al., 2022). Furthermore, as SDGs are based on the concept that partnerships between governments, corporations, non-government organizations (NGO) and civil society are central to obtaining the goals, accountability is necessary to ensure interactions among the relevant actors (Lauwo et al., 2022).

The quest for accountability in achieving SDGs can lead to the extensive adoption of sustainability reporting which would incorporate SDG measures. However, as governments usually lack specific information systems to facilitate the application of reporting frameworks, there is a major risk that these reports will be a further burden for governments and will not produce the expected outcomes in terms of better accountability (Niemann & Hoppe, 2018). Scholars have suggested alternative solutions to provide accountability on environmental and sustainability issues, such as integrating specific disclosures and measures in the financial reports to inform stakeholders through an integrated lens (Manes Rossi et al., 2020, 2021).

There is a large strand of research discussing alternative reporting formats that incorporate information about non-financial issues (a review in Manes Rossi et al., 2020), which can be used for accountability on SDG purposes. However, there is a dearth of academic research explicitly focusing on SDG reporting by LGs. Guerrero-Gómez et al. (2021) investigated a sample of LGs in Latin America, showing that some factors (such as population size, education level, unemployment, legislation quality and political corruption) have an influence on the transparency of sustainability issues tackled by the UN. However, as other variables may affect SDG disclosure, they called for further empirical research. Lauwo et al. (2022) examined how SDGs have been implemented in Tanzania and considered governance and accountability mechanisms, finding that formal top-down structures have created a difficult environment for multi-stakeholder collaborations, which is an obstacle to localizing accountability. Furthermore, they commented that the lack of reporting and accountability systems has constrained the implementation of SDGs within the country.

Another strand of research focuses on how cities incorporate SDGs in their strategic plans. Zeemering (2018) noted that most studies dealing with SDG adoption look at policy tools; moreover, integrating sustainability into strategic planning must go hand in hand with changes in organizational processes and the adoption of performance

measures. Guarini et al. (2021, 2022) defined and applied a conceptual framework that can support politicians and managers to embed SDGs within the classic strategic planning and control cycle. More specifically, Guarini et al. (2022) recalled the need for each LG to identify the relevant SDGs and targets. Through analysing the strategic plans of all Italian capital cities, they highlighted that the alignment between SDGs and strategic objectives is still in its infancy and only a few cities have connected strategic goals, actions and indicators to measure outputs and outcomes produced. Furthermore, they showed that larger cities are more prone to embedding SDGs within their strategic plans and making use of indicators than small cities.

Moving to the calculation of SDG ratios, Caruana and Dabbicco (2022) stressed the possible relationship of budgeting with SDGs. They claimed that the commitment toward SDGs could be depicted in the budget through a chart of accounts linking all expenditures to particular sub-goals.

Overall, the literature mainly focuses on the strategic dimensions of SDGs and their role as accountability mechanisms. It has not focused thus far on the accounting dimension of SDGs, as only a few related targets and indicators that relate to SDGs are financial indicators and are therefore monetary. Unraveling how LGs actually report on SDGs could provide insights concerning whether they relate sustainability goals with indicators based on available accounting information and whether they are able to assign and monitor financial resources devoted to SDG achievement. In other words, does accounting information emanating from several sources (i.e. budgeting, financial accounting and management accounting) provide input for SDG reporting in practice?

Methodology

This article addresses a gap in the literature by providing a comparative analysis of frameworks that propose indicators to assess and report the achievement of SDGs in LGs. Based on this categorization, four specific frameworks for reporting about SDGs were analysed. The UN general framework (Global Indicator Framework for SDGs and targets of the 2030 Agenda for Sustainable Development) was adopted as a benchmark. In addition, we analysed the International Framework for Smart Cities (United4Smart Sustainable Cities [U4SSC], 2017) and the SDG Reporting Frameworks for LGs in Belgium and Spain. This allowed us to study the extent to which the UN general framework has been translated for LG purposes and whether accounting-based indicators have been developed during this adaptation process. Although we acknowledge that other frameworks exist, our selection was based on three criteria. The framework should be related to LGs directly (developed solely for LGs) or indirectly (suitable for LGs), such as the SDG Global Indicator Framework; be available in English; and have a European focus.

Our aim was to identify whether the measures included in the frameworks correspond to financial indicators, as well as the sources of information required to obtain them. More specifically, in our analysis, we split these indicators into two groups: financial and non-financial. The financial indicators were monetary and were retrieved from either national accounts or the accounting system. These

indicators also make use of other statistical information (for example information about the population). Non-financial indicators are non-monetary and are quantitative (for example percentages, numbers and ratios) or qualitative.

The analysis focuses on the macro- or micro-perspective of the frameworks, i.e. whether the framework addresses individual entities (micro-perspective) or refers to a whole group of entities, such as countries (macro-perspective); b) the internal or external orientation, i.e. whether the report was developed by the entity itself or by an external party; c) the type of indicators, for example financial and non-financial ones; d) the number of financial indicators; and e) the sources of information to calculate financial indicators.

We downloaded all VLRs published by European cities for 2021 available on the UN website (<https://sdgs.un.org/topics/voluntary-local-reviews>) in October 2022. This resulted in 10 reports.

The reports were manually content-analysed with the aim of 'making replicable and valid inferences from data according to their context' (Krippendorff, 1980, p. 21). Content analysis is suitable for examining non-financial reports, where common patterns and insights from the classification of quantitative and qualitative information can be identified following a pre-defined scheme (Manes Rossi et al., 2021)

For the content analysis, we followed a three-step process (Manes Rossi & Nicolò, 2022). In the first stage, all 10 reports downloaded from the UN database were examined in their entirety to identify their descriptive characteristics and the connection between strategies and SDGs (see Table 1, Questions 1 to 6). To this end, a further screening based on applying search queries for the occurrence of keywords, such as 'sustainable development', 'sustainable', and 'SDGs', was performed to improve the reliability of the analysis.

The second stage involved qualitative analysis to identify which of the 17 SDGs are covered in the reports. The purpose of this step was to examine the extent to which the cities include one or more SDGs in their reporting and, in turn, to track SDG disclosure trends. In this stage, only sentences, paragraphs, or infographics explicitly mentioning one or more SDGs were taken into account (see Table 1, Question 7).

The aim of the third stage was to detect the use of performance measures related to SDGs and, in doing so, identify whether the cities make use of financial or non-financial data to build these indicators. We searched for the presence of quantified targets (against which achievements are compared) and the frequency of relevant follow-ups. We also analysed the VLRs to detect whether additional data were included, directly or through links to other

Table 1. Methodology for analysing the VLRs.

- (1) Does the report refer to any specific framework? If yes, which one?
- (2) What reporting period is covered by the report?
- (3) What is the length of the report (for example number of pages)?
- (4) Is there a connection with the strategic plan?
- (5) Is there any implementation map for strategies connected with SDGs?
- (6) Does the report cover all areas or only specific projects/areas?
- (7) Which SDGs are included in the report?
- (8) Does the report include performance measures? Are there any financial measures?
- (9) Are control activities for the achievement of planned targets included in the report? Is any timing identified?
- (10) Does the report provide any additional data (directly or through a specific link)?

documents published by the city on its website (see Table 1, Questions 8 to 10).

To ensure the reliability of the coding process, one author manually performed the content analysis at each of the three different stages. Another author performed an objectivity test to ensure consistency. Considering the limited number of reports available, no further reliability tests were performed.

Frameworks for LGs reporting on SDGs

In this section, we compare the four frameworks selected. The aim was to identify the type of indicators (financial and non-financial) proposed for monitoring the success of LGs in achieving SDGs and the type of information required for SDG measurement. Table 2 outlines examples of financial and non-financial indicators to illustrate the methodology followed in the classification process.

The classification of an indicator as financial or non-financial is related to the existence of monetary information (numerator, denominator, or both). In this sense, we classified efficiency indicators that relate output to monetary units (for example material footprint per GDP) as financial indicators. The reason for this is that, apart from the fact that monetary information is involved, if the ratio was calculated the other way round (by swapping the numerator and denominator), it would convey information that resembles cost information.

Table 3 summarizes the frameworks analysed and their main characteristics. Taking the macro-perspective contained in the UN (2020) global framework as a base, some proposals have been developed for the micro-perspective, such as the U4SSC key performance indicators (KPI), following the Recommendations of the International Telecommunication Union (ITU, 2016). The aim of the indicators is to provide a framework to collect and report the data necessary to quantify, measure, report and monitor performance and progress in achieving SDGs with a focus on smart cities.

In some cases, such as the methodology of U4SSC (2017), the indicators are proposed to be developed by LGs (internal orientation), whereas, in others, the indicators are developed by external parties or associations or any other entity. In this case they are based on external information sources to facilitate comparisons and create a benchmark for the entities' achievements. The latter is true for Spain, where the assessment is prepared by an external entity, the Spanish Network for Sustainable Development (2020), which compares the achievement of 100 municipalities and

obtains data from 24 national databases. Even though these indicators are assessed externally, the LGs can use them for decision-making and accountability purposes.

With respect to indicator type, they are either developed with reference to the 17 SDGs, following the structure of the general framework (UN, 2017, 2020), or they are grouped into traditional areas: economy, environment and social. The number of indicators varies from 231 in the general UN framework to 91 in the the U4SSC.

The number of financial indicators is low in all cases. This is not surprising because, even in the UN framework, only 47 (20.35%) indicators can be classified as financial (see Table 4). In the frameworks with a micro-economic perspective, even fewer indicators are financial and can be obtained from accounting systems. In fact, in these frameworks, the percentage of financial indicators to total indicators ranges from 3.30% to 11.32%. Note that, even within the set of indicators selected by the Association of Flemish Cities and Municipalities (2019), which is mainly inspired by the UN framework, only seven indicators (3.41%) are financial (see Table 5). In other words, the application of the UN framework in LGs is mainly translated into non-financial indicators.

The UN's financial indicators are all based on national accounts data (as they have a macro-orientation) or national accounts data in combination with other statistics (for example population or workforce information). The financial indicators in the other three frameworks are based on accounting or a combination of accounting and national accounts (mainly GDP), sometimes requiring other statistical data. The accounting information necessary to inform the financial indicators can only be provided by advanced financial management systems.

Actual LG reporting on SDGs

In this section, we analyse all VLRs on the UN website prepared by European cities for 2021. The small number of reports (10) demonstrates that only a few European cities have embarked on this type of reporting.

Overall, only three cities follow a specific framework and two of these follow national guidance (Barcelona and Stuttgart). Most cities are in Nordic countries, excluding Barcelona (Spain), Ghent (Belgium) and Stuttgart (Germany). Helsinki was the first European city (and the second in the world after New York) to commit to city-level reporting of SDGs. Thus, SDG reporting shows geographical clustering.

Table 2. Examples of financial and non-financial indicators.

Categories of indicators	Examples of indicators
Financial indicators	
National accounts	UN 17.11.1: Developing countries' and least developed countries' share of global exports
National accounts/statistics	UN 8.1.1: Annual growth rate of real GDP per capita, UN 12.2.1: Material footprint, material footprint per capita and material footprint per GDP
Accounting	U4SSC (2017): Percentage expenditure on city cultural heritage
Accounting/national accounts	Association of Flemish Cities and Municipalities (2019): Research and development expenditure as a proportion of GDP
Non-financial indicators	
Quantitative (non-monetary)	UN (Proportion) 1.1.1: Proportion of the population living below the international poverty line by gender, age, employment status and geographic location (urban/rural), UN (Number) 12.6.1: Number of companies publishing sustainability reports, Spanish Network for Sustainable Development (2020): Ratio of paper and cardboard packaging collected per inhabitant per year
Qualitative	UN 12.b.1: Implementation of standard accounting tools to monitor the economic and environmental aspects of tourism sustainability

Table 3. Analysis of frameworks of SDG indicators for LGs.

Title	Source	Type of assessment	Type of indicators	Number of indicators	Number of financial indicators	Percentage of financial indicators to total number of indicators (%)	Sources of information
Global indicator framework for SDGs	United Nations (UN, 2017, 2020)	Macro-perspective, internal and external	Related to the 17 SDGs	231	47	20.35	National accounts statistics
Collection methodology for KPIs for smart sustainable cities	United4Smart Sustainable Cities (U4SSC, 2017)	Micro-perspective, internal	Economy, environment, society and culture	91	3	3.30	ITC systems, national accounts, budgetary and financial reporting
Local indicators for the 2030 agenda (SDGs)	Association of Flemish Cities and Municipalities—VWSG (2019)	Micro-perspective, internal	Context: input and process indicators and impact	205 (54 basic indicators)	7	3.41	Central data base available for all LGs: statistics, national accounts and budgetary reporting
The SDG in 100 Spanish cities	Spanish Network for Sustainable Development (2020)	Micro-perspective, external/benchmarking	Related to the 17 SDGs	106	12	11.32	Information sources obtained from 24 publicly-available databases based on financial reporting

Notes: Micro-perspective: for each entity; macro-perspective: for the country; internal: developed by the entity; external: developed by external agencies.

Table 6 summarizes the VLRs, from which it is evident that all cities provide a report connected to a strategic plan, except Stuttgart. This strategic approach suggests that SDG achievement is reliant on a long-term perspective based on long-lasting social, economic and environmental changes. Furthermore, six of the 10 VLRs have an implementation map illustrating actions already undertaken and actions still undergoing or to be implemented (for example the VLR for Asker in Norway).

The reports mention that cities are attempting to adopt SDGs in all their activities. However, in several cases, the reports focus on the most significant projects and provide an in-depth analysis of them. Moreover, the adoption of performance measures is common in all reports, but only a few entities clarify how these measures are used to adjust activities based on feedback (for example Gladsaxe in Denmark). Consequently, the reports do not disclose the extent to which the reporting cities implement specific control activities to evaluate the progressive achievement of SDGs or use the information to re-direct future actions.

The analysis reveals that non-financial data prevails and the production of narratives and qualitative information (for example on the quality of life in Helsingborg, Sweden) is a consolidated practice to inform all stakeholders on the public value-creation process. Barcelona is one exception here, as it shows expenditures linked to each SDG and provides indicators for specific activities: for example for SDG 5 (Resources of the municipal global justice programme allocated to combating gender violence) and for SDG 6 (Environmental damage due to overflow on the beaches). This empirical case shows that, although the disclosure of financial information in relation to the resources devoted to SDGs and specific projects might not be a common practice, it is still technically possible. Of course, this calls for suitable financial management information systems to be put in place, including performance-measurement systems (Kloot & Martin, 2000).

In terms of embracing an accountability perspective, it might be beneficial for citizens and other stakeholders to know which expenditures are connected to specific actions (or goals). Nonetheless, a clear connection between the resources and actions undertaken to achieve SDGs is provided only in the Barcelona and Malmö VLRs. However, in the case of Malmö, the VLR does not provide any financial data (i.e. on resources devoted to specific goals or actions). Thus, the only VLR identifying a connection between expenditure and actions undertaken to achieve SDGs target is the one published by Barcelona. Barcelona's report, prepared in accordance with the guidelines provided by the Spanish Network for Sustainable Development, shows both current expenditure and capital expenditure connected to different actions. Furthermore, for each SDG, Barcelona's VLR highlights the projects launched and their connections with other SDGs.

It is interesting that, for Vantaa in Finland, the decision to prepare the VLR was made following the example of other cities both within the country (Helsinki) and outside the country (for example New York). This demonstrates that best practices can inspire and inform the efforts of other governments. Indeed, efforts from national governments in preparing guidelines and promoting the adoption of SDG reporting might increase the number of LGs actively involved in disclosing SDG achievement.

Table 4. Financial indicators in the UN Framework.

Sustainable Development Goals		Number of financial indicators	Source of information*	
			NA	NA/S
SDG1	No poverty	4	1.5.2, 1.a.1, 1.a.2,1.b.1	
SDG2	Zero hunger	2	2.a.2, 2.b.1	
SDG3	Good health and well-being	1	3.b.2	
SDG4	Quality education	1	4.b.1	
SDG5	Gender equality	0		
SDG6	Clean water and sanitation	1	6.a.1	
SDG7	Affordable and clean energy	2	7.a.1	7.3.1
SDG8	Decent work and economic growth	7	8.9.1	8.1.1, 8.2.1, 8.4.1, 8.4.2, 8.5.1, 8.a.1
SDG9	Industry, innovation and infrastructure	6	9.5.1, 9.a.1, 9.b.1	9.2.1, 9.3.1, 9.4.1
SDG10	Reduced Inequalities	4	10.4.1, 10.7.1, 10.b.1, 10.c.1	
SDG11	Sustainable cities and communities	2	11.5.2	11.4.1
SDG12	Responsible consumption and Production	3	12.c.1	12.2.1, 12.2.2
SDG13	Climate action	1	13.a.1	
SDG14	Life below water	1	14.a.1	
SDG15	Life on land	2	15.a.1 (a), 15.b.1 (a)	
SDG16	Peace, justice and strong Institutions	2	16.4.1, 16.6.1	
SDG17	Partnerships for the goals	11	17.1.1, 17.1.2, 17.2.1, 17.3.1, 17.3.2, 17.4.1, 17.7.1, 17.9.1, 17.11.1, 17.17.1, 17.19.1	
Total**		47		

The codes correspond to the ratios available at: <https://sustainabledevelopment.un.org/content/documents/11803Official-List-of-Proposed-SDG-Indicators.pdf>

*Where: NA, national accounts, NA/S, national accounts and other statistics.

**The number of indicators is not the sum of the indicators per category (i.e. 50 indicators) as three indicators are found in two different categories. More specifically, Indicators 1.5.2 and 11.5.2, 8.4.1 and 12.2.1 and 8.4.2 and 12.2.2 are respectively the same.

Discussion

LGs are responsible for the intensity with which local communities and their stakeholders work toward achieving sustainable development. Indeed, the importance of PSOs in designing policy tools that might contribute to the realization of the UN 2030 Agenda is widely acknowledged (Abhayawansa et al., 2021; Bowen et al., 2017). Despite this, empirical studies are lacking on the role played by accounting information (for example financial accounting, management accounting, cost accounting and budgeting) in supporting managers to adapt organizational processes toward these ambitious goals and following up on their achievement.

We attempted to address this gap by analysing the current use of accounting information in SDG achievement by LGs from two perspectives: (a) the financial dimension of frameworks proposed for measuring and assessing SDG attainment; and (b) and the use of financial indicators to provide SDG information in the VLRs published by European LGs on the UN website.

Scholars have highlighted the need to use accounting to monitor SDG achievement and the resources required for this purpose (Cohen, 2022; Caruana & Dabbicco, 2022). However, based on our analysis, there is still a long way to go until accounting becomes an indispensable ally in the pursuit of LG sustainability strategies. Existing frameworks and guidelines set by international and national organizations on SDG monitoring at the local level only contain a few financial indicators that make use of accounting information. In the general framework developed by the UN (2017, 2020), only 47 (20.35%) indicators are related to accounting (with reference to national accounts) and there is no balance in the number of accounting-related indicators among the SDGs. For instance, SDG 5 is not related to any financial indicator whatsoever, whereas SDGs 3, 4, 6, 13 and 14 include only

one financial indicator each to keep track of their achievement. Unfortunately, the other three frameworks analysed also lack accounting information-related indicators; the percentage of financial indicators to total indicators is small, ranging from 3.30% to 11.32%. These results evidence the lack of financial indicators for assessing SDGs in LGs. This finding raises a number of important questions: Why don't LG specific frameworks try to use more accounting data to translate SDGs? Why don't LGs rely on their financial management systems as fundamental accountability and performance measurement tools to document their sustainability achievements?

A possible answer to these questions is that data availability is a vital barrier in defining and preparing indicators. Data retrieval requires advanced ICT systems integrated with accounting systems to ensure that necessary information is available to measure SDG achievement. The frameworks currently developed, despite following a micro-perspective, only moderately make use of information from public sector financial management systems. This is a double-edged sword. On the one hand, the availability of financial information may affect the number of financial indicators: as information is unavailable, there is no point in developing indicators that cannot be calculated in practice. On the other hand, a small number of financial indicators does not provide enough stimuli to improve and expand existing financial management systems and adapt them to measure SDG achievements.

It should be acknowledged that assigning monetary values to SDG achievement might be inappropriate (Cohen, 2022). However, this needs to be considered against the proposition that the use of qualitative and quantitative non-monetary information is 'fuzzy' and provides multi-interpreted evidence regarding SDG achievement. Indeed, a balance between the two must be sought and our VLR analysis shows that using accounting information to translate SDGs is possible but not very common.

Table 5. Financial indicators in frameworks for local governments.

United4Smart Sustainable Cities (U4SSC, 2017)		
Name of the indicator	Description of the indicator	Source of information
Cultural expenditure	Percentage expenditure on city cultural heritage	Accounting
R&D expenditure	Research and development expenditure as a percentage of the city's GDP	Accounting/national accounts
Disaster-related economic losses	Economic losses (related to natural disasters) as a percentage of the city's GDP	Accounting/national accounts
Spanish Network for Sustainable Development: Red Española para el Desarrollo Sostenible (2020)		
Name of the indicator	Description of the indicator	Source of Information
Expenditure on social promotion services	Municipal social services and social promotion expenditure	Accounting
Expenditure on education	Municipal education expenditure	Accounting
Expenditure on water service	Expenditure for water management	Accounting
Fee for water supply and sanitation	Average value of the municipal fee for water supply and sanitation.	Accounting
Fee for water supply	Fee of domestic water supply	Accounting
Fee for water sanitation	Fee of domestic water sanitation.	Accounting
Reduction of expenditure on public lighting	Expenditure in public lighting of year X compared to X-1	Accounting
Annual growth rate of municipal GDP per capita	GDP of year X compared to X-1	National accounts/other statistics
Annual growth rate of productivity	Annual growth rate of municipal GDP per capita and annual growth rate of employers	National accounts/other statistics
Expenditure on research, development and innovation	Municipal R&D&I expenditure	Accounting
Financial autonomy of the municipal institution	Proportion between income from own resources compared to total income	Accounting
Co-operation and development projects	Expenditure per inhabitant allocated to co-operation and development aid projects	Accounting
Association of Flemish Cities and Municipalities- VVSG (2019)		
Name of the indicator (ratio)	Indicator of the UN Global Framework that the ratio is related to	Source of information
Additional financial support from the municipality to social protection	1.3.1 Proportion of population covered by social protection floors/systems, by gender, distinguishing children, unemployed persons, older persons, persons with disabilities, pregnant women, newborns, work-injury victims and the poor and the vulnerable	Accounting
Total expenditure on human resources and training in year t /total operating expenditure in year t	There is not correspondence in the UN Global Framework. The indicator assesses the achievement of SDG 4	Accounting
Gross value added per citizen	8.1.1 Annual growth rate of real GDP per capita	National accounts/other statistics
Gross value added per working citizen	8.2.1 Annual growth rate of real GDP per employed person	National accounts/other statistics
Share of municipal budget spent on local–global policy	10.b.1 Total resource flows for development, by recipient and donor countries and type of flow (for example official development assistance, foreign direct investment and other flows), 17.2.1 Net official development assistance, total and to least developed countries, as a proportion of the Organization for Economic Cooperation and Development (OECD) Development Assistance Committee donors' gross national income (GNI)	Accounting
Expenditure on heritage policy	11.4.1 Total per capita expenditure on the preservation, protection and conservation of all cultural and natural heritage, by source of funding (public, private), type of heritage (cultural, natural) and level of government (national, regional and local/municipal)	Accounting
Budget for international development grants as part of grant budgets	17.3.1 Additional financial resources mobilized for developing countries from multiple sources, 17.3.2 Volume of remittances (in United States dollars) as a proportion of total GDP	Accounting

From the analysis of the VLRs, it is evident that LGs mainly adopt non-financial measures to communicate outputs and outcomes. In general, disclosure of financial data portraying the amount of SDG-related financial resources is lacking, even when actions and projects related to SDGs are identifiable. This disclosure would necessitate the existence of fit-for-purpose cost accounting systems. Nevertheless, our empirical analysis provides tangible evidence that this type of disclosure is possible. For instance, Barcelona is the only city in our VLR sample that discloses accounting information that relates to the amount of financial resources devoted to SDG achievement. By analysing the human and technical preconditions and the characteristics of existing financial management systems (including cost accounting systems) in cities that have attempted to bridge accounting information with SDG achievement, the literature could be enriched via best practice examples and thus pave the way for more accounting-related sustainability disclosures. To do this, further research is needed at the entity level through case studies.

Conclusions

Introducing more financial SDG indicators

In this article, we examined whether SDGs are being translated into accounting terms. We found that the accounting dimension of SDGs exists, but it is limited. Instead, disclosure regarding SDGs is mainly focused on non-financial indicators. Financial ratios cannot and should not substitute for non-financial indicators, but the relationship between accounting and SDGs could and should be both expanded and empowered. Based on our findings, we offer a number of suggestions concerning how accounting could be used to translate SDGs.

The ratios reporting on SDG achievement are not meant to be based solely on financial information. The analysis of the frameworks verified that. Instead, to cover the whole spectrum of dimensions corresponding to the achievement of the 17 SDGs, different types of information are necessary. Non-financial information is important, but scholars and policy-makers should work toward introducing more ratios

Table 6. Analysis of 2021 VLRs from 10 European cities.

City	Country	Framework used for measuring SDGs/ indicators	Period covered	Length (pages)	Strategic plan	Implementation map	Separate projects (P) /the city as a whole (C)	SDGs included	Identified activities	Performance measures	Type of indicators financial (F) or non-financial (N)	Quantified targets	Time of measuring	Availability of additional data (for example links)
Asker	Norway	U4SSC (2017)	2020	46	2020–24	Yes	C	All	Yes	Yes	N	Yes	NA	Yes*
Barcelona	Spain	National indicators for 2030 Agenda/Spanish Network for Sustainable Development	2021	142	2020–30	No	C	All	Yes	Yes	N + F (current expenditure and investments for each SDG)	Yes	Annually	Yes*
Ghent	Belgium	No standard	2021	106	2020–25	Yes	C	All (grouped around the '5Ps': people, planet, prosperity, peace and partnership)	Yes	Yes (a few)	N	No	NA	No
Gladsaxe	Denmark	No standard	2019–21	44	2018–22	Yes	C + 3 P	SDG 3, 4, 8, 11, 12, 13 and 17	Yes	Yes	N	Yes	Monthly and annually	No
Helsinki	Finland	No standard	2020	63	2017–21	Yes	C	All	Yes	Yes	N	Yes (descriptive)	NA	Yes*
Helsingborg	Sweden	No standard	2018–20	80	2016–22	No	C	All SDGs grouped around four themes	Yes	Yes	N	No	NA	Yes*
Malmö	Sweden	No standard	2018–20	129	2018–30	Yes	C	SDGs 1, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13 and 16	Yes	Yes	N	No	NA	Yes*
Stockholm	Sweden	No standard	Till 2020	65	Vision 2040	No	C	All SDGs grouped under three themes (SDGs 5, 10 and 11 are particularly relevant)	Yes	Yes	N	Yes (descriptive)	NA	Yes
Stuttgart	Germany	National	2010–20 (when data available)	236	No mention	No	C	All	Yes	Yes	N + F (SDGs 4 and 7)	Descriptive and not for all indicators	Annually	Yes*
Vantaa	Finland	No standard	2018–20	51	2018–21	Yes	C	All (SDGs 8, 10 and 11 are emphasized)	No	Yes	N	No	NA	No

*Link to further documents and data on actions and reports.

that can be fed with data retrieved from LGs' accounting records. This would mitigate the huge data-availability problem in measuring SDG achievement. The development of robust financial management systems, that include multi-dimensional and timely information, would make it possible for new ratios to be created and measured. At least a small number of financial indicators per SDG should be added. The creation of new accounting-related ratios calls for the close collaboration of public managers, accountants, policy-makers, politicians and stakeholders to meet the different information needs of users. In addition, the identification of relationships among financial and non-financial sustainability indicators and measures could be sought in the spirit of a balanced scorecard methodology (Kloot & Martin, 2000).

Measuring the resources attributable to SDG achievement

Moving away from the indicators themselves, another suggestion is related to the resources consumed in achieving SDGs. Improvement, stability, or deterioration in meeting sustainability goals, as depicted in the whole suite of SDG indicators, may be justified based on the resources devoted to them. Unless LGs create management accounting systems to monitor the flow of resources toward specific projects and actions linked to SDGs, prioritization of SDG achievement is difficult to manage. We consider that earmarking budget items might be a good start. However, incorporating SDGs as drivers of LGs operational needs—apart from their inclusion in their strategic plans—would make their continuous monitoring and following up through the management accounting systems possible. In other words, planning and assigning resources toward the achievement of SDGs is important but not sufficient. The materialization of planned activities and programmes and the resources devoted to achieving them are also important to consider. The Disclosures Delegated Act (EU, 2021) points in this direction by requiring large private sector entities to disclose the share of their taxonomy-aligned activities in turnover and expenditures (capital and operational). In calculating these percentages, accounting information is required, but it must be properly calculated to avoid double counting in allocations and, in this context, the Disclosures Delegated Act offers some guidance (Annex I and II of the Disclosures Delegated Act). Although EU taxonomy is mainly focused on the environment, this method could also be expanded to the other dimensions of sustainability.

More specifically, the achievement of SDGs is related to actions and activities performed by LGs. If LGs adopt accrual accounting, information about resources consumed becomes available and subsequently the application of cost accounting practices to measure the resources devoted to these actions is then feasible. Thus, the adoption of accrual accounting is the prerequisite for LGs to develop cost accounting systems (for example activity-based costing) to relate resources to activities at the municipal level. In turn, they could map these activities as well as the relevant costs and resources to SDG-related projects. For example, for SDG 5 (Gender equality), which has no financial indicators, budget allocations for gender programmes could provide a suitable financial indicator retrieved from the accounting

system. We acknowledge that the use of budget information to connect resources with SDGs is a plausible way of making this relation; however, as most of the LGs' resources related to SDGs usually come from the same pools of resources, defining direct relations between line-item budget expenditures and SDGs is not straightforward.

Limitations and further research

This study is not without limitations. Due to the indirect approach followed, the analysis of VLRs did not allow for clarifying whether internal measures and financial figures have been used for managerial purposes or whether politicians have defined their strategic approach by taking into account the financial resources distributed among different strategic priorities. Furthermore, the analysis did not allow us to detect whether the VLRs were produced directly by the cities or with the support of consultants, and if the process through which the report is prepared derives from an organizational tension toward the achievement of SDGs, or it is rather the result of a symbolic approach (Manes Rossi & Nicolò, 2022). To address this, future research could analyse SDG information included in financial or non-financial reporting.

This article contributes to the new strand of research investigating how accounting can contribute to the realization of the 2030 Agenda, as well as to support the accounting standard setters in their efforts to increase reporting on SDG achievements. We believe that further efforts should be made toward the investigation of how accounting can facilitate sustainable development and, in this article, we have presented some solutions. Our proposals refer to the identification of new financial indicators that would properly proxy for SDG achievement. These financial indicators would build on the information retrieved from financial management systems and cost accounting systems that would be further developed to measure the resources consumed in achieving SDGs and SDG-related programmes. In this regard, it would be beneficial to further investigate LGs that innovate the use of financial indicators in SDG reporting. We trust that politicians and managers will be inspired by these suggestions on how to deal with SDGs and embrace accounting as a facilitator in their SDG achievement strategy.

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