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Rankings for smart city dialogue? Opening up a critical scrutiny.

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# **Rankings for smart city dialogue?**

## **Opening up a critical scrutiny**

### **Abstract**

**Purpose** – This paper explores whether and how contemporary rankings reflect the dialogic development of smart cities.

**Design/methodology/approach** – This paper is based on a synthesis of smart city, rankings and dialogic accounting literatures. It first analyses ranking documents and related methodologies and measures and then reflects on four smart city rankings, taking a critical stand on whether they provide space for the polyphonic development of smart cities.

**Findings** – We argue that rankings do not include divergent perspectives and visions of smart cities, trapping cities in a mirage of multiple voices and bringing about a lack of urban stakeholder engagement. In other words, there is a gap between the democratic demands on smart cities and what rankings provide to governments when it comes to dialogue. As such, rankings in their existing traditional and technocratic form do not serve the dynamic and complex nature of the smart city agenda. This, in turn, raises the threat that rankings create a particular notion of smartness across urban development with no possibility of questioning it.

**Originality/value** – The paper responds to recent calls to critically examine the concept of the smart city and the role that accounting has played in its development. We bring new insights regarding the value of dialogic accounting in shaping a contemporary understanding of rankings and their criticalities in the smart city agenda.

**Keywords** – Rankings, Smart cities, Dialogic accounting

## **Introduction**

In recent years, the smart city (SC) concept has been increasingly endorsed as a panacea for sustainable urbanisation (Caprotti et al., 2017; Manville et al., 2014, p. 7; Mora & Deakin, 2019). Broadly defined, SCs suggest urban development with ‘investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure [that] fuel sustainable economic growth and high quality of life, with a wise management of natural resources, through participatory governance’ (Caragliu et al., 2011). This conceptualisation has progressed through several successive trends in the understanding of what SCs represent and how (Grossi et al., 2020; Marvin et al., 2015; Meijer, 2018; Meijer & Bolívar, 2016).

Notably, the technocentric and technocratic view of SCs is gradually being replaced with a more human-centric dialogic view (Grossi et al., 2020; Mora et al., 2017). The former positions technology at the centre of urban sustainability, with ICT companies and city authorities as key experts and decision-makers in city development (Anthopoulos, 2017; Batty, 2013; Kitchin, 2014; Mayer-Schonberger & Cukier, 2013; Mora et al., 2017; Wiig, 2015). The latter acknowledges the greater complexity of SC dynamics, where multiple actors should be engaged in city development (Mora & Deakin, 2019). In other words, it suggests that the central SC element is not technology for urban sustainability itself but rather the more human aspects of its implications, including citizen engagement, coproduction and dialogue among divergent actors (Grossi et al., 2020; Kitchin, 2015; Lovan et al., 2017; Vanolo, 2016).

Yet while the move from techno-centric and technocratic vision towards dialogic SC development is increasingly welcomed to secure sustainability (OECD, 2018; United Nations, 2017), scholars warn that such a shift also requires support from related governance technologies (Grossi et al., 2020; Guarini et al., 2021; Meijer, 2018; Mora & Deakin, 2019). This paper addresses rankings, which are an important governance and calculative technology in SC development (Giffinger et al., 2010).

Ranking are receiving increasing attention as calculative technologies for measuring and managing cities (Argento et al., 2020; Brorström et al., 2018; Cohen & Karatzimas, 2021; Elgert, 2018; Kaika, 2017; Kitchin et al., 2015; Saez et al., 2020). Yet, they are not ‘just an easy way’ of representing cities (Czarniawska, 2010; Lapsley et al., 2010). Instead, rankings and related measures are an information policy device that is essential to defining, mediating and even governing cities’ development and future (Brorström et al., 2018; Giffinger et al., 2010; Kornberger & Carter, 2010). In other words, rankings not only reflect and describe the particular status of cities and what is "out there" in an urban hierarchy but can also prescribe and shape urban visions and be used in policy-making (Acuto et al., 2021; Elgert, 2018; Kaika, 2017; Saez et al., 2020).

In response to these capacities, there is a call to critically examine the inner workings of rankings. In the case of rankings used relative to SC development, Giffinger and Gudrun (2010) point out that there is an excessive focus on the objective outputs of rankings (e.g., a single number on a linear scale), thus neglecting the empirical investigation of their underlying methodologies and related measures. Criticising previous city rankings, Giffinger and Gudrun call for more transparent and methodologically advanced rankings that can facilitate learning, dialogue and multiple perspectives on SC development (Giffinger et al., 2010). Yet, despite the many new SC rankings that emerged during the last decade, inspired by this call and by increased interest in sustainability (Escolar et al., 2019; Saez et al., 2020), empirical investigation of their inner workings is lacking. It remains unclear whether contemporary rankings, as calculative technologies, reflect and support the complex dynamics of SCs under a human-centric dialogic vision and give space for the polyphonic development of cities.

Motivated by this gap, this paper explores *whether and how contemporary rankings reflect the dialogic development of smart cities*. To answer this question, we juxtapose the existing literature on SCs and cities rankings/measures with dialogic accounting ideas (Bebbington et

al., 2007; Brown, 2009; Brown & Dillard, 2015). Empirically, we select and analyse four contemporary SC rankings which, despite differences in authorship and the cities and issues covered, employ similar rhetoric of serving dialogic SC development in their reports. In particular, we take a critical stand on the methodologies of rankings and related measures, using dialogic accounting as an analytical frame to help systematically evaluate their possible shortcoming in SC development.

Our findings illustrate that the selected rankings do not include multiple perspectives on SCs, with limited dialogue formation for cities' future. In other words, there is a gap between the human-centric and dialogic demands on SCs and the information that rankings provide to governments. In their existing technocratic form, rankings do not serve the dynamic and complex nature of the SC agenda. This, in turn, raises the concern that rankings create a particular unquestioned meaning of smartness across urban development, introducing bias into the urban agenda. In other words, there is a risk that ranking may make administrative, business, research and technological actors the only sources, creators, and interpreters of SC visions. As a step forward, this paper proposes a reconsideration of ranking methodologies via dialogic accounting, to develop SC rankings that critically reflect SC complexity and bring about the necessary dialogue among stakeholders.

The paper proceeds as follows. First, we review the existing literature on SCs and the role of rankings in city development and develop arguments in favour of rankings with multiple dimensions. Second, we review the key ideas of dialogic accounting theory, followed by its application to SC rankings. After presenting our findings, we discuss the contemporary place of rankings and their criticalities in the SC agenda. Finally, we reflect on how dialogic theory can be applied to revise SC ranking methodologies and measures for SC dialogue along with potential challenges.

## **Smart city development and rankings**

Despite the lack of a common definition of SCs, the core idea lies in the use of technology (mostly ICT) to solve densification and excessive urbanisation around the world, thus increasing quality of life and securing a sustainable future (Meijer & Bolívar, 2016; Mora & Deakin, 2019; OECD, 2018; United Nations, 2017). With such promises, the SC concept has become open to many different interpretations and views at the level of city practices. At least two leading views can be identified (Grossi et al., 2020; Mora et al., 2017; Mora & Deakin, 2019).

First, the so-called technocratic view of SC development has been flourishing since the 2000s (Giffinger et al., 2010; Hollands, 2008; Meijer & Bolívar, 2016). This view has centred around the use of technology (mainly ICT) as the main tool for increasing efficiency and effectiveness, city investments, business development and regional activity in general (Manville et al., 2014). Such a view suggests that corporations and ICT companies actively contribute to developing current city infrastructures and sustainable development via a technological lens (Anthopoulos, 2017; Batty, 2013; Kitchin, 2014; Mayer-Schonberger & Cukier, 2013; Mora et al., 2017; Wiig, 2015). Here, technology provides novel solutions for cyber-physical integration of the urban space, a growing network of city alliances, forums and marketplaces aiming to bring together experts from business, science and city governments (Anthopoulos, 2017). This technocratic view magnifies various ICT solutions, city data and technological systems (e.g., transport, energy, surveillance) to play a crucial role in the sustainability agenda (e.g., Batty, 2013; Mayer-Schonberger & Cukier, 2013). Moreover, it promotes the SC as an intelligent, interconnected, and instrumented set of scientific, objective, commonsensical and apolitical developments where citizens become merely end-users of technology (Kitchin, 2015; Wiig, 2015).

However, during the last decade, these positive technocentric and technocratic connotations of the SC concept have been increasingly criticised (e.g., Greenfield, 2013; Grossi & Pianezzi, 2017; Hollands, 2008, 2015; Kitchin, 2014; Marvin et al., 2015; Vanolo, 2014, 2016). According to this critique, the SC technocratic plot became 'embittered' with complexity and the multiplicity of SC actors, raising such issues as politics, technocratic domination, and marginalisation of actors and their roles. For example, it is evident that such a vision can lead to the marginalisation of the environmental, social and economic aspects of sustainability in favour of the interests of IT companies and business elites (e.g., Hollands, 2008; Kitchin, 2014; Marvin et al., 2015). Likewise, the danger of 'technological blindness' becomes reality when new ICT tools become a passion rather than rational instruments (Walravens, 2015). Moreover, they can create a utopian vision, which detracts from 'real' urban problems and promotes neoliberal ideas (Greenfield, 2013; Grossi & Pianezzi, 2017; Hollands, 2015; Kitchin, 2015), making it a relatively poor approach to securing future urban life and sustainability (Vanolo, 2016).

A second and growing alternative to technocentric and technocratic SC development is the human-centric and dialogic view that shifts the focus from the role of technology in securing urban sustainability towards public value creation (Mora & Deakin, 2019). This approach acknowledges the complexity and dynamics of urban value creation, employing not only ICT but also diverse actors not limited to business corporations, ICT companies and public technocrats (Grossi et al., 2020). In other words, it stresses the social-technical dynamics of SCs (Meijer, 2018), where the interests of multiple actors are considered with a particular focus on the local dimension, i.e., the demands of citizens (Anthopoulos, 2017; OECD, 2018; United Nations, 2017). As such, the human-centric dialogic view calls to incorporate democratic and collaborative ideals into the SC concept, where various actors, including citizens, become coproducers and cocreators of SC solutions rather than passive users (Kitchin, 2015; Torfing &

Triantafillou, 2016). Citizens and other stakeholders can bring local knowledge (Lovan et al., 2017), and their participation allows plural voices to be heard through the deliberation and dialogue process (Fung & Wright, 2003).

Thus, there is an increasing trend away from overly techno-centric and technocratic SC approaches towards the dialogic-oriented vision. However, despite growing acknowledgement, this vision still reflects a utopian, romantic and idealistic future (Bina et al., 2020). While such a future is desirable, scholars warn that such a shift requires support from related calculative technologies (Grossi et al., 2020; Meijer, 2018; Mora & Deakin, 2019). Our particular interest applies to such calculative technologies in the form of rankings that contemplate how and through which boundaries alternative models of new city governance might emerge.

Alongside other metrics and performance indicators, city rankings were introduced to the public sector under neoliberal ideologies of competition, financialisation, managerialism and market rationality (Giffinger et al., 2010; Grossi & Pianezzi, 2017; Kitchin et al., 2015). Claiming to increase accountability, efficiency, and good governance (Shore & Wright, 2015b), city rankings show where cities stand against each other, forming commensuration (Espeland et al., 2016). The top players' performance sets the standard as 'best practices' that spread to other cities further down the ranking (Shore & Wright, 2015a). In this way, it can be claimed that rankings are necessary to assist decision-makers to, among other things, assess cities' progress and position in the urban hierarchy (Ahvenniemi et al., 2017; Giffinger et al., 2010), i.e., knowing 'the city from the inside but also being aware of the surroundings and the system of cities the city is located in' (Giffinger et al., 2010, p. 10). Moreover, rankings become essential in forming general practitioner learning about what is out there as a 'state of things' (Elgert, 2018).

Yet, it is also evident that rankings go beyond being 'just an easy way' of representing the world of cities (Czarniawska, 2010; Lapsley et al., 2010), since they exert an increasing influence on



organisations, individuals and society (Pollock et al., 2018). Rankings represent existing organisational development and reshape how organisations and individuals operate (Shore & Wright, 2015a), framing boundaries and conversations for the future (Mennicken & Espeland, 2019). In that sense, they become calculative technologies used by ‘governments and other organisations’ that ‘have sought to mobilise their assets to compete more successfully in the global knowledge economy’ (Shore & Wright, 2015b). They create outputs (league tables) as generalisable characteristics that establish a homogenous ordering framework (Kornberger & Carter, 2010), serving as mechanisms of governing and power (Shore & Wright, 2015b). For example, some city rankings become quantitative guidelines (Kaklauskas et al., 2018) and manuals for city practitioners to follow (Giffinger et al., 2010), influencing what is acceptable and even determining what cities consider to be quality, i.e., becoming standards (Acuto et al., 2021; Elgert, 2018). Moreover, they also influence policymakers, who use these rankings to develop urban strategies and engage in urban policy (Brorström et al., 2018; Neirotti et al., 2014; Saez et al., 2020).

Therefore, when conceptualising a shift from technocentric towards dialogic SC development, we assume that rankings play a decisive role as a governance and calculative technology (Giffinger et al., 2010). Interestingly, however, while much research considers the power and capacities of city rankings, only a few studies have addressed the content of rankings as means instead of final ends. In other words, instead of tracing the effects of simplification of a set of multiple statistical indicators into a single number arranged linearly in league tables, we need more knowledge of the methodological basis of such simplification. For example, Giffinger and Gudrun (2010) argued that too much emphasis is placed on the objective outputs of rankings (e.g., a single generalist numerical value compared with another on a list), ignoring the empirical investigation underlying the calculations. Similarly, Saez et al. (2020) criticised sustainable city ranking methodologies for neglecting complex causalities in measurements and

for the lack of transparency in the design of data collection, weighting and aggregation. Together, both studies call for an ongoing questioning of the inner workings of rankings in the sustainability and SC domains and for developing more transparent and methodologically advanced rankings that can facilitate learning, dialogue and multiple perspectives.

However, while SC rankings have flourished in recent years under the growing interest in SC initiatives and promotion of sustainability (Escolar et al., 2019; Saez et al., 2020), there has been virtually no empirical evaluation of the underpinnings of the final numbers in rankings and the development of their inner workings. Such investigation is important considering the potential unintended consequences of rankings and measures in general, including temporary paralysing effects on city development (Argento et al., 2020), forming dominant labels, exacerbating inequalities and incentivising safe governance policies (Elgert, 2018), downsizing sustainability (Kaika, 2017) and even marginalising other human and social values, such as social justice and democratic participation (Shore & Wright, 2015a).

In short, it remains unclear whether contemporary rankings, as a governance and calculative technology, support the complex dynamics of SCs under a human-centric dialogic vision. In other words, if human-centric dialogic development represents the future of cities, how do contemporary rankings support this future in practice? Below, we discuss the value of dialogic accounting theory as an analytical frame (see Figure 1) for understanding the possible pitfalls of rankings in the development of boundaries for and conversations about the future of SC.

### **Bringing dialogic accounting theory to SC rankings**

As previous research has stressed, the key aspect of rankings is their inner workings (Giffinger & Gudrun, 2010; Saez et al., 2020). This refers to their methodologies and related calculations or, in a broader sense, to accounting in the sense of measuring, processing and communicating financial and nonfinancial information (measures/indicators) about different aspects of a city

(Kitchin et al., 2015). In particular, the accounting of rankings can reveal what they actually represent and stands for (Argento et al., 2020; Brorström et al., 2018; Elgert, 2018).

Accounting in general has long been scrutinised (Power, 1997), highlighting the limitations of calculative technologies in representing 'all values of all' (Power, 2004). Instead, accounting always represents someone's values, creating particular visions of what is thinkable, sayable, or actionable; that is, forming mainstreams such as neoliberalism and capitalism (Brown et al., 2015; Tanima et al., 2020). In this regard, the so-called dialogic accounting school suggests revising the commonly established accounting philosophy and the knowledge it produces (Brown, 2009). In other words, in contrast to previous technical examinations of rankings (Giffinger & Gudrun, 2010; Saez et al., 2020), dialogic accounting suggests changing the very nature of SC representation and of the construction of the reality of SCs in rankings.

Originating in sustainable accounting and environmental accounting studies, dialogic accounting argues that value creation and related financial and nonfinancial measures should be based on a dialogue among divergent voices (Bebbington et al., 2007; Brown, 2009; Brown & Dillard, 2015). As applied to SC rankings in particular, this dialogue relates to how calculations communicate the appearance (or absence) of various actors in SCs, reflecting the interests, values, decisions and shared knowledge of (and for) all who want to intervene (but are not necessarily permitted to).

Previous studies have partly raised this issue by indicating that rankings are frequently created by consultants, business actors, government representatives and academic experts (Giffinger et al., 2010). However, from a dialogic accounting perspective, the danger is that these actors become the only sources, creators and interpreters of SC visions as reflected in the various rankings. Under such conditions, the dialogic vision of SC ranking formation would argue for the need to create calculations where the boundaries between citizen voices, technology

companies, local authorities and political elites become fluid, or at least are clearly and openly articulated as being porous.

Nevertheless, the dialogic approach also stresses that it is difficult to change the traditional accounting philosophy. The main challenge is the unwillingness of business and political elites to dismantle the system of a single dominant voice, i.e., a monologue (Brown & Dillard, 2015; Brown et al., 2015). The problem appears to be that, while the literature acknowledges that the social-technical complexity of SC construction should be taken into account in rankings (Giffinger et al., 2010; Kitchin et al., 2015), existing ranking mechanisms continue to consider engagement and dialogue as mere democratic rhetoric without taking it seriously (Brown, 2009). Moreover, it can be claimed that the existing accounting philosophy of rankings ‘submerges ideological differences and associated politics by taking certain meanings as self-evident which, unwittingly or otherwise, closes off opportunities for democratic engagement and transformative change’ (Tanima et al., 2020, p. 3). So, the traditional accounting of SC rankings may pretend to be deliberative, while in reality it is not (Aleksandrov et al., 2018; Shore & Wright, 2015a).

As a solution, Brown (2009) proposed moving from a deliberative to an agonistic approach (Mouffe, 2013), influencing how we approach the methodologies of rankings and how their calculations function. The general claim of agonistic democrats is that, while requiring pluralist actors to be heard, any dialogue and consensus is also irrational and characterised by antagonism and conflict. Even if consensus is achieved, conflicts remain with issues of power and domination (Mouffe, 2013). Applying such an approach to SC rankings by placing attention on pluralism, difference, conflict, and power struggles in calculations is not democratic per se, but it at least opens a space to see the trade-offs and the conflictual nature of (city) reality (Brown, 2009; Brown and Dillard, 2015). Moreover, such calculations can help citizens to exercise democratic rights over powerholders and even foster emancipatory accountings

(Brown et al., 2015; Tanima et al., 2020) where terms such as ‘best’, ‘smart city’ and ‘quality’ are treated as concepts contested via multiple ideologies.

Applied to the human-centric dialogic view of SC, dialogic accounting becomes an idealistic way to theoretically ground rankings and to visualise the future of SCs (see Figure 1). It also becomes a useful analytical tool for seeing the gaps between such an idealistic future and the current trajectory of SC development as reflected and projected by existing rankings.

(insert Figure 1 here)

*Figure 1. Dialogic accounting for SC rankings*

Based on an agonistic view of democracy, Brown (2009, pp. 324-238) proposed eight principles underpinning dialogic theory that can also be applied to the analysis of SC rankings (see Figure 1). We operationalise those principles to systematically evaluate the possible shortcomings of rankings for dialogic SC development, juxtaposing the ideal situation with the actual results delivered (see Table 1). While we acknowledge the existence of overlapping aspects of those principles as a limitation (Brown & Dillard, 2015), we believe that each captures critical and individual points to consider and revise in future rankings<sup>1</sup>.

(insert Table 1 here)

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<sup>1</sup> We reflect on several alternatives to a critical analysis of SC rankings in the limitations and further research section.

*Table 1. Underlying principles of dialogic accounting theory and their application for SC rankings analysis*

Thus, by juxtaposing SC and ranking research with dialogic accounting, we promote research on SC rankings that ‘takes divergent perspectives seriously – not only to critique dominant hegemonies but also to advance alternatives’ (Tanima et al., 2020, p.2). Using dialogic accounting for SC development is valuable for revealing how competing discourses (if any) are articulated in rankings along with surfacing them for wider policy and civil society engagement and scrutiny. We believe that such operationalisation will stimulate debate on the contested nature of calculations within contemporary SC rankings, which in turn can show how accounting practices grounded in rankings can substantiate but also potentially protest and challenge dominant hegemonies within SC development.

## **Method**

The paper examines rankings that are now widely available. Giffinger and Gudrun (2010, p. 9) posit that the term ‘ranking’ is more precise when examining state-of-the-art city rankings. As a point of departure, the first two co-authors conducted independent searches to ensure trustworthiness and consistency, using the Google search terms ‘smart city ranking’ (keywords: ‘smart city’ + ‘top’, ‘ranking’, ‘rating’, ‘index’, ‘indicator’) . This search returned numerous articles, webpages, news, and scholarly and practitioner literature written in English. In addition, we carried out a scholarly and practitioner search via Google Scholar by cross-referencing highly cited articles in the field (e.g., Giffinger & Gudrun, 2010; Giffinger et al., 2010). Two members of the research team then sorted through the search results and merged the two separate lists into one, which was further discussed with the two other co-authors. These

actions assured the reliability of our search results and ensured that we included all relevant rankings. Following Giffinger et al. (2010), we then applied the following key parameters to compile the final list of rankings: authorship by different providers; large number of cities and different coverage; issue (first edition and number of editions); and most importantly, the aim and scope in terms of formation of dialogue and multiple perspectives on SC development. First, regarding authorship, it was essential to acknowledge different possible creators of rankings since accounting is always produced by someone (Power, 1997). Following Giffinger et al. (2010), we ensured the inclusion of a diverse group of rankings authors, including private actors, practitioners, and research and producer consultancy groups. Second, regarding coverage and issues, we focused on the inclusion of diverse rankings that covered cities internationally and that had an established periodic publication cycle. The last selection parameter within the overall problem statement of the paper was the aim and scope in terms of dialogue formation. Altogether, these criteria resulted in four smart city rankings, selected in their most recent versions or issues, that reflected the multiplicity and variation of rankings in their potential role in SC dialogic development (see Table 2).

(insert Table 2 here)

*Table 2. SC rankings under analysis*

For each ranking, a multistage analysis was performed. First, the first two co-authors separately read through rankings-related documents (ranking report and methodology file, producing 550 pages of raw data in English). The idea was to create an in-depth impression of what information the four rankings provide about SC. Second, two co-authors independently scrutinised each ranking and its corresponding methodology, measures and calculations by means of coding

procedures. Text interpretations were carried out by combining NVivo software with manual coding of the text to provide creativity in the search for relations between theoretical ideas and what rankings “tell us”. One of the researchers conducted an initial manual coding while another used NVivo. Both researchers have been exposed to dialogic accounting and have operationalised Brown's (2009) eight principles of dialogic accounting to analyse the rankings and their corresponding methodologies and calculations/measures (see Table 1). Of note is that the interpretation process was not straightforward, moving back and forth between dialogic accounting principles and the text. Upon completing this stage, the two co-authors held regular discussions to ensure proper identification of the similarities and differences between the two interpretations. Such intercoder assessment procedures also secured sufficient agreement in our collective interpretations of the rankings, which resulted in eight jointly developed aggregated codes (e.g., aggregated code ‘Recognition of multiple ideological orientations’ → code ‘Networked society city index’ → sub-code ‘limited recognition’). The use of joined codes tried to capture what rankings tell us as informants, meaning that we searched for direct evidence of operationalised dialogic accounting principles (i.e., in the form of direct quotations and illustrations if possible) along with indirect evaluations and subjective reflections on said principles, which are difficult to capture via direct text evidence (e.g., principles 7 and 8). As a follow-up, the other two co-authors examined each code and related interpretation, followed by several rounds of joint discussion. This resulted in a jointly developed data analysis table where we reflect on eight dialogic accounting principles for each ranking (see Table 4). Finally, after agreement was reached among the authors, we produced the following eight empirical sections integrating and comparing rankings and their methodologies.

## **Empirical findings**

### ***1. Recognition of multiple ideological orientations***



Dialogic accounting (Brown, 2009) suggests that SC rankings should consider divergent ideological perspectives and give a voice to different actors, since this forms a basis for exploring commonalities and differences. Our empirical findings reveal that most of the rankings are limited in their recognition of a diverse range of ideological perspectives. Most either contain only one dominant ideology, that of a particular group of actors, e.g., information and communication technologies (NSCI), citizens (IMD), or public sector practitioners (Top 50), or if the multiplicity of ideologies is acknowledged (as in IESE), aggregate indicators from divergent sources.

For example, NSCI consists of statistical indicators aggregated around the triple-bottom-line (TBL) and information-communication technology (ICT) maturity correlation, while democratic ideology is ignored, justified by ‘the lack of sufficient data to create a variable for democracy’ (NSCI, p.12). Similar observations apply to the Top 50 ranking, which is constructed to represent the positions of key players and to benchmark governmental actions rather than incorporate voices (e.g., citizens) in decision-making (Top 50, p.6). The opposite dominant position of citizens is evident in the IMD ranking, which argues for the central role of citizens in relation to measuring smartness (IMD, p. 1). At the same time, it is the only ideology that is contestable in terms of generalisability (data only from 120 residents’ perceptions from 100 cities), questioning other possible alternatives. Finally, only the IESE ranking comes close to acknowledging multiple ideological orientations. However, a more critical stand also reveals that divergent voices are conflated by means of one single value, i.e., indicators. The analysis aggregates indicators from divergent sources, flattening and simplifying divergent ideologies into a handful of final measures.

## ***2. Avoiding monetary reductionism***

Using the monetary-reductionism analytical dimension of dialogic accounting, we investigated and analysed whether and how rankings form diverse quantitative and qualitative data that can

help make judgements about monetisation, incommensurability and space for trade-offs (Brown, 2009). Overall, when analysing the four different rankings, we discovered that, in most cases, there is a predetermined frame of judgment presented as ideal.

For example, NSCI claims that the combination of TBL and ICT maturity provides an optimal solution for all stakeholders to see diverse effects for themselves (see NSCI, p. 10). At the same time, while NSCI acknowledges both quantitative and qualitative data for judging SC performance, we discovered that it is limited by ignoring incommensurability, since ICT maturity correlates better with socioeconomic progress than with environmental sustainability. Similarly, while claiming a balance of monetary and nonmonetary parts, the Top 50 ranking is constructed solely for city governments to formulate smart strategies and includes initiatives, funding, programmes and policies for cities with a blurred measurement methodology in terms of monetary and nonmonetary issues (Top 50, pp.6-7). According to Brown et al. (2015), the Top 50 ranking is an optimal solution, not for all stakeholders, but rather *only* for city administrations. In contrast to the Top 50 ranking, a more citizen-driven approach to quantitative and qualitative indicators is evident in the IMD ranking. With its citizen-driven approach, the IMD ranking captures cities' existing infrastructure and technologies (i.e., describes the technological services available to inhabitants) (IMD, p. 12). Yet, despite placing the citizen dimension at the centre of judgement, there is limited room for monetisation, as cities are ranked based on perceptions, thus forming only a limited recognition of the balance between monetisation and what is beyond. Finally, only the IESE ranking is constructed with a multiplicity of perspectives (dimensions): human capital, social cohesion, economy, governance, environment, mobility/transport, urban planning and international outreach. Those dimensions offer the possibility of relating to both economic and noneconomic values (see IESE, pp. 11-22). However, for Brown et al. (2015), it is still not an optimal solution for all

stakeholders but only for city leaders, entrepreneurs, academics and experts, since citizens are still outside the principal stakeholder group.

### ***3. Openness about the subjective and contestable nature of calculations***

SC rankings should recognise that subjectivity and uncertainty are essential parts of the dialogic process, and the accounts introduced by rankings should be open to being contested and challenged by other participants (Brown, 2009). Most of the rankings in our analysis have only limited recognition of such openness and contestability, as they lack one or another aspect of dialogic exchanges.

At NSCI, ICT indicators are selected based on discussions with ICT experts, while the choice of TBL indicators is built upon opinions from the relevant research fields, which Brown (2009) argues shows that NSCI recognises the subjectivity and uncertainty of the ranking. However, it appears that the selection of NSCI indicators is not particularly transparent if someone wants to reconstruct these values. The IMD ranking, in turn, is based on citizens' perceptions (IMD, p. 12), making it possible, according to Brown (2009), to provide the necessary dialogic exchange. However, here also we see possible challenges in reconstructing such values as subjective perceptions. By using rankings made by other organisations, news articles and authors' 'experience advising government agencies' (Top 50, p. 6), the Top 50 ranking makes it almost impossible to challenge the reconstruction of their indicators, as they are closed to any justifications or questions. Only in IESE's case do we see partial recognition of openness and contestability in that the ranking provides a comprehensive set of indicators, showing some contestability and trade-offs (IESE, pp. 36-38).

### ***4. Enabling access for nonexperts***

Dialogic accounting (Brown, 2009) stresses the importance of information in rankings being accessible in a multi-layered fashion, including technically understandable forms available for

testing by nonexperts. Yet, when analysing the four different rankings, we discovered that ‘technical’ and ‘expert’ layers of information dominate, with minority attempts ‘to communicate epistemic and ethical uncertainties to stakeholder audiences’ (p. 325).

For example, NSCI contains very technical information on each dimension of measurement, described as a set of variables created by aggregating a set of proxies. On the other hand, the TBL index is described as simplistic, being a geometric aggregate of three dimensions (each constituting one-third of TBL). Similarly, the IESE ranking reflects a very technical description, in which the basic model, on which the process of creating the indicator is based, is the weighted aggregation of partial indicators representing each dimension. Thus, despite providing information in a multi-layered manner, this ranking is not sufficiently accessible to non-specialists to enable independent testing due to the technical background required to make sense of the measures and methodology. In contrast, the Top 50 ranking is supplied in ‘multi-layered ways that are accessible to non-specialists’ Brown (2009) since the information provided is based on existing rankings, news articles and interviews with mayors, chief information officers, and top SC project managers. Yet it is not as accessible when deciding the scale for each city: the scale of one (low) to five (high) represents the level of performance, determining readiness (Top 50, p.7). Finally, we see that the IMD ranking is based on the perceptions of 120 randomly chosen residents in each city who were asked to select one option: strongly agree, agree, disagree, or strongly disagree. This approach makes the IMD ranking more user-friendly for nonexperts, despite some aspects of the measurements remaining too simplistic, e.g., the link between the overall ranking score and the quartile of the UN Human Development Index.

### ***5. Ensuring effective participatory processes***

Becoming a SC is complex and controversial, so it is necessary for rankings to demonstrate that people can express diverse views (Brown, 2009). All four of the rankings analysed promise effective stakeholder engagement and dialogue. However, in practice, we discovered a range—

from no recognition of participation to limited and partial forms of participation—used to generate critical reflections and discussions with citizens and other stakeholders.

NSCI has no effective participatory process as such, since it builds its ranking based on layers of data and the involvement of ICT experts and consultants. Even the inclusion and measurement of democracy indicators is outside its scope due to the lack of data (NSCI, p. 12). IESE and Top 50 both recognise the democratic participation of citizens in limited terms. In IESE's case, the ranking is based on success stories and a series of in-depth interviews with city leaders, entrepreneurs, academics, and experts, as well as statistical indicators (IESE, p. 11). IESE deals with variables relating to communication channels with the public (open platform), an index of how the country is using information technology to promote access and inclusion of its citizens, and the democracy index (freedom and participation). However, it either simply assigns a value of 1 if there is an open platform in the city and 0 otherwise, or it measures the variables at the country's aggregated level, not at the city level (IESE, p. 17). Top 50 builds upon the participation of city officials (p. 6). For Brown (2009), this means that only city officials were able 'to describe and take account of costs and benefits in their own way' (p. 326). The Top 50 cities' playbook recognises forms of stakeholder engagement by acknowledging that all government officials ultimately respond to their constituents and indicates how citizens can volunteer high-quality feedback to tap into the collective talent of a city's citizenry as well as to cocreate SCs (Top 50, pp. 22-23). However, Brown (2009) posits that this playbook, not the ranking itself, cannot be considered the basis for critical reflection or discussion with citizens and other stakeholders. The ranking closest to ensuring the participatory process is that of IMD. It incorporates the full participation of citizens in the ranking through a survey. However, it does not consider ICT experts or city officials, and, when designing the index and measures, it relies solely on experts and sponsors, representing the

ranking's authors (IMD, p. 1). Again, according to Brown (2009), we observe a lack of 'dialogic entitlements – as rights to participation' (p. 326).

### ***6. Attention to power relationships and their dynamics***

The producers of SC rankings should be aware that rankings wield considerable power and authority, insofar as they can provide managerial and other power elites with a way to filter the information they disseminate. That is why it is vital that 'others' be able question the decisions and be included in participatory ranking creation (Brown, 2009). Yet when analysing the four rankings, we found them all to lack focus on the power balance between dominant actors and marginalised groups.

NSCI's ICT infrastructure and triple-bottom-line indicators are based on discussions with ICT experts and numerous layers of statistical and financial information, involving the consulting agency but not the 'voice of others' (Brown, 2009). These numerous layers of the hierarchy with aggregated components leave no room for alternative judgements or the inclusion of others in the methodology. In the IMD ranking, despite a random selection of citizens for the survey, the groups represented are undefined. Meanwhile, managerial or other power elites (IMD World Competitiveness Center and Singapore University for Technology and Design) are included, as well as numerous experts and city specialists from around the world (IMD, p. 1). Thus, experts continue to dominate the construction of measures, despite the 'hard numbers' coming from citizens. IESE lacks any representation of social actors other than city leaders, entrepreneurs, academics and experts. In Brown's (2009) terms, there is no opposition to highlighting contradictions and introducing 'new facts', as the ranking is developed by a research platform launched jointly by the Center for Globalization and Strategy and IESE Business School's Department of Strategy (IESE, p. 9). The Top 50 ranking, however, considers social actors from other rankings, news articles, and the authors' 'experience advising government agencies' (Top 50, p. 6). The ranking is developed by Eden Strategy Institute consulting firm and OXD, which

is part of ONG&ONG Pte Ltd, 'a multi-disciplinary design house focused on creating and building beautiful experiences through a complete 360° design approach' (Top 50, p. 85). Top 50 lacks public appreciation of 'other voices' in highlighting contradictions and introducing 'new facts' (Brown, 2009).

### ***7. Recognising the transformative potential of dialogic accounting***

To recognise the transformative potential of dialogic accounting, it has been suggested that rankings should encourage social actors to become more critically reflective and to facilitate better discourses across groups with different perspectives on SC development (Brown, 2009). In other words, rankings can be a tool for dialogic learning, including discussion, debate and reflection regarding both the future of SCs and criticalities within a sustainability agenda. Yet when analysing the four rankings, we discovered a mostly limited recognition of the transformative potential of rankings with respect to dialogue formation and critical examination. Instead, most rankings ignore the possibility for critical reflections and debate, at least within their methodological and descriptive components.

While claiming to promote dialogue and debate between city managers, Top 50 has simply become a benchmark to compare city governmental actions in three dimensions and ten factors (Top 50, pp. 6-7), instead of involving discussions of a range of diversely situated perspectives and indicators that open the door to critical reflection of these perspectives, as proposed by Brown (2009). Likewise, despite being citizen-oriented, the IMD ranking still offers a predetermined vision of smart dimensions and measures of competition rather than a critical reflection on trade-offs (IMD, p. 10-13). Thus, there is no transformative potential to follow up on, as this ranking considers only one (arguably represented by 120 residents in each city) citizen voice and is unable to engage in a horizontal dialogue.

In contrast, greater horizontal dialogue rhetoric is evident in the NSCI and IESE rankings. Having established itself in the ranking arena over five editions, NSCI, in its latest edition,

recognises more sustainable development of cities, particularly, to cities' environmental performance (NSCI, p. 20-22). However, while claiming to influence the boundaries of city development, the index does not facilitate debate or critical reflection from plural perspectives. Instead, there is a more 'algorithmic' message of the link between ICT and sustainability. IESE, with its six editions, is more open to transformation. It follows observations of how social actors have used rankings as benchmarks and for urban development. The authors call for comments and suggestions to improve indicators, or in Brown's (2009) terms, seeking to facilitate horizontal dialogue (IESE, p. 23). Despite this call, the criteria for the inclusion of the 96 indicators, which reflect both objective and subjective data, are mainly based on conceptual relevance and statistical rigour.

#### ***8. Resisting new forms of monologism***

Based on Brown's (2009) interpretations, SC rankings and their mechanisms of methodological involvement should not only be about dialogic rhetoric, which guides people to a predetermined 'right answer'. Rather, they should ensure the ongoing contestability of methodologies, reflecting that the goal of rankings is 'not necessarily to reach agreement but rather a richer appreciation of [the] complex issues' (ibid., 327) of measuring smartness. However, our analysis of the four rankings shows limited progress in this direction, rendering questionable their resistance to monologism and leaving no room for the contestability of methodology.

For example, despite the rhetoric of constructive discussion with cities on ICT and triple-bottom-line improvements, NSCI suggests a new form of predetermined answer that ICT is the core of urban sustainability, introduced via the city-boundaries concept (NSCI, p. 26-27). Similarly, IMD promotes a new form of monologism in a citizen-centric approach to ranking smartness. As our analysis of IMD states, despite the rhetoric of around using citizens' voices to define smartness (i.e., dialogue), the voice itself is predetermined with a set of noncontestable questions (no clear articulation of how questions were formed, IMD, p. 1), and as such the



measures become predetermined. A similar predetermination is evident in the IESE and Top 50 rankings. Specifically, in IESE, despite the methodology welcoming comments for improving multiple dimensions (IESE, p. 23), so far, the ranking has become a new uncritically accepted way of measuring urban development where advanced statistical aggregations leave no room for contestability. Top 50, in turn, has become a critical exemplar of a new monologism of success stories and related ‘must-have’ elements (‘key tools’) for SCs (Top 50, p.5) deriving from the single voice of public administration.

## **Discussion and conclusion**

This paper conducts a qualitative study of the role of rankings in SC development as an under-investigated topic in contemporary critical examinations of calculative and governance technologies for SCs (e.g., Argento et al., 2020; Brorström et al., 2018; Cohen & Karatzimas, 2021; Elgert, 2018; Kaika, 2017; Kitchin et al., 2015; Saez et al., 2020). In particular, we carry out a critical examination of four established contemporary SC rankings, focusing on whether and how they reflect and can support dialogic SC development, which entails a dialogue among multiple actors involved in SC development and represents an idealistic vision of the future of SCs (Grossi et al., 2020). The nature of the reflections and projections of the future that existing rankings can provide remains open to question, particularly in relation to ranking methodologies and measures. Employing ideas from the dialogic accounting literature (Brown, 2009; Brown & Dillard, 2015), we assert that if rankings can reflect and project SC development, it is important to know how they are theoretically grounded, designed and fit for the human-centric SC future (Shore & Wright, 2015a, 2015b).

Our analysis of four SC rankings shows that despite promising multiplicity, dialogue and tools for a sustainable urban future, existing ranking methodologies and measures do not include divergent perspectives and visions of SCs, i.e., they engage in an accounting monologue rather

than a dialogue (Brown, 2009). Table 2 summarises our main findings regarding the underlying methodologies of the four SC rankings and measures via the eight dialogic accounting principles and their related gaps relative to the dialogic promises of SCs.

(insert Table 3 here)

*Table 3. SC rankings under the critical stand of dialogic accounting*

Overall, we argue that existing ranking mechanisms do not include multiple visions of SCs, trapping cities into a mirage of multiple voices and stakeholder engagement. Instead, we observe more technocentric or technocratic dominance (Grossi et al., 2020) in methodologies and underlying principles that are framed by a single dominant voice or expert community, both of which have been identified in previous studies of SC development (e.g., Grossi & Pianezzi, 2017; Hollands, 2015; Kitchin, 2015; Marvin et al., 2015). Our critical stand on SC rankings is in line with previous critiques of calculative technologies for SCs (Argento et al., 2020; Bebbington & Unerman, 2018; Brorström et al., 2018; Elgert, 2018; Kaika, 2017). In particular, we show that, as with accounting in general (Power, 2004), existing rankings do not really maintain the ‘pace’ and complexity of SC development toward a dialogic and human-centric vision. That is, there is a gap between the demands of SCs and the contemporary rankings calculations used by governments. Overall, the analysed rankings, with their current dominant technocratic approach, do not reflect or serve the dynamic and complex nature of the SC agenda.

This, in turn, raises an even more critical aspect of future of SC development. The assumption that rankings not only reflect but also prescribe SC developments (Acuto et al., 2021; Elgert, 2018; Kaika, 2017; Saez et al., 2020) opens a more critical reflection on their role in urban practices. If rankings project the future of SCs (Shore & Wright, 2015a, 2015b), in their current form, they reflect and support a view of SC development that is far from the idealistic vision of the dialogic and human-centric SC (OECD, 2018; United Nations, 2017). Moreover, there is a threat that rankings can create a monolithic, unquestioned vision of ‘smartness’ across the information-policy interface (Elgert, 2018). In other words, elites can resort to rankings as a way of filtering information about what they deem of value to develop a platform for running a SC, often through a traditional technocratic approach toward SC rather than a human-centric one<sup>2</sup>.

Such a monologic representation is in line with previous studies the creation of dominant SC labels, which may exacerbate urban inequalities and degradation by means of calculative technologies (Elgert, 2018; Kaika, 2017). In a broader sense, this creates a risk that administrative, business, research and technological actors will be the only sources, creators, and interpreters of the vision of SCs through the various rankings. However, dialogic accounting offers interesting ideas for reconsidering the accounting assumptions that underpin rankings, particular those relating to the future of SCs.

### ***Rethinking rankings in a dialogic utopia: from accounting monologue to broader dialogue formation***

How can SC rankings be developed that critically reflect SC trends and bring about the necessary dialogue among stakeholders for the future of SCs? Based on our evaluation, each of the four rankings reflects one dominant voice or particular vision, with many downsides for a

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<sup>2</sup> We are thankful to one of the reviewers for raising this point.

bright SC future. That said, a general overview and comparison of the rankings suggests some potential for dialogic formation by creating inter-dialogue between divergent visions, if correctly approached by practitioners and policy-makers. We can still rethink rankings in a dialogic utopia by raising the question of how to facilitate dialogue between rankings. Taking this broader dialogue-formation perspective, we claim that, despite an apparent lack of dialogic principles in the four rankings, cities can still identify their pluralistic aspects to create a dialogue between different opinions about the future of SCs.

Moving to a broader agenda, practitioners and policymakers still have a choice regarding which rankings to use. On this level, there can be a degree of inter-ranking dialogue. However, we must understand how to incorporate and tolerate plural voices through coproduction with users and urban stakeholders. This brings us to the enhanced role of politics in the technocratic approaches to interpreting SC dynamics. Dialogic thinking suggests the agonistic approach as a solution, paying attention to pluralism, difference, conflict, and power struggles (Brown, 2009; Brown and Dillard, 2015). For us, dialogic thinking involves not making rankings to be dialogic in their methodologies and calculations, but rather fostering critical reflections on the part of practitioners and policy-makers on what rankings convey about smartness. The dialogic approach proposed in this paper (see Table 1) is an interesting instrument for practitioners and policymakers in examining SC rankings. Ideally, it will foster dialogic thinking as they exercise greater care in using rankings and realise the contested nature of the SC concept and the limited capacity of rankings to capture SC complexity. In other words, each city would argue for its own choices and formation of a unique SC vision while considering the criticalities of global rankings, based on an agonistic approach and the limitations of dialogue. In that sense, practitioners and policymakers can rethink the role of SC rankings and how to reframe them to reflect democratic perspectives by deconstructing dominant SC labels and alleviating urban inequalities. Dialogic thinking, with its underlying agonistic approach to democracy, is one way

to move in such a direction, but it is still utopian and normative. Thus, as a step forward, we need to understand how to move the ‘seeds of hope’ (Brown et al., 2015) in dialogic ranking formation to a real city agenda in practice.

### ***From utopia to SC dialogic practice***

If a dialogic approach facilitates rankings that will foster SC dialogic development, how can various stakeholders be practically engaged in defining the key performance aspects of the ranking system? We propose that SC rankings be based on a methodology like that promoted by the Global Reporting Initiative (GRI) sustainability reporting standards, which have historically evolved around the primacy of stakeholder engagement (Grushina, 2017). The GRI standards (e.g., GRI 101 and GRI 102) recommend that a wide range of stakeholders be engaged in the process of deciding which indicators to include in sustainability reporting and how.

Based on this approach, SC rankings can open the door to wide-ranging dialogue through two-way communication arenas for stakeholder engagement. Reflecting on Table 2, such practices already have some dialogic potential, since SC rankings recognise the contested nature of ranking information. Yet, it is still necessary to develop public forums for expressing different points of view (e.g., public workshops, deliberative mapping, multi-criteria analysis, open space technologies, dissensus conferences) (Bellucci et al., 2019). Such spaces allow the comparison of multiple and sometimes conflicting viewpoints rather than focusing on a single perspective of consensus. Here, SC rankings can even benefit from stakeholder engagement mechanisms via social media, although this should be done with caution to avoid the illusion of making an impact and of listening, because some social media have low levels of built-in interaction (Manetti & Bellucci, 2016). For instance, rankings can improve the legitimacy of SCs where they are created by digital platforms for wider direct citizen engagement. Widely used in the private sector, the use of digital platforms has significant potential also for governments to secure citizen engagement beyond the traditional methods. Platformisation can open up a wide

spectrum of engagement alternatives ranging from more scientific designs (e.g., highlighting the scientific importance of participation) to more game-oriented designs (e.g., highlighting its entertainment value). The gamification alternative has interesting potential as it is often used to engage people in different ways, aiming at higher levels of participation, motivation and engagement (Kolpondinos & Glinz, 2020).

### ***Implications and further research***

This paper has several implications for theory and practice. First, we bring new insights to critical examinations of SC concept development and the related role of calculative technologies (Argento et al., 2020; Bebbington & Unerman, 2018; Brorström et al., 2018; Elgert, 2018; Kaika, 2017). We apply dialogic accounting literature to show that contemporary SC rankings have created a learning monologue. Rankings create a situation in which cities learn from the best ranked SCs, which continue being the best with no challenge from newcomers to the rankings. Second, we bring new insights into the value of dialogic accounting (Brown, 2009; Brown & Dillard, 2015; Brown et al., 2015) in shaping a contemporary understanding of rankings and their criticalities in the SC agenda (Giffinger et al., 2010; Kornberger & Carter, 2010; Mennicken & Espeland, 2019; Saez et al., 2020; Shore & Wright, 2015a, 2015b). We claim that if rankings reflect and potentially shape the future of SC development, this future does not currently correlate with the human-centric dialogic SC vision, which therefore necessitates critical adjustments in methodologies and related measures. The paper calls on practitioners and policymakers to revise the meaning of rankings and their approach to them to support new learning and a democratic SC future.

The paper has several limitations, providing avenues for further research. First, the current study is too narrow, since it analyses only four rankings and normative, since idealises dialogic accounting as a perfect solution for SC rankings, essentially replacing one SC utopia with

another. While our study sees dialogic accounting as a good analytical frame for addressing future visions of SCs, we encourage further studies to investigate SC rankings and city rankings in general to a greater extent (e.g., Saez et al., 2020) by considering other theoretical frameworks. For example, Arnstein's famous ladder of citizen participation (Arnstein, 1969) may be a valuable approach to analyse city rankings based on democratic values and citizen perspectives. In line with our findings, we believe that such investigations will not make cities that employ the rankings proud<sup>3</sup>. Considering such a critique, we also encourage the study of how consultants, government experts and policymakers work with rankings in practice. This leads us to a second limitation, namely, the assumption that contemporary rankings will shape SC development in the wrong direction. In this regard, in-depth case studies and comparative studies of SC experiences can reveal how rankings influence SC strategies. This can help us identify their real effects in practice (Kornberger & Carter, 2010; Mennicken & Espeland, 2019; Shore & Wright, 2015a, 2015b). Third, since we only took a snapshot of one year of rankings in our analysis, it could be interesting to compare the development of rankings over time to see whether there is an evolution towards more or less dialogic SC development. Finally, our suggestions for dialogic thinking and some learning from the GRI approach to stakeholder engagement on SC ranking formation can be further developed into action-oriented and experimental research.

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<sup>3</sup> We are thankful to one of the reviewers for raising this point.

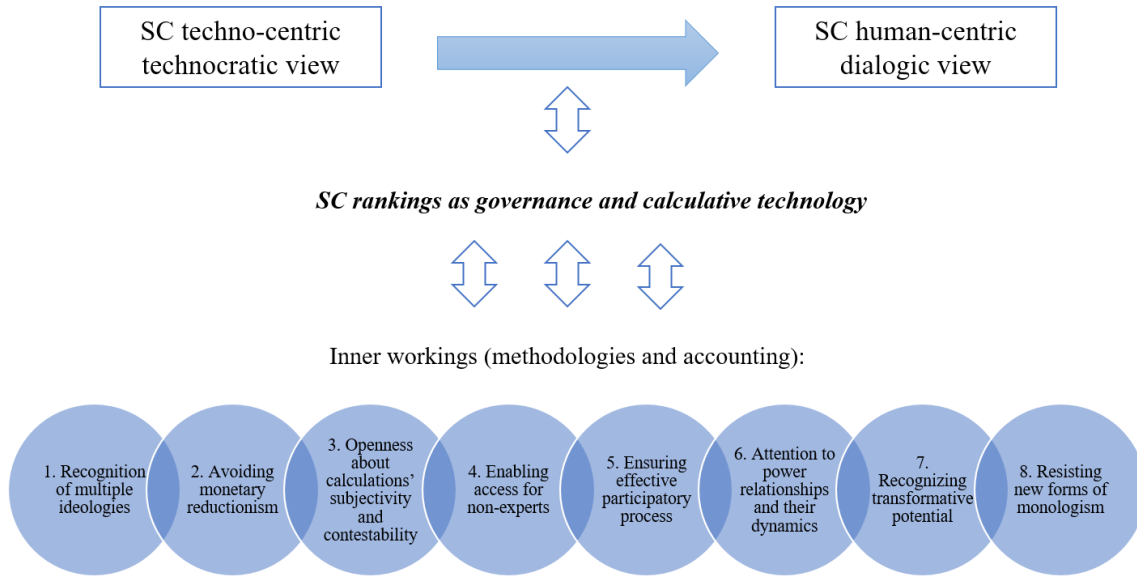
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*Figure 1. Dialogic accounting for SC rankings*

<b>Principle of dialogic accounting</b>	<b>Application for SC rankings</b>	<b>Operationalisation for analysis of the ranking methodology and measures</b>
1. Recognition of multiple ideologies	During SC ranking construction, we should recognise that actors are different and ‘account’ for things differently. Therefore, rankings should recognise divergent ideological perspectives, and show and give a voice to all of them, thus providing a basis for exploring the commonalities and differences of SCs.	What ideologies are presented in the rankings and articulated in methodologies and measures? Are they dominant or marginalised ones? How is this evident in measures/indicators?
2. Avoiding monetary reductionism	SC rankings should offer a range of financial and nonfinancial data for individuals and groups to see diverse effects for themselves and make their own judgements about monetisation.	How are financial and nonfinancial measures presented and balanced in rankings?
3. Openness about the subjectivity and contestability of calculations	SC initiatives should not gloss over the conflictual aspects of pluralist relations. In that sense, the ‘accounts’ introduced in SC rankings should be open to being contested and challenged by other participants.	How do ranking methodologies articulate objectivity vs. subjectivity? Do rankings acknowledge the contestability of their indicators and aggregations and if so, how?
4. Enabling access for nonexperts	SC rankings should make information accessible in technically understandable forms available for testing by nonexperts.	How are rankings transparent and understandable in their methodologies?
5. Ensuring effective participatory process	SC rankings should be organised with procedural rules (e.g., collaborative design workshops) designed to establish dialogue among divergent actors on what calculations to include and develop for broader structural change.	How do rankings involve different groups of stakeholders in ranking design and calculations?
6. Attention to power relationships and their dynamics	Ranking creators should be aware that they wield considerable power and authority, potentially allowing powerful elites to sustain and filter data and initiatives. During smartness measurements, even in win-win scenarios, asymmetric power relations should be considered, as some groups may win far more than others.	How does ranking methodology consider and articulate a possible (im)balance of power and influence of particular actors in SCs? Is this reflected in calculations, and if so, how?
7. Recognising transformative potential	SC rankings should encourage social actors to become more critically reflective and facilitate better discourses regarding urban development across groups with different perspectives. Rankings can be a tool for dialogic learning, discussion, debate and reflection.	How do rankings articulate their value for society and end users? Do they stress possible urban transformation through the use of rankings and related measures, and if so, how?

8. Resisting new forms of monologism	SC ranking methodology should not only consider dialogic rhetoric, which guides people to a predetermined 'right answer' on smart development, but, rather, should ensure the ongoing contestability of methodologies.	How do ranking methodologies justify their key measures? Is there any room to consider alternative indicators or data sources within the calculations, or are they predetermined as the best ones? Is there recognition of methodological monologism and related limitations?
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*Table 1. Underlying principles of dialogic accounting theory and their application for SC rankings analysis*

Table 2. SC rankings under analysis

Ranking	Author(s)	Number of cities / Issuing	Background information	The aim and scope in terms of SC dialogic development
Networked Society City Index with methodology (NSCI, 2016)	Ericsson and Sweco	41/ First edition: 2011 Issues: 5	NSCI aggregates represent maturity in information and communications technology (ICT) and the triple-bottom-line (TBL). ICT maturity and TBL are divided into dimensions that are described by a set of variables created by aggregating a set of indicators (and proxies). ICT maturity is divided into three dimensions: infrastructure (7 indicators), affordability (3 indicators) and usage (8 indicators). TBL has the following dimensions: social (7 indicators), economy (5 indicators) and environment (5 indicators).	Recognising that ‘cities should be governed in a dynamic way’, ‘NSCI ranks cities based on ICT maturity and performance in sustainable urban development [...] The Networked Society is a more responsive and transparent society’ (pp. 4-5)
IMD Smart City Index with methodology (IMD, 2019)	Institute for Management Development	102 / First edition: 2019 Issues: 1	IMD assesses the perceptions of residents related to a structure pillar (infrastructure of the cities) and technology pillar (technological provisions and services available to the inhabitants), where each pillar is evaluated in five key areas: health and safety, mobility, activities, opportunities, and governance.	As a ‘bottom-up driven’ index, ‘IMD assesses perceptions of residents on issues related to structures and technology applications available to them in their city’ (p. 12). ‘IMD Smart City Index is holistic attempt to capture the various dimensions of how citizens could consider that their respective cities are becoming better cities by becoming smarter ones’ (p. 1).
IESE Cities in Motion Index with methodology (IESE, 2019)	IESE Business School	174 / First edition: 2014 Issues: 6	There are 10 dimensions and 106 indicators in total, and ranking is based on the weighted aggregation of partial indicators representing each of the 10 dimensions. Dimensions: human capital (10 indicators), social cohesion (16 indicators), the economy (13 indicators), governance (12 indicators), the environment (11 indicators), mobility and transportation (10 indicators), urban planning (5 indicators), international outreach (6 indicators), and technology (13 indicators).	Being a ‘multiple oriented’ index (p.7), ‘IESE is intended to help the public and governments to understand performance of ten dimensions for a city: human capital, social cohesion, the economy, governance, the environment, mobility and transportation, urban planning, international outreach, and technology’ (p. 10).

<p>Top 50 Smart City Governments with methodology (Top 50, 2018)</p>	<p>Eden Strategy Institute and OXD</p>	<p>50 / First edition: 2018 Issues: 1</p>	<p>Top 50 ranks cities based on an aggregation of 10 different indicators (scaled from 1 (low) to 5 (high) into a single linear number. The following factors are used to determine ranking: vision, leadership, budget, financial incentives, support programs, talent-readiness, people-centricity, innovation ecosystems, smart policies, and track record.</p>	<p>‘With holistic vision [...], Top 50 details the development of smart cities from a city government’s perspective based on ten factors: vision, leadership, budget, financial incentives, support programs, talent-readiness, people-centricity, innovation ecosystems, smart policies, and track record’ (p.7).</p>
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<b>Dialogic accounting</b>	<b>Gap between underlying principles and dialogic accounting in SC rankings</b>
1. Recognition of multiple ideological orientations	Mostly limited recognition of multiple ideologies with either dominance of a single voice (e.g., technology) or numerical average of several ideologies.
2. Avoiding monetary reductionism	With few exceptions (IESE), rankings have limited recognition of this principle. While most rankings under review include noneconomic values and measures, those values fail to provide data by and to all types of stakeholders (e.g., dominance of citizen-driven data or statistically driven data).
3. Openness about the subjectivity and contestability of calculations	Limited recognition of the subjective and contestable nature of which items are included and how and the decision rules for ranking smartness. Most rankings are entirely subjective and not based on constructive dialogue with relevant stakeholders.
4. Enabling access for nonexperts	Each ranking promises to enable access for nonexperts. However, it seems that there is little consideration of this aspect, not taking into consideration all the ‘multi-layered ways’ nor ‘in forms that are accessible to nonspecialists’ (Brown, 2009).
5. Ensuring effective participatory processes	Rankings vary in ensuring participatory processes. Although rankings promise that all stakeholders are involved in dialogic entitlements, and some forms of participation are used, rankings arguably do not generate critical reflection and discussion.
6. Attention to power relationships and their dynamics	Rankings lack a balanced focus on power relations. There are either one or two main perspectives/voices, ensuring that marginalised groups are not engaged or included in the participatory process. This relates to both the design and communication of ranking information.
7. Recognising the transformative potential of dialogic accounting	Mostly limited recognition of the transformative potential of rankings for dialogue formation and critical examination. Rankings barely acknowledge the possibilities of critical dialogic learning formation regarding SC developments. Instead, we see a narrow focus on conceptual relevance, statistical rigour, and an ‘algorithmic’ message

<b>Dialogic accounting</b>	<b>Gap between underlying principles and dialogic accounting in SC rankings</b>
	regarding the link between ICT and sustainability, which questions the transformational potential of rankings regarding critical reflection and debate on urban sustainability.
8. Resisting new forms of monologism	Rankings leave no space for contesting their methodologies and mostly become new forms of monologic accounting, i.e., suggesting one specific dominant voice and interests in defining SC.

*Table 3. SC rankings under the critical stand of dialogic accounting*