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Co-creating sustainability performance accounts in cities via tinkering and bricolage

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Abstract:

Purpose: Existing performance assessment frameworks, such as the Sustainable Development Goals (SDGs), struggle to incorporate diverse voices and representations of heterogeneous contexts. Cities, in particular, present a challenging context for sustainability performance assessment as they pursue new forms of governance based on the multiplicity of actors and inter-organisational collaboration. This study explores how sustainability performance accounts are created at the urban level within collaborative forms of governance and amidst the plethora of available devices for performance assessment.

Design/methodology/approach: This study adopts a case study approach. Qualitative methods are mobilised to study a large European project focused on the urban transition to a circular economy in six participating cities. The construction of sustainability performance accounts is studied via the Actor-Network Theory lens.

Findings: The study highlights that when it comes to sustainability assessment in city initiatives, existing performance assessment devices are adapted and modified to fit local needs, and other sources of performance information are spontaneously mobilised to address the different dimensions of sustainability.

Originality/value: This study contributes to the public sector accounting literature by explaining the process of modifying existing devices for performance assessment to allow for the co-creation of accounts and by illuminating the spontaneous way in which performance information is generated and combined.

Keywords: public sector accounting, sustainability accounting, performance assessment, circular economy, cities, Actor-Network Theory

Paper type: Research paper

Introduction

Adopted in 2015 by the United Nations (UN), the Sustainable Development Goals (SDGs) provide an agenda and guidance for achieving global progress while tackling climate change, reducing inequalities, improving health and education, and preserving natural habitats (United Nations, 2015). The SDGs aspire to stimulate change on different scales, from individual citizen action through companies, cities, and regions to national and transnational initiatives. Performance measurement has been identified as a key accountability process for tracking national and local contributions to the SDGs (Abhayawansa *et al.*, 2021). The SDGs are also one of the globally recognised sustainability performance frameworks (Bebbington and Unerman, 2018), defining the measurable aspects of sustainability via financial, societal, and environmental metrics (Quattrone, 2022). They are one of many devices, that is, 'frameworks, tools, and templates' (Ruff, 2021, p. 332) used in sustainability performance assessment, which have proliferated both in practitioner and academic sources (Gasparatos *et al.*, 2009). However, attempts to create a universal performance assessment device for sustainability (see Cagno, 2023) are problematic because of the need to adapt general schemes to diverse local contexts and multiple dimensions that characterise sustainability (Ruff, 2021). Indeed, even by seemingly expanding the realm of what is measurable to social and environmental issues (Quattrone, 2022), the SDGs limit the debate and inclusion of different priorities and understandings of sustainability, as 'any single perspective involves the non-reporting of others' (Brown, 2009, p. 317). This is the case for most devices suggested for sustainability performance assessment; these devices have been labelled as 'reductionist' because they only consider a single perspective (Gasparatos *et al.*, 2009). Meanwhile, sustainability should be accounted for based on participatory approaches, building on dialogic accounting (Thomson and Bebbington, 2005; Brown, 2009; Brown and Dillard, 2015).

Cities have been identified as key actors in achieving sustainable development with a dedicated Urban Sustainable Development Goal that aims at making them inclusive, safe, and resilient (Klopp and Petretta, 2017; Grossi and Trunova, 2021). Simultaneously, cities have been gaining relevance in the public sector accounting literature, studied as complex systems where actors require collaboration across organisational boundaries to achieve common goals (Brorström *et al.*, 2018; Grossi and Argento, 2022). To achieve the SDGs and remain competitive, cities have introduced strategies to become more sustainable (Guarini *et al.*, 2021), turning to concepts such as a circular economy (CE) at an urban level (Bekier and Parisi, 2023). While its definition is contested (Corvellec *et al.*, 2022), the CE essentially opposes the linear production and consumption system in which resources are extracted, transformed, used, and disposed of. The implementation of CE initiatives in cities requires cross-sector collaboration and the involvement of heterogeneous stakeholders because of the growing need to monitor and disclose various elements of sustainability performance to remain competitive (Grossi and Steccolini, 2014). CE initiatives are key examples of collaborative governance, whereby the blending of the resources and interests of various stakeholders generates a need for new

accounting approaches (Grossi and Argento, 2022). Dialogic accounting approaches (Brown, 2009) that address the diversity of stakeholder values and interests could be particularly relevant to CE initiatives in cities. However, dialogic accounting approaches contrast with performance assessment devices, which are often imposed on CE initiatives, creating tension and potential resistance (Sobkowiak *et al.*, 2020). Therefore, it is important to understand what happens when performance assessment devices are given yet fail to embrace the multidimensionality of sustainability and to include relevant actors. Moreover, little empirical evidence exists in the public sector accounting literature on performance assessment practices in collaborative arrangements (see Grossi and Argento, 2022). This study addresses this gap by examining how sustainability performance is accounted for in cities implementing CE initiatives. Particular attention has been paid to how sustainability performance measures are imposed, challenged, and transformed in CE initiatives in cities.

This study relies on a constructivist perspective on sustainability performance accounting to uncover its emergence and practices within cities. Specifically, it adopts an Actor-Network Theory (ANT) perspective (Latour, 1987; 2005) and leans on the concepts of tinkering (Knorr, 1979; Latour, 1981) and bricolage (Lévi-Strauss, 1966; Latour, 1981) to better understand the idiosyncratic circumstances that lead to the creation of sustainability performance accounts in CE initiatives in cities.

The paper is structured as follows: first, the paper is positioned at the intersection of public sector accounting and sustainability accounting by introducing recent debates in these two streams of literature. Subsequently, the theoretical concepts of bricolage and tinkering are introduced as useful perspectives for studying sustainability performance accounting practices in the city context. Finally, the empirical setting and data collection methods are presented, followed by a discussion of the findings, conclusions, and recommendations for further research.

Accounting for sustainability performance in cities

The public sector has been recognised as an important context for studying accounting in general, and particularly performance assessment, due to its distinctive features, namely, the heterogeneity of its organisations and stakeholders, scale of operations, ambiguity of goals, multifaceted performance, and diversity of accounting practices (Lapsely, 1988). Considering political influences and complicated levels of accountability, the public sector is a context characterised by inherent complexity (Arnaboldi *et al.*, 2015), making performance assessment a challenging task (Arnaboldi and Azzone, 2010). Issues pertinent to the public sector become even more evident when studying cities (Lapsley *et al.*, 2010) and sustainability initiatives therein due to the lack of a clear definition of sustainability (Bebbington, 2009) and the broad collaboration required for its achievement (Bebbington *et al.*, 2007).

Cities as examples of collaborative governance

A city can be defined as a '*complex, dynamic ecosystem through which resources flow between a myriad of actors, across multiple scales and sectors*' (Williams, 2019, p. 2751).

Within the ecosystem, different strategies and objectives are pursued through specific initiatives that require collaboration across organisational boundaries (Brorström *et al.*, 2018) and citizen participation to ensure citizen needs are met (Grossi and Argento, 2022). City initiatives, where multiple organisations from different sectors work towards a common goal and involve citizens in solving specific social problems, are key examples of collaborative governance (Grossi and Argento, 2022). Such arrangements consist of a broad range of actors, which blend different resources and interests, necessitating the development of new accounting tools and approaches (Grossi and Argento, 2022). Given the variety of interdependent actors involved, some scholars have proposed that the performance of city initiatives should be accounted for through systems that support information flow and stimulate dialogue between these actors (Almqvist *et al.*, 2013). The goal of performance information in such settings is to improve the outcomes of collaborative efforts rather than intra-organisational efficiency and effectiveness (Almqvist *et al.*, 2013). Thus, outcome-based performance assessment is likely to be pursued, as it would support public service improvement and facilitate collaborative performance (Campanale *et al.*, 2021). Moreover, given that collaborative initiatives' performance assessment should take into consideration multiple values, new approaches should account for both financial and non-financial performance (Grossi and Argento, 2022).

As performance assessment is expected to take new forms in collaborative initiatives (see Almqvist *et al.*, 2013; Grossi and Argento, 2022), it has the potential to become more '*multi-voiced*' and '*attuned to a diversity of stakeholders' values and interests*' (Brown, 2009, p. 317). In other words, rather than relying on the traditional monologic accounting approach, the new performance assessment systems can fully embrace citizen-oriented practices of dialogic accounting (Grossi *et al.*, 2023; Brown and Dillard, 2015; Brown, 2009). In contrast to monologic accounting, which privileges a single perspective centred on the needs of financial capital (Brown, 2009), dialogic accounting has the potential to embrace diversity, avoid 'monetary reductionism', and ensure participatory processes and access for non-experts (Brown, 2009). In this pursuit, dialogic accounting opens up the discussion of different framings (Brown and Dillard, 2015), whereby a situation can be accounted for in various ways to 'illuminate' its many sides (Brown, 2009). Accounts can be both quantitative and qualitative, with narratives and visual images playing an important role as different groups of actors provide different visibilities (Brown, 2009).

Particularly, accounting for sustainability in city initiatives presents a strong potential for the development of new, multidimensional, and participative approaches that would engage multiple viewpoints and take stakeholder engagement seriously (Brown, 2009; Bebbington *et al.*, 2007; Thomson and Bebbington, 2005). Actors engaged in city initiatives may have different views on the goals of the initiative and how to account for its outcomes (see Arnaboldi and Azzone, 2010). A monologic accounting approach privileges financial representations and a shareholder perspective (Brown and Dillard, 2015), inherently excluding other accounts. Meanwhile, sustainability performance encompasses the environmental, social, and economic levels of systemic change,

potentially requiring accounting devices other than traditional quantification and key performance indicators (Brorström *et al.*, 2018).

Challenges in accounting for sustainability performance

In recent years, sustainability and sustainable development have developed as areas of concern for accounting and, not least, for performance assessment (e.g. Hopwood *et al.*, 2010; Bebbington, 2007). However, the concept of sustainable development poses significant challenges in this field of research.

First, sustainable development suffers from a lack of clear definitions in the organisational context (Bebbington and Larrinaga, 2014; Bebbington, 2009). As sustainable development is 'politically plastic' (Bebbington, 2009, p. 189), meaning it can be interpreted and acted upon in various ways, what constitutes 'good' or 'bad' performance in relation to sustainable development remains unclear and contested (Bebbington, 2009). The SDGs are meant to address this issue by indicating, with 17 goals, 169 targets, and 232 indicators, the sustainable development aspects that should be prioritised. However, in so doing, the SDGs seem to pursue the '*infallible truth*' (Boyce, 2000, p. 53) about global sustainability rather than facilitating and broadening the debate and allowing for more diverse representations of values and priorities. Additionally, while the SDGs are developed globally, the measurement and reporting task is imposed on individual organisations or initiatives, which often operate in specific local contexts. Without clear guidance and capacity building to enhance organisational or governmental capabilities to measure and report SDGs, local interpretations and bottom-up approaches to accounting for performance are likely to emerge (Sobkowiak *et al.*, 2020). Yet, research providing rich details on emerging sustainability and SDGs accounting practices is still scarce (Bebbington and Unerman, 2018), and studies demonstrating dialogic accounting in practice are lacking.

Second, the uncertainty of solutions and the ever-changing nature of circumstances pose another challenge to sustainability performance assessment. In other words, sustainable development presents itself as one of the 'wicked problems' of our times (Bebbington and Larrinaga, 2014), whereby "*solutions*" require continual reworking as actions taken often create other manifestations of problems' (Bebbington and Larrinaga, 2014). Simultaneously, sustainability and sustainable development address a wide range of issues and scales (Gasparatos *et al.*, 2009), and they require continuous and active input from diverse fields of expertise to tackle them. Their achievement requires changes in entire ecosystems, economic sectors, societies, and cities, which cannot be approached by breaking them down into their components due to the constitutive nature of the interrelationships between them. Therefore, Gasparatos *et al.* (2009) suggest using multiple methods for sustainability performance assessment rather than resorting to traditional 'reductionist' performance measurement devices. In other words, they suggest that 'methodological pluralism' and increased stakeholder participation can be the key to achieving more concrete and relevant sustainability assessments (Gasparatos *et al.*, 2009, p. 253). However, this argument assumes that various sustainability

assessment devices can be selected and combined in an ‘conscious attempt’ to apply methodological pluralism (Gasparatos *et al.*, 2009, p. 253). Given the sustainability accounting challenges, it is possible that a conscious selection of devices to assess sustainability performance will be difficult for many organisations and their initiatives. Furthermore, although mobilising various methods for sustainability accounting expands its reach to include diverse stakeholder values and interests, it does not align with dialogic accounting, where participatory processes, enabling accessibility for non-expert audiences, and avoiding new forms of monologism are highlighted (Brown, 2009).

Theoretical framework

Tinkering and bricolage

This study explores the practice of accounting for sustainability performance in collaborative initiatives in cities, with a particular focus on how sustainability performance measures are imposed, challenged, and transformed therein. To better understand the local, idiosyncratic circumstances that bring about accounting change and innovation, the concepts of *tinkering* (Knorr, 1979; Latour, 1981) and *bricolage* (Lévi-Strauss, 1966; Latour, 1981) are particularly useful. Introduced by Lévi-Strauss (1966), the term ‘bricolage’ can be roughly translated as ‘making do’ with the available resources (Lévi-Strauss, 1966; Baker, 2007; Baker and Nelson, 2005), both on the ideational and material levels. The former refers to the process of recombining the elements of ideas, myths, and stories to create new myths that can serve new functions. The latter refers to processes ‘*through which people use and combine the various resources they have “at hand” as a means of finding workable—if typically imperfect—approaches to a wide variety of problems and opportunities*’ (Baker, 2007, p. 697). Bricolage often invokes ideas of improvisation; while the two are related, they should not be seen as synonymous (Baker, 2007). Similarly, bricolage is often perceived as leading to suboptimal results, although that is not always the case – on the contrary, bricolage can often ‘*reach brilliant unforeseen results*’ (Lévi-Strauss, 1966, p. 17). Given its focus on creation, the concept of bricolage has been used to investigate the processes of research, knowledge development (see Latour, 1981) and innovation (see Baker, 2007). The concept of ‘tinkering’ is linked to opportunism (Latour, 1981) and acting upon heterogeneous or changing circumstances to arrive at a solution (Knorr, 1979). Similar to bricolage, it is about ‘making do’ and adjusting or modifying the resources that are readily available. The terms ‘bricolage’ and ‘tinkering’ have been often used in parallel since Knorr (1979) and Latour (1981) mobilised them to discuss the research and development process of scientific knowledge. Further adopted by accounting scholars (see Dambrin and Robson, 2011), they can be succinctly defined as ‘*the use of available resources, practices, cultural artefacts or institutions in new combinations to achieve change*’ (Nicholls, 2009, p. 756), which is the definition we will follow in this study.

The concepts of tinkering and bricolage are borrowed from studies within the ANT tradition (Latour, 1987; 2005), which informs our analysis. Having a broad foundation in ANT allows us to ‘*get into the middle of action and observe it*’ (Barter and Bebbington,

2013) to understand how sustainability performance is accounted for in practice, before the accounts stabilise. Rather than studying publicly available numbers indicating sustainability performance, this study follows the networks of human and non-human actants (Latour, 1987; 2005) that lead to their construction. Here, 'actant' is understood as the source of action, that is '*something that acts or to which activity is granted by others*' (Latour, 1996, p. 373). By recognising actants, the connections they develop, and their impact on transforming performance accounts, we investigate sustainability performance measurement before it becomes a 'black box' (Latour, 1987).

Several notable accounting studies adopt an ANT perspective (see Justesen and Mouritsen, 2011), exploring the emergence of new accounting systems in various public sector settings (see Preston *et al.*, 1992; Arnaboldi and Azzone, 2010; Bruno and Lapsley, 2018; among others). However, sustainability performance assessment in collaborative initiatives is yet to be investigated with an ANT lens. In light of the recent developments in public governance and organising public life (Grossi and Argento, 2022; Almqvist *et al.*, 2013), particularly visible in the functioning of cities, we want to investigate how actors 'make do' with the existing devices, methods, and information available to account for sustainability performance in collaborative initiatives. To that end, mobilising the tinkering and bricolage concepts allows us to study the interplay between various performance assessment devices and their local adaptations, thus generating unique insights into the public sector and sustainability accounting.

Research context and methods

This study uses qualitative methods within a case study approach (Stake, 2000) to investigate how sustainability performance is accounted for in cities that implement CE through collaborative initiatives. As sustainable development has been criticised as vague and challenging for practical implementation (see Kirchherr *et al.*, 2017), various concepts have emerged as potential operationalisations, complements, or substitutes, with CE being discussed as one such approach (Wishart and Antheaume, 2021). In essence, CE opposes the linear approach in which resources are extracted, transformed, used, and disposed of as waste and promotes a regenerative economy in which resource extraction is limited and the life of existing resources is extended. There is no single definition of CE, as the concept has a long history and multiple affiliations (Wishart and Antheaume, 2021); however, based on a literature review of 114 definitions, Kirchherr *et al.* (2017) conceptualised it as: '*an economic system that replaces the "end-of-life" concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes. It operates [...] with the aim to accomplish sustainable development, thus simultaneously creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations.*' (2017, p. 229). Taking this definition as a point of departure, the CE is considered in this study as one of the available means to pursue sustainable development strategies, ultimately contributing to achieving the SDGs. Given its ambitious reimagining of current

consumption and production patterns, the CE is considered a setting in which practices and issues related to sustainability performance assessments are particularly visible.

Consequently, this study follows a large-scale European project funded by the European Commission (EC) under the Horizon 2020 programme, which aims to *'develop circular and regenerative cities through the re-localisation of production and the re-configuration of material flows at different scales'* (Project Internal Document, 2019). The three-year project has the concrete ambition to support cities in adopting CE principles that would further advance their efforts to achieve the SDGs (Project Internal Document, 2019). The project involves six cities, each in a different European country, that are actively engaged in the development and testing of innovative solutions with the potential to address the most pressing sustainability challenges. These solutions range from redefining the role of municipal food markets to developing new solutions for the collection of discarded textiles or designing plastic sorting units for healthcare institutions. While the solutions differ in their focus, the approach to their development is common across the project, with a strong emphasis on citizen involvement through consultations and workshops at different stages of solution development. With each city team focusing its efforts on the most pressing local needs identified and applying a similar approach to solution development, the differences between the six cities in terms of population size, location, and political climate, among others, become less pertinent to this study. Each city team that leads the initiative has a unique composition but typically consists of municipality representatives, small- and medium-size enterprises, FabLabs (defined as workshops providing public access to tools and skills), and several local partners. The overall project management is conducted centrally by one coordinating organisation and locally by one key organisation in each city. The EC requires periodic and final reporting; however, city teams are also accountable to local stakeholders and communicate with them regarding the performance of the CE initiative.

Initially, each city's performance was supposed to be assessed using three devices purposefully selected to address different aspects of sustainability (Project Internal Document, accessed 10-10-2022):

1. Theory of Change (ToC), which is often used in non-governmental organisations and the public sector to illustrate how an intervention will lead to a desired impact, presents a detailed roadmap of activities and their links to outputs and outcomes (Anderson, 2009). In this study's CE initiatives, the ToC identifies the desired outcomes and provides a narrative account of how they were achieved.
2. Key Performance Indicators (KPIs) quantify the changes in environmental, social, and economic dimensions.
3. Social Return on Investment (SROI) assigns financial proxies to monetise the societal outcomes of interventions (Ruff, 2021). In this study's CE initiatives, the SROI provides a valuation of the potential social impact of the prototyped solutions.

These devices constituted the project's performance assessment framework, as defined in the project proposal. Not all project partners were involved in writing the proposal or defining the performance assessment framework. As the proposal subsequently became a binding agreement for all project partners once the project received funding, the framework became imposed on participating city teams. As such, it can be understood as a top-down, predefined performance assessment framework, similar to many sustainability frameworks that exist, not least SDGs (Sobkowiak *et al.*, 2020). However, as this study demonstrates, the framework and its three constitutive devices were a source of controversy, and other methods of performance assessment were drawn upon by city teams.

Methods

In line with the ANT approach, this study relies on multiple data sources (Barter and Bebbington, 2013), such as field observations, formal and informal documents, visualisations, and semi-structured interviews. This flexibility allowed us to obtain varied accounts of the performance assessment practice and follow key actants, also non-human (Latour, 2005). Data collection occurred over a 30-month period between late 2019 and mid-2022. The authors had full access to the project, which allowed them to gain close and detailed insights into how the performance of the participating cities was accounted for. Prolonged field engagement helped us develop an in-depth understanding of the context, including the relationships between actants, various devices, and artefacts involved. Data from 100,5 hours of participant observation and 12 individual interviews was analysed for this study.

The observations were conducted primarily in meetings in which various methods of performance assessment were in use or under debate. Particularly, we followed the KPI iterations (21 hours), ToC iterations (22 hours), project meetings and workshops (52 hours), and meetings of project managers (3 hours). In the project studied, the iterations of KPIs and ToC referred to workshops in which city team members discussed, defined, proposed, and transformed KPIs and ToC elements to represent developments in their city's CE initiatives. Two project review meetings, the midterm review and the final review, were also observed, and city presentations were included in the analysis (2,5 hours). Most meetings were recorded and extensive field notes were taken to document some of the unspoken changes, such as modifications to the KPI lists or ToC visualisations. Field notes were also used when recording was not possible. The inscriptions related to the performance of the cities were also part of the analysis, including the performance reports in project deliverables, the Grant Agreement (GA), the spreadsheet where indicators were modified, and the online whiteboards where different performance assessment devices were combined (see Table I).

The observational and documentary data were supplemented with semi-structured interviews conducted with key actors involved in the performance assessment of the city initiatives, namely the city team members and project managers in the European project. The interviews aimed to clarify the meaning and motivation behind certain performance

assessment practices in the project and to gain insight into sustainability accounting practices from various perspectives. All interviews were recorded and transcribed. Details of the interviews and documentary data collection are presented in Table I.

Interviews				
Interviewee	Role in the project	Organisation	Date	Duration
1	Project manager	University	27/09/2022	40min
2	Pilot [cities] coordinator	Non-profit	04/10/2022	35min
3	Project officer	University	21/11/2022	35min
4	Performance assessment specialist	Consulting company	11/11/2022	30min
5	Performance assessment specialist	Consulting company	30/09/2022	40min
6	City team member	Municipality	23/09/2022	30min
7	City team member	FabLab	23/09/2022	35min
8	City team member	Municipality	27/09/2022	50min
9	City team member	FabLab	10/11/2022	30min
10	City team member	Non-profit	22/11/2022	45min
11	City team member	Municipality	22/11/2022	45min
12	City team member	Non-profit	23/11/2022	30min
Documents				
Document	Document name	Key data	Published/obtained	
1	Project Grant Agreement	Formal performance assessment framework	01/12/2019	
2	Deliverable 1	Potential redesign of assessment framework	29/02/2020	
3	Deliverable 2	Pilot city strategies	31/05/2020	
4	Deliverable 3	Revised KPIs	31/05/2021	
5	Deliverable 4	Project performance evaluation	30/11/2021	
6	Deliverable 5	Final performance assessment	31/05/2022	
7	KPI iterations spreadsheet	KPI revision history	21/07/2020	
8	Online document with ToC information	ToC revision history	30/03/2020	

9	Online document with KPI information	KPI revision history	07/04/2021
10	Online document with SROI information	SROI revision history	06/01/2022

Table Error! No text of specified style in document.-1. Data sources. Table by authors.

The analysis was conducted on field notes, interview transcriptions, and documents and involved two rounds of coding carried out manually using NVivo software. The initial round of open coding was conducted to identify themes emerging from the data, which highlighted the variety of tools and methods used in sustainability performance assessments, issues with individual performance assessment tools, and modifications made to them in response to local contexts. A subsequent round of directed content analysis (Hsieh and Shannon, 2005) used concepts from ANT, such as tinkering, bricolage, or translation, applied as codes. For instance, particular expressions about how performance was accounted for, such as ‘patchwork’, ‘ad hoc’, ‘unorganised’ or ‘spontaneous’, among others, were coded as bricolage, while ‘modified’, ‘adapted’ or ‘changed’ were coded as tinkering, in line with our theoretical framework.

Research results

Devices suggested for performance assessment in the project

Formally, the performance of cities in the CE project was guided by the GA. The GA represents a contract between all project members and the institution funding the project; it broadly describes the project’s objectives and planned activities. Given that the GA was drafted in line with the funding requirements of the EC, its contents inherently translated the broader interests and policy ambitions of the EC into local innovation projects in the participating cities. The GA was a powerful actant with strong influence on the project’s actions and practices. It was circulated, debated, referred to, and mobilised in various situations, having an impact on how things in the project were done – that is, it *made others do things* (Latour, 2005). Given that the GA put forward an objective for the project to ‘*provide critical examples of ways in which cities can adopt a CE model and reach the 2030 Sustainable Development Goals*’ (Project Internal Document, accessed: 10-10-2022), it advocated for the SDG agenda and assumed the cities’ performance should contribute to its achievement.

According to the GA, the assessment of the cities participating in the project should rest on three devices: ToC, KPIs, and SROI. Each device was expected to be implemented by the participating city teams in line with its traditional use, that is, following the steps described in the literature (Nesta, 2019; SROI Network, 2012). Additionally, the GA defined nine KPIs for each city participating in the project. The KPIs imposed by the GA are listed in Table II.

Performance indicator	Target
<i>Number of textile specific city resources identified (materials, infrastructures, etc.)</i>	100
<i>Number of specific textile streams identified</i>	10
<i>Number of governance / business models developed</i>	5
<i>% textile regenerated (current 20% of complete stream)</i>	40%
<i>Overall stakeholder satisfaction with new models</i>	80%
<i>Number of new applications for textile waste developed</i>	10
<i>Willingness to pay for regenerated products and materials</i>	80%
<i>Number of local makers and business reached through showcases</i>	2,000
<i>Number of citizens engaged through educational programmes</i>	500

Table Error! No text of specified style in document.-2. KPIs included in the Grant Agreement. Example of City A. Table by authors.

Imposed performance assessment devices become contested

As the project progressed, the devices imposed by the GA were contested by the participating cities, who considered them confusing, restrictive, and ill-fitted to their approach of co-designing CE solutions with various stakeholders. Particularly, KPIs were a source of controversy among city teams, seen as outdated or irrelevant to how the project developed. In one of the meetings, a municipality employee described the key issues: *'They [KPIs] capture only a part of the journey, and it is very partial. It is not the whole story [...]. The indicators are also not able to capture some of the perspectives of the stakeholders or beneficiaries [...]'* (Municipality employee, City D field visit, 08-11-2021). In other words, the suggested devices were not seen as useful for dialogue with diverse audiences or for representing different perspectives; rather, they were treated as another top-down accountability mechanism. Initially, the project management team aimed to keep the existing KPIs unchanged, primarily because they were useful for benchmarking between cities and as a key accountability mechanism for the EC. However, as the city teams developed their initiatives in different directions, the concerns regarding these KPIs mounted and the tensions increased, and thus the position of the project management team also begun to change: *'Of course, these KPIs are in the GA, so we need to be compliant. But the EC is also aware that these KPIs have been written long ago, [...] so it is completely reasonable for us to change some KPIs, some numbers, if we find it necessary'* (Project manager, City D KPI calibration meeting, 02-09-2020). The project manager later reflected that *'these KPIs were disconnected from the reality of the cities'* (Project manager, Interview, 27-09-2022).

The need for KPI iterations emerged from the city teams' dissatisfaction with the perceived rigidity and lack of contextual fit of the KPIs imposed by the GA. The CE initiatives pursued in cities were inherently complex, due to their collaborative nature and the objective of generating multiple values (Grossi and Trunova, 2021) as well as the

high ambiguity caused by the lack of an agreed-upon definition of CE (Kirchherr *et al.*, 2017). As the City Teams Coordinator reflected, there were manifold areas that could be addressed in the CE initiative: *'for the cities, it is really about: what are your objectives and why? What is the context of your city and how are you going to address the circular economy through the different lenses? How are you addressing governance or policy issues, technology or social [aspects]?' (City Teams Coordinator, Project coordination meeting, 13-01-2020).*

Consequently, there was a push for tinkering with the existing indicators, which allowed the city teams to respond to heterogeneous contexts and changing environments in their indicator design, as the CE solutions were yet to be defined (Knorr, 1979; Latour, 1981):

'We had to modify the KPIs as we progressed in the project, because the reality was facing us, and the reality is not always something you can write in a grant proposal. It was absolutely necessary to modify the KPIs, otherwise we would have had a project focused only on meeting KPIs – and this is not what [this initiative] was about. I realise that measurements are necessary. But the measurement is a means to an end and not an end itself.' (City A team member 1, Project meeting 7-10-2021).

In response, a process was designed for city teams to iterate the existing KPIs; that is, to modify the KPIs in a series of workshops with all city team members present and to construct, via co-creation, additional KPIs as deemed necessary. The process of KPI development consisted of three key steps: (1) longlisting, where a repository (so-called longlist) of CE KPIs was created based on practitioner and academic sources; (2) shortlisting, where each city team member negotiated the KPIs most relevant to measure their performance; and (3) calibrating, where both the KPIs in the GA and the newly selected KPIs were modified and finetuned to best fit the cities' ambitions and reality.

Tinkering with and co-creating KPIs

In practice, the process of constructing the final set of KPIs in each city involved dialogue between team members and project managers, trialling various indicators, and adapting their descriptions and targets. In discussing and modifying the KPIs, the city team members effectively engaged in the process of their co-creation.

In City E, which focused on increasing the circularity of temporary construction materials, different city team members initially expressed different priorities for the project. For instance, the municipality representative focused on partnerships with zero-waste events, while the FabLab members focused on materials, cost, and aesthetics. As the project progressed, an initiative was developed to support start-ups through incubation programmes. A discussion emerged on how to best measure the success of such an approach:

'PM: Then on governance, we have "new forms of financing". What is your ambition when it comes to new forms of financing?'

E1: It could be mixed forms of financing for developing new solutions, like public-private, crowdfunding, and so on. I don't know, what do the others think?'

E2: For me... is this not about business models? There is a GA KPI on business models.

E1: For me, from the incubation point of view, this KPI on forms of financing would refer more to the phase before a business is established, how you kick off a business. For instance, what we are experiencing now in our organisation... [gives an example of new project supported].

E3: I am not an expert, but I can't see that we will come up with five new forms of financing. I think it's more on new expertise or the way you manage your project economically and help others doing it. But how many new ones can we really see?

E1: I can see that we responded with a high number on the survey for this KPI. And I think it's because we know we are supporting very fragile project leaders, because they are in very early project development stages, so we thought we needed to find new ways of funding them. [...] For me, in P3 we talk about success cases, new business models established. Here, we are trying to evaluate how many projects enter the incubator, even though some of them will fail.

PM: Maybe changing it into "number of projects that receive support" would be appropriate?

[conversation continues]' (KPI iteration workshop, City E, 30-07-2020)

The indicators were modified, commented on, and elaborated on in a spreadsheet, which ultimately became a powerful actant in the project, as various interests were translated into specific indicators and targets. The spreadsheet was mobilised at different times in the project and travelled between city team members, project managers, various reports and deliverables, and different groups of local stakeholders, where it was used to gather allies for agreed-upon solution development.

The process of tinkering with existing KPIs was considered important for two reasons. First, it served as a mechanism to deal with the uncertainty of the CE, providing more time to define and prototype the solutions. CE, as operationalisation of sustainable development, addresses one of the 'wicked problems' of our times, where results of undertaken actions often not only fail to fully resolve the problem but also illuminate its other manifestations (Bebbington and Larrinaga, 2014). For the cities studied, this issue was partially addressed through the iterative development of KPIs and their ability to tinker with them. Second, the process of tinkering with KPIs, which was visible during the KPI iteration workshops, allowed for a debate between city team members and their stakeholders, in which different actors argued for the assessment of project aspects that were important to them. As one of the project managers reflected, this increased the feeling of project ownership among the city team members:

'It was good that the cities could rethink and recalibrate the proposal KPIs and had the freedom to take some of them out. [...] maybe the achievement of KPIs is not so critical, but the context where these KPIs were created. Because the process itself actually created some ownership among the pilot city members over their own project, so it was very important.' (Project Manager, Interview, 27-09-2022).

Tinkering with and co-creating ToC

Given that the definition of specific indicators was often challenging for city teams (the iterations took place over a 24-month period), the ToC was discovered as a way to support it while simultaneously providing a qualitative narrative of the city's performance. Initially, the ToC template based on a well-recognised 'DYI (Development Impact and You) Toolkit' (Nesta, 2019) was used to guide city teams in developing their own ToC. There were eight questions related to the challenges at hand: key beneficiaries, planned activities, envisioned outputs, outcomes, and impact. Although the cities attempted to 'make do' with the available framework (Molecke and Pinkse, 2017), the categories were challenged to better fit the CE initiative. Consequently, the ToC was shifted from a simple spreadsheet to a more visual online whiteboard where the intertwined connections between various activities and stakeholders could be drawn more explicitly. Additionally, the framework was further tinkered with by adding a category of 'scenarios' to demonstrate various possible pathways that would lead to the desired impacts, and by splitting the 'outcomes' category into short-term and long-term outcomes, further emphasising the temporal aspect of what is achievable. Finally, the ToC was further modified by the project managers, where each city's ToC was complemented with a project timeline and the activities of other project members to understand the potential synergies and requirements to achieve the desired performance. This demonstrated how, by tinkering with the existing device, the interests of project managers (i.e. achievement of objectives within the given operational and budgetary constraints) were translated into a device typically used for impact identification (Nesta, 2019).

Already in planning how the KPI development should unfold in the project, synergies between the KPIs and the ToC were identified, pointing towards a potential mediating relation between them: *[the different steps] will promote some discussion and then refinement of the KPIs. I think that the Theory of Change will already bring that discussion to the table. Where they have the ideas clearly visible on a board or a sheet of paper, I think that will really help to narrow down everything else.* (Consultant 1, KPI process design meeting, 03-02-2020). The idea was to maintain a close dialogue between the city teams and the two performance assessment devices, ToC and KPIs, which over time became key actants and mediators in the project. Indeed, as city team members added and modified descriptions of the desired impacts and planned actions over time, some of the existing KPIs were challenged, and new KPIs were suggested.

Acceptance of the adapted devices

After the suggested devices became instigators of dialogue and representations of various views on CE solutions, they were accepted for their relevance and benefits to the project. For instance, KPIs came to be considered crucial for setting boundaries and defining common ground between city team members. Given the ambiguity and multiple understandings of CE (Kirchherr *et al.*, 2017), it was particularly important to establish the framework of a CE intervention. The list of KPIs and related targets was a key actant

in each city, promoting an agreed-upon understanding of CE and impacting the development of other project activities. Meanwhile, the ToC was seen as a way to provide a more comprehensive account of the city's performance, where various assumptions could be communicated, accounting for contingencies in achieving the desired targets. As such, the ToC provided a space for cities to imagine what a good performance could look like: *'Theory of Change was a bit more high-level, to give a broad orientation of what a good performance would be in general. It was nice to have it done relatively early because it's not like the cities had no idea how a successful pilot or a successful city could look like'* (Performance management specialist 2, Interview, 22-09-2022). Given that the development of solutions for CE or sustainability requires continual reworking (Bebbington and Larrinaga, 2014), ToC provided the required flexibility and space for explanation.

Bricolage of devices to account for performance

Owing to the complexity of CE, which requires multilevel systemic change when implemented in cities (Prendeville *et al.*, 2018), performance assessment was problematic, and each of the suggested devices was criticised for its incompleteness. Given that neither the ToC nor the KPIs were seen as a 'complete' representation of the city's performance, the two were superimposed to create a coherent narrative with quantifiable outputs. A visual inscription of ToC was the basis for applying KPIs and their targets to specific activities and outputs, allowing project managers to 'make do' with the two devices that were otherwise deemed insufficient on their own. The prior translation of the ToC template from a simple spreadsheet into a colour-coded visual representation on an online whiteboard was key to enabling this process. Once the ToC was on an online whiteboard, it provided space for the interaction of different devices and for trialling them in different constellations. In other words, it allowed the bricolage of different devices, and the information extracted through them, that the city teams had at hand. The information was drawn not only from the agreed-upon KPIs, but also from other tools, such as Material Flow Analysis (MFA), value flow mapping, or SROI. Users of the online whiteboard based on ToC could mobilise data and information from various devices that were deemed important to create a coherent narrative of the city's performance:

'All these tools have been used in an iterative way. So every tool has been in a way, reused and readapted step by step. The ToC, in my view, has been one of the more comprehensive tools, because it takes together different aspects. Because in the ToC you have the KPIs but also other kinds of tools to represent the process, how the stakeholders have been engaged and what they perceived of this process. [...] And so at the end I feel that it's a kind of a frame in which we have worked in different steps and with the possibility to change and to adjust and to tell... the kind of storytelling of what has changed during that journey.' (City D team member 1, Interview, 23-09-2022).

As mentioned, the data required for performance assessment were gathered by city teams from various sources using methods serving different purposes in the project. While the devices existed in the project, they were not explicitly recommended for

performance assessment; rather, the city teams mobilised them as deemed relevant and necessary at a given moment. This occurred spontaneously and within different timeframes in each city depending on when new information emerged through the use of different devices. For instance, MFA was used to map the material flows in each city; however, its focus was largely environmental, and data were gathered on a specific scale. MFA refers to a method of quantifying the flows and stocks of materials and visualising them to easily identify areas requiring improvement. Data collected for the MFA were often mobilised by cities, as they were deemed useful for creating a narrative about environmental performance and impacts and defining environmental KPIs. However, it provided no insight into the economic or social performance of each city. To that end, value flow mapping was used to understand the value created through different solutions, primarily in terms of economic value. Value flow mapping was introduced in the project to design a technological solution for a digital marketplace; meanwhile, having the information available, the cities used it to demonstrate the economic value created and, hence, good performance. The data collected to calculate SROI were mobilised to understand and communicate performance regarding the social aspect of sustainability. Beyond these devices, more ‘informal’ data were often bricolaged into performance assessments; it consisted of stories, quotes, and pictures illustrating certain outputs and project results from the perspective of various stakeholders and beneficiaries. Instead of using a formal performance assessment framework, the cities in the project and the project managers drew upon the information available. The lack of intentionality in using multiple performance assessment devices was confirmed by one project specialist:

‘I felt like it was a bit of a patchwork. [...] I think it would be ideal if cities had a Theory of Change, and the different steps within it, and multiple indicators clearly assigned to know what data to collect and when, versus us trying to identify how we are progressing based on the information that we are collecting now, informing the next step, and then that informing the next step. [...] But, at the same time, I think it requires too much effort to be the best option’ (Performance management specialist 1, Interview, 22-11-2022).

Thus, in a largely ad-hoc manner, the city teams combined different data relevant to a ‘holistic’ performance assessment report of CE initiatives – such that would reflect the environmental, economic and social aspects of the interventions, in line with the idea of sustainability and SDGs (Ghisellini *et al.*, 2016). Furthermore, different devices were used to incorporate diverse perspectives and representations of sustainability. The data were subsequently translated into a combination of ToC narrative and KPIs. What emerged was a performance assessment based on methodological bricolage, in which the available data from various devices were combined and translated into a single form. Rather than following a single existing approach, the multidimensionality of CE resulted in cities collecting available data on its different aspects and stitching them together to create a common performance narrative.

Discussion

As sustainability grows in popularity, so does the number of ‘frameworks, tools, and templates’ (Ruff, 2021, p. 332) – that is, devices for performance assessment of sustainability initiatives. The UN SDGs, the largest global sustainability framework, are a key example of this trend, with many more devices suggested by organisations and governments (see Bebbington, 2007; 2009; Bebbington *et al.*, 2021). Although sustainability performance assessment devices, such as the SDGs, seek to expand the view on what is measurable within economic, social, and environmental aspects (Quattrone, 2022), they are inherently ‘reductionist’ in nature (Gasparatos *et al.*, 2009) and limiting when it comes to inclusion of diverse voices and perspectives. In the context of collaborative governance (Grossi and Argento, 2022), particularly visible in city initiatives, sustainability performance should be accounted for based on participatory approaches that stimulate dialogue and support information flow (Thomson and Bebbington, 2005; Almqvist *et al.*, 2013). This can be achieved not least through dialogic accounting (Brown, 2009; Brown and Dillard, 2015). However, empirical evidence disentangling how such accounts are created in practice is scarce.

To contribute to this interdisciplinary debate, this study explored the context of collaborative city initiatives and the practice of performance assessment therein. We relied on the ANT approach (Latour, 1987; 2005) to examine the process of creating sustainability performance accounts before they become a ‘black box’ (Latour, 1987). The study results, which followed a performance assessment of six cities in a large European project, explained the dynamics through which performance accounts are modified and assembled spontaneously, allowing for the inclusion of diverse voices and representations. In essence, this study observed how performance accounts were co-created in line with dialogic accountability (Brown, 2009; Brown and Dillard, 2015).

First, the results illustrated how performance assessment devices imposed on cities became contested due to their inability to capture the perspectives of diverse stakeholders and various elements of sustainability performance. In response, performance assessment devices, such as ToC and KPIs, were tinkered with (Knorr, 1979; Latour, 1981) to address the development of CE initiatives, which resulted from new information collected, changing circumstances (e.g. the COVID pandemic), and emerging local needs. The modifications unfolded over time and were based on ongoing inputs from different actors in the project. For instance, the process of developing contextually relevant KPIs to replace existing ones lasted for over 24 months and involved multiple iterations. This confirms that the local implementation of sustainability assessment frameworks is not merely a matter of transferring devices from the global to local levels (Abhayawansa *et al.*, 2021; Sobkowiak *et al.*, 2020). However, the findings also explained that tinkering with performance assessment devices, such as KPIs, created a space for dialogue and allowed various stakeholders to argue for the representation of project aspects that were important to them. Therefore, tinkering with performance assessment devices resulted in accounts being co-created and reflecting more diverse voices, values, and interests (Brown, 2009).

Second, the findings showed how, in a situation where performance assessment devices were suggested by the project contract, the project participants created performance narratives using available information via a patchworked and largely improvised process resembling material bricolage (Lévi-Strauss, 1966; Latour, 1981). While previous studies recognised that any accounting assemblage is '*imperfect and constantly in flux*' (Thomson, 2021, p. 239), this case further demonstrated that some accounting information is based on chance rather than meticulously collected data. The variety of information mobilised in performance assessment can be partly explained by the continuously evolving understanding of what good performance means and how it can be assessed and reported (Arnaboldi and Azzone, 2010), given the need for input from various stakeholders (see Abhayawansa *et al.*, 2021) and the complexity of the city system and its collaborative governance (Grossi and Argento, 2022; Brorström *et al.*, 2018). Drawing on various devices in an uncoordinated manner allowed the teams to capture the perspectives of various actors, both in terms of what was considered 'good' performance by different stakeholders and also what was considered good performance on various sustainability dimensions. As such, the bricolage of performance information contributed to 'illuminating' the many sides of an urban sustainability initiative, not least by allowing for the incorporation of narrative or visual elements to provide different visibilities (Brown, 2009). Consistent with the findings of Gasparatos *et al.* (2009), this study illustrates that sustainability performance assessment requires more than a single methodology. However, it also suggests that the use of multiple devices is not necessarily a deliberate and conscious endeavour, as is the case in methodological pluralism (Gasparatos *et al.*, 2009), but rather it relies on 'making do' (Lévi-Strauss, 1966; Baker, 2007) with the information that is readily available.

Conclusion

In response to the growing importance of sustainability efforts, sustainability performance assessment frameworks, tools, and templates have proliferated in recent years (Bebbington *et al.*, 2021). However, the majority of them are 'reductionist' (Gasparatos *et al.*, 2009), and fail to stimulate dialogue and allow for the representation of various perspectives, values, and interests (Brown, 2009). This is particularly problematic in collaborative forms of governance (Grossi and Argento, 2022), where multiple actors work together, blend resources and interests, and involve citizens in the co-production of solutions. However, as most performance assessment devices are imposed on organisations, projects, and initiatives (see Abhayawansa *et al.*, 2021; Sobkowiak *et al.*, 2020), it is important to understand what happens when they fail to embrace multiple perspectives on sustainability and become contested by the actors involved.

Based on the key findings of a qualitative study of a large European project, this study makes a two-fold contribution to interdisciplinary accounting research. First, building on public sector accounting, this study disentangles the complexities of performance assessment in collaborative initiatives. It illustrates that, in situations where performance assessment devices are imposed on a city initiative, they are likely to be

tinkered with (Knorr, 1979; Latour, 1981) and adapted to incorporate various voices and perspectives. Such processes, whereby new performance measures and accounts are co-created, can contribute to addressing dialogic accountability (Brown, 2009; Brown and Dillard, 2015). Second, with reference to sustainability accounting, this study uncovers the mechanisms through which sustainability performance is accounted for when definitions of CE or sustainable development have not yet stabilised (Kirchherr *et al.*, 2017). In the process of creating holistic sustainability performance accounts, pieces of information generated both ad-hoc and by performance assessment devices are combined in a spontaneous, 'patchworked' manner, rather than via conscious attempts as the literature has so far suggested (Gasparatos *et al.*, 2009).

Additionally, this study illuminated how varied and 'messy' the practice of developing sustainability performance accounts can be; it also confirmed the challenges related to the implementation of standard performance assessment devices, such as the SDGs, in collaborative sustainability initiatives. While policymakers and regulatory bodies may attempt to develop novel sustainability performance frameworks or iterate existing ones, their efforts may not yield the desired results. For sustainability initiative managers, allowing more participatory approaches, where team members can collectively shape specific performance indicators, devices (e.g. ToC), and performance reports, can allow for a more diverse representation of ideas, perspectives, and understanding of sustainability. Consequently, as more aspects are represented in performance measures, ownership increases in the project, and more attention is paid to ensuring success.

This study is limited, as it follows a single case of a European project; however, we see it as a first step towards further empirical research into the practices of sustainability performance assessment in collaborative initiatives in cities. The special characteristics of the SDGs, and not least the multinational consensus for their implementation, certainly call for a closer investigation of their roles in relation to other sustainability performance frameworks.

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