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# Achieving the sustainable development goals through stakeholder value creation: Building up smart sustainable cities and communities

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ABSTRACT

Sustainable development is the process of reaching sustainability, and Stakeholder Value Creation (SVC) can foster urban sustainability. Sustainable Development Goals (SDGs) are optimal tools for scrutinizing sustainable development processes. Although SVC and urban sustainability are clearly connected, the dyadic phenomenon of the contribution of SVC to achieving the SDGs is obscure. Thus, this study explores how SVC contributes to achieving the SDGs at the city level. We performed the Cross-Network Information Analysis protocol, which is properly designed for investigating dyadic phenomena. The main findings revealed that SVC contributes to most SDGs in cities, mainly 11, 17, 9, and 8. Consensus building, smart sustainable cities, and innovation ecosystems are central aspects of the SVC contribution to the SDGs in general. Other relevant aspects are: shared meaning, networking strategy, socio-spatial & cultural patterns, technology, circular economy, sharing economy, corporate social responsibility, entrepreneurship, social bricolage, knowledge sharing, open innovation, ethics, and creativity. However, there has been no empirical evidence of SVC contribution to reaching the SDGs 5, 14, and 15. Policymakers, academics, and practitioners can address the lack of applied research on these last three SDGs by including non-human stakeholders, the environment, and gender diversity in organizational processes, organizational systems, and partnerships.

## 1. Introduction

Along with urbanization, *stakeholder networks* and *sustainable development* have gained even more attention in cities worldwide (Fotino et al., 2018; Kankaala et al., 2018; Beck and Storopoli, 2021). Fostering sustainable development through stakeholders' synergies is fundamental to reaching sustainability globally and locally (Lehtonen, 2004; Gray, 2006; Mauerhofer, 2008; Lubin and Esty, 2010; Iazzolino and Laise, 2016; Purvis et al., 2019; Beck and Storopoli, 2021; Ataman and Tuncer, 2022; Beck & Ferasso, 2023a, 2023b). In urban governance, Stakeholder Value Creation (SVC) is a Stakeholder Theory construct that reflects the satisfaction and harmonic interactions among urban stakeholders (Tantalo and Priem, 2014; Beck and Storopoli, 2021; Beck and Ferasso, 2023b). SVC and urban sustainability are conceptually connected; nonetheless, the environmental dimension of urban sustainability has not been fully integrated into the SVC paradigm (Ataman and Tuncer, 2022; Beck and Ferasso, 2023b).

Although related to sustainability, sustainable development is not synonymous with sustainability. In general, *Sustainability* is an umbrella concept comprising the social, economic, and environmental

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dimensions (Elkington, 1987), which is an umbrella concept for a harmonic development among these dimensions (Fonseca and Lima, 2015). However, when it comes to *Urban Sustainability*, the institutional dimension is a fourth relevant dimension (Ataman and Tuncer, 2022).

According to the Brundtland Report, *Sustainable Development* is "the development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations, 1987). Furthermore, *Sustainable Development* is understood as the adaptive process of reasonable trade-offs among each sustainability dimension, which is critical for reaching sustainability (Scherer et al., 2018; Purvis et al., 2019). For this reason, the United Nations (2015) proposed 17 Sustainable Development Goals (SDGs), which are optimal units of analysis for assessing sustainable development at all levels, including the city one (Han et al., 2021; Lorenzo-Sáez et al., 2021; Saiu et al., 2022).

In this context, SVC is fundamental to reaching sustainability (Purvis et al., 2019; Beck and Storopoli, 2021; Ataman and Tuncer, 2022; Beck and Ferasso, 2023b). The literature reveals the existence of clear conceptual connections between SVC and urban *sustainability*, revealing the need for better integrating the environmental dimension (Beck and Ferasso, 2023b). However, there is a knowledge gap on how SVC contributes to *sustainable development*. The process of sustainable development matters in overcoming climate change and globally urban ecosystem issues (Bayulken & Huisingh, 2015a, 2015b). This study aims to explore how SVC contributes to achieving the SDGs at the city level. Therefore, we intend to clarify the following research question: How does SVC contribute to achieving the SDGs at the city level?

In order to achieve the research purpose, this study employed the *Cross-network Information Analysis protocol* (Beck & Ferasso, 2023a, 2023b), which is helpful for exploring dyadic phenomena with meta-inference, qualitative inference (Research Synthesis and Classification), and quantitative inference (Network Analysis and Exploratory Data Analysis).

The research findings revealed substantial evidence that *SVC at the city level can help achieve most SDGs, especially the SDGs 11, 17, 9, and 8*. However, SVC has not helped enough to achieve the SDGs 14 and 15. Thus, more endeavors should be made to advance the salience of nature and non-human stakeholders in the SVC paradigm at the city level. Besides SVC being an essential driver for urban socioeconomic systems, environmental, natural, and non-human stakeholders still need closer attention.

After this introduction, we provided details of each research phase, designed based on the Mixed Methods Research. The results section has two subsections: the first subsection presents the results of the Research Synthesis; and the second one presents the results of the Network Analysis and Exploratory Data Analysis. Finally, the discussion and conclusion section closes the manuscript, where the results in light of the literature are discussed, followed by the research contributions and an agenda for future studies.

## 2. Stakeholder value creation, Urban sustainability, and the SDGs

SVC is one of the most critical constructs of Stakeholder Theory, which is a multi and interdisciplinary theoretical approach (Freeman et al., 2010; Bridoux and Stoelhorst, 2014; Tantalo and Priem, 2014; Harrison et al., 2015; Freudenreich et al., 2020). According to Tantalo and Priem (2014, p. 317), SVC is " … the sum of all the valuation estimates made by each of that system's essential stakeholder groups for the multiple utilities they receive from participation in the system … " of organizations. In simple terms, SVC occurs when the management and governance meet the stakeholders' needs and expectations, revealing a synergic relationship among stakeholders.

The most classic definition of stakeholder was given by Freeman (1984, p. 49), which is understood as "who can affect or are affected by the achievement of an organization's purpose". Freeman (1984) argued that stakeholder-orientation is a key strategy for the success of organizations, which has been legitimized by empirical studies in organizational strategy (Crane and Ruebottom, 2011; Fonseca et al., 2016).

In cities and urban management, the most recent definition for *urban stakeholder is*: "who/which has the salience attributes of power, urgency, legitimacy, and proximity and simultaneously is affected or affects … the goals of municipalities, [and] even the whole body of urban governance" (Beck and Ferasso, 2023b, p. 2). Urban stakeholder types include governments, citizens, tourists, industries, civil society, non-governmental organizations, and the academic community (Beck and Storopoli, 2021). The bottom line is that SVC represents synergy among urban stakeholders and reveals how they are satisfied with the urban governance and urban management strategic purposes and actions (Beck and Storopoli, 2021; Beck and Ferasso, 2023b).

SVC matters in fostering urban sustainability and democratic values. First, SVC is vital for successful sustainable urban strategy, urban marketing, and networks since the needs and expectations of urban stakeholders are met by urban governance, which is anchored in sustainable urban systems and policies as well as in smart, sustainable, and pluralistic governance (Beck and Storopoli, 2021; Bayulken & Huisingh, 2015a, 2015b). Furthermore, although the social, economic, and institutional dimensions of urban sustainability have been integrated into the SVC-urban paradigm, the environmental dimension still needs to be integrated (Beck and Ferasso, 2023b).

For this reason, SVC has been classified as *weak sustainability* (i.e., when man-made capital threatens/excludes natural capital) or even as *unsustainable* (Pearce and Atkinson, 1993; Gutés, 1996; Biely et al., 2018; Ayres et al., 2001; Beck and Ferasso, 2023b). However, Beck and Ferasso (2023b) suggested some approaches that better integrate the environmental dimension: circular economy; sharing economy; social entrepreneurship; non-human stakeholders orientation; stakeholder proximity; smart sustainable cities; environmental issues; environmental management; and innovation. Fig. 1 illustrates the conceptual connection between SVC and sustainability in cities.

However, the investigation on SVC and Urban Sustainability should be more specific and focus on a more detailed analysis (Beck and Ferasso, 2023b). The SDGs can indicate and measure the progress towards *Sustainable Development* and represent a shared expression of global stakeholder needs, balancing economic, social, and environmental development (Fonseca et al., 2020). The 17 SDGs, listed in Table 1, are excellent units of analysis for an in-depth investigation of urban sustainability (United Nations, 2015; Purvis et al., 2019; Han et al., 2021; Lorenzo-Sáez et al., 2021; Saiu et al., 2022) and provide a wider gamut of theoretical explanations of this dyadic phenomenon and practical orientations for policymakers, urban planners, stakeholders, and governments.

It is challenging to achieve all the SDGs without tradeoffs among them, but it cannot be considered impossible. For instance, Scherer et al. (2018) found that pursuing social-oriented SDGs is usually associated with higher environmental impacts. Notwithstanding, SVC could be a means for fostering urban sustainability through stakeholder consensus as well as by considering the own environmental as a non-human stakeholder (Driscoll & Tarkik, 2004; Beck and Ferasso, 2023a; Beck and Ferasso, 2023b).

## 3. Research design

This study performed a *Cross-network Information Analysis* (CNIA), which was designed by Beck and Ferasso (2023a) and Beck and Ferasso (2023b). CNIA is a methodological protocol based on the sequential mixed design of Mixed Methods Research (MMR) (Teddlie and Tashakkori, 2009; Åkerblad et al., 2021; Nooraie et al., 2020; Tashakkori & Teddlie, 2020). CNIA is helpful for exploring dyadic phenomena of the interaction among concrete and abstract things and pieces of information. In this study, *to contribute* is the verb of interaction, *Stakeholder Value Creation* is the active abstract information, and the

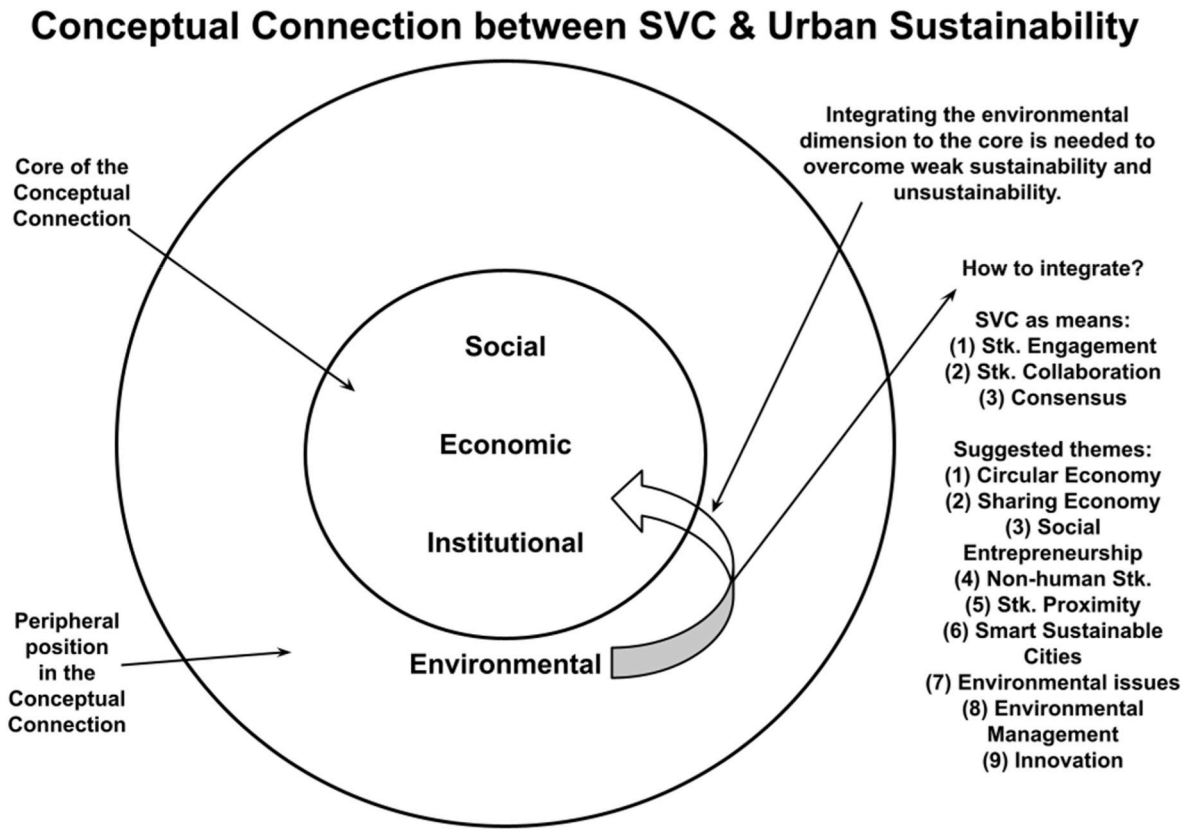


**Fig. 1.** Conceptual connection between SVC and Urban Sustainability.
*Note.* Created based on "Bridging 'Stakeholder Value Creation' and 'Urban Sustainability': The need for better integrating the Environmental Dimension," by D. Beck, and M. Ferasso, 2023, *Sustainable Cities and Society*, *89*, 104316, p. 10. Copyright 2023 by Elsevier.

*Sustainable Development Goals* are the passive abstract pieces (dimensions) of information. In other words, this study investigates the *dyadic phenomenon* of SVC contributing to the achievement of the SDGs.

CNIA provides robust and rigorous findings because it scrutinizes dyadic phenomena with meta-inferences that integrate qualitative and quantitative analyses. As schematized in the flowchart depicted in Fig. 2, CNIA comprised the following summarized steps: First, at the *Preparation*, researchers make clear the dyadic phenomenon they will explore and collect the data for exploration. Second, in the *Qualitative Analysis*, informational data is synthesized and classified according to the type of interaction that characterizes the dyadic phenomenon (in our case, the identified contribution of SVC to a specific SDG). Third, in the *Quantitative Analysis*, the identified dyadic phenomenon classified in the previous step is the source for generating a graph. Thus, this study employed a *Network Analysis* (NA) and an *Exploratory Data Analysis* (EDA) of the NA centrality measures. Finally, a *Meta-inference* integrates the findings and results of the qualitative and quantitative analyses.

### 3.1. Preparation

In order to explore the dyadic phenomenon of the *contribution* of SVC to achieving the SDGs, 40 elements of SVC literature were retrieved from *Scopus* through the following advanced search expression: TITLE-ABS-KEY ("stakeholder" AND "value creation" AND "city" OR "cities" OR "municipalit*" OR "urban") AND PUBYEAR < 2022 AND (LIMIT-TO (DOCTYPE, "ar")). We wrangled and cleaned the data to assure theoretical validity by reading all articles thoroughly and verifying if there is an SVC contribution in the references to at least one SDG. Thus, five articles were excluded from the sample. Finally, the final sample comprises 35 articles.

### 3.2. Qualitative analysis

This study employed Research Synthesis (RS), a systematic and replicable method for literature collection, synthesis, and classification (Cooper et al., 2019). In this study, the RS is a tool for identifying and synthesizing the heterogeneous characteristics of SVC literature regarding the SVC contribution for each SDG. After that, the existing connections between SVC literature and SDGs were classified by considering the identified contributions within the articles. These classifications were, in turn, the sources for generating the graphs of the dyadic phenomenon (i.e., the contribution of SVC to achieving the SDGs) in the next stage.

### 3.3. Quantitative analysis

Network Analysis (NA) and Exploratory Data Analysis (EDA) were means for examining the network centrality measures, i.e., Degree Centrality (DC), Closeness Centrality (CC), Betweenness Centrality (BC), and Eigen Centrality (EC). In addition, NA and EDA enable a replicable and objective analysis of the dyadic phenomenon (Tukey, 1977; Nuzzo, 2016; Newman, 2018). There are two clusters of nodes representing an abstract dimension of the dyadic phenomenon: first, the SVC cluster contains nodes representing each node of one of the 35 sample articles; second, each node of the SDGs' cluster is one of the 17 SDGs. The edges represent the contribution of SVC to achieving the SDGs, which were identified and classified into their respective clusters in the qualitative analysis.

### 3.4. Meta-inference

The aggregation of the qualitative and quantitative inferences

**Table 1**
The 17 SDGs.

| Number | Short Mission Statement | Detailed Mission Statement |
|---|---|---|
| SDG 1 | No Poverty | End poverty in all its forms everywhere |
| SDG 2 | Zero Hunger | End hunger, achieve food security and improved nutrition and promote sustainable agriculture |
| SDG 3 | Good Health and Well-being | Ensure healthy lives and promote well-being for all at all ages |
| SDG 4 | Quality Education | Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all |
| SDG 5 | Gender Equality | Achieve gender equality and empower all women and girls |
| SDG 6 | Clean Water and Sanitation | Ensure availability and sustainable management of water and sanitation for all |
| SDG 7 | Affordable and Clean Energy | Ensure access to affordable, reliable, sustainable and modern energy for all |
| SDG 8 | Decent Work and Economic Growth | Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all |
| SDG 9 | Industry, Innovation, and Infrastructure | Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation |
| SDG 10 | Reduced Inequalities | Reduce inequality within and among countries |
| SDG 11 | Sustainable Cities and Communities | Make cities and human settlements inclusive, safe, resilient and sustainable |
| SDG 12 | Responsible Consumption and Production | Ensure sustainable consumption and production patterns |
| SDG 13 | Climate Action | Take urgent action to combat climate change and its impacts |
| SDG 14 | Life Below Water | Conserve and sustainably use the oceans, seas and marine resources for sustainable development |
| SDG 15 | Life on Land | Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss |
| SDG 16 | Peace, Justice and Strong Institutions | Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels |
| SDG 17 | Partnerships for the Goals | Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development |

*Note*. Source: United Nations, 2015.

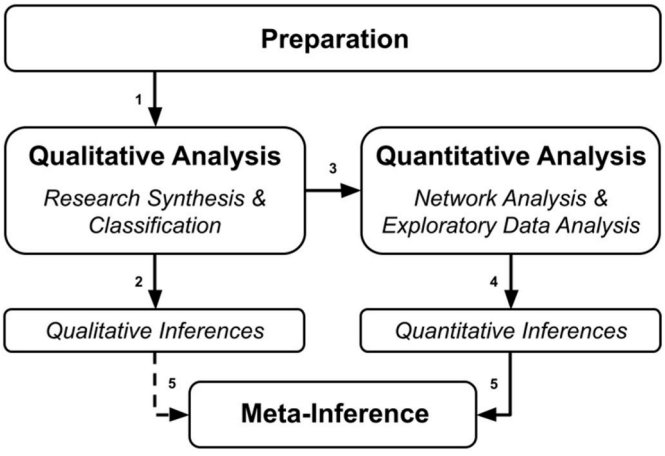


**Fig. 2.** Flowchart of the research stages.

provide a more robust inference, ensuring higher rigor, reliability, and accuracy of the research findings and results (Tashakkori & Teddlie, 2020).

## 4. Results and discussion

### 4.1. Qualitative analysis

This subsection presents the inferences and classifications made through Research Synthesis and is divided into four parts. This step considered the content and quantity of studies in classifying the SVC contribution to achieving the SDGs. Thus, the first part of this subsection presents SVC qualities and the SDGs to which SVC can strongly contribute. The second part also reveals SVC qualities and how SVC contributes to other SDGs. The third part highlights the SDGs to which there is a lack of evidence of SVC contribution in the sample literature. Finally, the fourth part summarized the qualitative inferences.

#### 4.1.1. SVC strongly contributes to achieving the SDGs 8, 9, 11, and 17

The sample literature has revealed a strong connection between SVC and the achievement of the SDGs 8, 9, 11, and 17. *Stakeholder engagement, smart sustainable cities*, and *innovation ecosystems* have been crucial concepts developed in the SVC paradigm to reach SDGs 8, 9, and 11. *Stakeholder engagement* allows urban governance to establish partnerships, reach consensus, and orient urban policies and systems toward sustainable development. Fig. 3 illustrates a flowchart of the SVC contribution to these SDGs (and their related urban sustainability dimensions) by highlighting the SVC qualities and interrelated concepts beneficial to achieving these SDGs.

The following paragraphs detail the important concepts interrelated with SVC that help reach these SDGs.

First, *consensus building*, *shared meaning*, *networking strategy*, and *stakeholder-oriented urban governance.* In the last one, stakeholders engage and collaborate among themselves in a fertile environment for partnerships and innovation. These attributes were found in 24 sample studies, it reveals that these attributes are salient in the (i.e., Lange and Bürkner, 2013; Sacco and Crociata, 2013; Mayangsari and Novani, 2015; Simeone et al., 2017; Fotino et al., 2018; Kankaala et al., 2018; Miller, 2018; Swagemakers et al., 2018; Yang et al., 2018; Camboim et al., 2019; Ma and Chang, 2019; Neumann et al., 2019; Winslow and Mont, 2019; de Kervenoael et al., 2020; Rust, 2020; Atkočiūnienė and Siudikienė, 2021; Beck and Storopoli, 2021; Chebo and Wubatie, 2021; Coenegrachts et al., 2021; Hiltunen et al., 2021; Pardo-Bosch et al., 2021; Park and Shin, 2021; Richards, 2021; Ruiz-Lozano et al., 2021).

These attributes are also useful to articulate local communities to fight against climate change and promote sustainable development, e.g., by fostering sustainable transportation (Yang et al., 2018; Ma and Chang, 2019; Pardo-Bosch et al., 2021). Also importantly, stakeholder event-related networks are critical for strategic management of urban resources, knowledge management, and attracting human, financial, and technical resources, which are critical for fostering sustainable development (Richards, 2021).

Second, fostering economic urban development and innovation based on the concept of *smart sustainable cities, technology entrepreneurship,* massive use of technologies, and Industry 4.0. These terms were found in 12 sample articles (i.e., Brandt et al., 2017; Mayangsari and Novani, 2015; Simeone et al., 2017; Miller, 2018; Romão et al., 2018; Camboim et al., 2019; Macke et al., 2019; Neumann et al., 2019; Das, 2020; Chebo and Wubatie, 2021; Robaeyst et al., 2021; Su et al., 2021; Velsberg et al., 2021). In the context of our research topic, a *smart sustainable city* is a " … multi-stakeholder ecosystem [that] upholds the value co-creation process of related actors within a framework to provide and deliver the expected service … " (Mayangsari and Novani, 2015, p. 315, p. 315).

In this way, data-driven economy and smart technological paradigms help to modernize the urban infrastructure and services (De Tuya et al.,

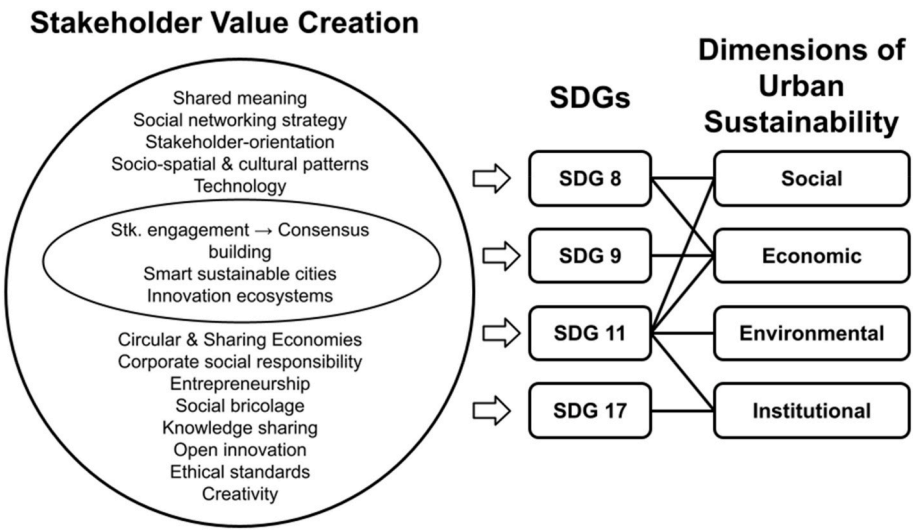


**Fig. 3.** SVC qualities and interrelated concepts for achieving the SDGs 8, 9, 11, and 17.

2017; Cuno et al., 2019; Das, 2020; Pedersen et al., 2021). Urban data space is useful in this context to identify relevant stakeholders, and data integration is important to support participative decision-making processes in addressing climate change issues in cities with high-density populations (Yang et al., 2018; Cuno et al., 2019). Moreover, SVC highlights the modernization of urban infrastructure and services with *smart sustainable solutions*. These solutions integrate resources and increase the delivery efficiency of urban systems and policies, e.g., urban mobility, business logistics, health, safety, public administration, and city labs (Gammelgaard et al., 2017, 2017de Kervenoael et al., 2020; Coenegrachts et al., 2021; Robaeyst et al., 2021; Su et al., 2021; Velsberg et al., 2021).

Third, embracing SVC in urban governance requires anchoring the urban economy/ecosystems to *social bricolage*, *creativity*, *open innovation*, and *knowledge sharing*. These approaches can be developed by stakeholder-oriented urban governance, stakeholder collaboration, and urban innovative ecosystems (Kankaala et al., 2018; Romão et al., 2018; Camboim et al., 2019; Atkočiūnienė and Siudikienė, 2021; Chebo and Wubatie, 2021; Park and Shin, 2021; Robaeyst et al., 2021).

Fourth, *socio-spatial and cultural patterns* are critical for SVC in cities since they offer critical information for understanding data and strategizing urban policies to foster the urban economy, e.g., tourism, culture, artistic, and educational sectors (Lange and Bürkner, 2013; Sacco and Crociata, 2013; Brandt et al., 2017; Romão et al., 2018; Rust, 2020).

Finally, establishing *ethical standards* in businesses and, thus, inserting the notions of responsible profits and *corporate social responsibility* (CSR) (Kankaala et al., 2018; Hiltunen et al., 2021). CSR refers to a company's voluntary initiatives to address embedded social and environmental issues within its operations (Fonseca et al., 2022). While both Sustainability and CSR aim for simultaneous economic development with social progress and equity while respecting the natural environment, the concept of CSR emphasizes more corporate business models (Fonseca et al., 2022). In contrast, Sustainable Development focuses on critical changes in the global environment (Fonseca et al., 2022).

These ethical concerns and CSR of public and private organizations also are responsible for fostering *circular* and *sharing economies* (Swagemakers et al., 2018; Winslow and Mont, 2019), which are emerging themes already embraced in the sustainable SVC framework proposed by Beck and Ferasso (2023b), which also can help to better integrate the environmental dimension.

#### *4.1.2. SVC contributes to achieving the SDGs 1, 2, 3, 4, 6, 7, 10, 12, 13, and 16*

Although embryonic, the sample literature on SVC in cities has revealed that SVC helps reach the SDGs 1, 2, 3, 4, and 10. These SDGs address socioeconomic issues and SVC contributes to achieving them in four main ways. *First*, urban modernization, industrial dynamism, and digital transformation have been led by SVC processes and governmental policies that are useful for reducing poverty, inequalities, homelessness, health promotion, and unemployment (Camboim et al., 2019; Su et al., 2021). *Second*, the interest of private entities, industries, and businesses in contributing to social policies is a source for SVC in reducing socioeconomic inequalities (Ruiz-Lozano et al., 2021). *Third*, ethics can enhance SVC in health services (Hiltunen et al., 2021). *Fourth*, social entrepreneurship can benefit students by stimulating them to be engaged in some activity related to their field of study and by providing education services to local students (Park and Shin, 2021).

SVC is also helpful to urban governance in achieving the SDGs 6 and 7. Urban governance (with city labs, industries, and governments altogether) can help to move industrial cities toward smarter and more sustainable cities by improving water quality and energy efficiency, fostering the use of clean transportation means, and depolluting urban water and waste systems (Swagemakers et al., 2018; Camboim et al., 2019; Pardo-Bosch et al., 2021; Pedersen et al., 2021). Fostering the circular economy in urban strategy is also essential to create decentralized and innovative waste management projects and thus create value (Swagemakers et al., 2018).

Furthermore, urban governance can strategically connect economic and environmental sustainability improvements by fostering intersectoral and community collaboration for energy, water, and waste management systems (Swagemakers et al., 2018; Ma and Chang, 2019). Thus, urban governance can create value for urban stakeholders by improving the water, energy grid, and sanitation systems, transforming cities to become smarter and more sustainable, and exploring the power of collaboration.

SVC contributes to achieving the SDGs 12 and 13 through: first, *environmental management* in which stakeholders are engaged in integrating the built and natural environment into sustainable urban strategy, urban policies, urban systems (Ma and Chang, 2019; Beck and Storopoli, 2021); second, *smart sustainable cities*, because they help overcome environmental pollution and social issues within the dynamics of production and consumption within the supply chain processes (Camboim et al., 2019; Macke et al., 2019); third, *sustainable mobility and logistics* that foster responsible consumption and production by optimizing the use of time and resources in logistics and integrating

transportation modes (Gammelgaard et al., 2017, 2017de Kervenoael et al., 2020; Coenegrachts et al., 2021; Pardo-Bosch et al., 2021); fourth, *clean energy* by promoting carbon reduction and energy savings in the whole urban ecosystems (Ma and Chang, 2019; Beck and Storopoli, 2021; Pardo-Bosch et al., 2021); fifth, *circular economy* and *sharing economy* (Swagemakers et al., 2018). Therefore, SVC can theoretically help counterbalance the environment and the economic activities toward sustainable development.

Finally, SVC could help achieve the SDG 16 for three main reasons. First, SVC is based on democratic principles of stakeholder participation that strengthen the institutions (Beck and Storopoli, 2021). Second, SVC promotes socioeconomic inclusiveness in policies and services and justice accessibility (Ruiz-Lozano et al., 2021). Third, SVC promotes digital transformation toward smart governance in which urban stakeholders can be benefited from better urban policies, systems, and services (Velsberg et al., 2021). Although recent studies form the sample literature for SDG 16, the literature is at an early-birth stage. Despite these studies revealing that SVC can help achieve the SDG 16, it is inconclusive that SVC contributes to SDG 16. The literature needs further development to conclude the contribution of SVC to achieving SDG 16.

#### 4.1.3. Lack of evidence that SVC contributes to achieving the SDGs 5, 14, and 15

It is inconclusive determining how SVC contributes to achieving the SDGs 5, 14 and 15. There is no single sample study embracing the SDGs 5 and 14. Notwithstanding, stakeholder theoreticians have highlighted the need for gender equality in society, mainly with the Environmental, Social, Governance (ESG) agenda (Fama, 2021; Beck and Ferasso, 2023a). As for SDG 15, Swagemakers et al. (2018) revealed that SVC could be important in preserving nature (e.g., forestry and habitats of animals) in the processes of upcycling solid organic waste through (a) collaborative management and decision-making, and (b) a supportive institutional environment. However, further studies are needed to explore how and to what extent SVC contributes to achieving these SDGs.

#### 4.1.4. Summary of the qualitative inferences

In essence, the qualitative inferences describe the dyadic phenomenon of SVC's contribution to achieving the SDGs in three main points: First, SVC strongly contributes to achieving the SDGs 8, 9, 11, and 17, and the main interrelated concepts responsible for this contribution are shared meaning, networking strategy, stakeholder-orientation socio-spatial & cultural patterns, technology, circular & sharing economies, corporate social responsibility, entrepreneurship, social bricolage, knowledge sharing, open innovation, ethical standards, creativity, stakeholder engagement that leads to consensus building, smart sustainable cities, and innovation ecosystems. These three last concepts are at the core of the SVC contributions in general.

Second, SVC contributes to achieving the SDGs 1 to 4, 6, 7, 10, 12, 13, and 16. Most of these contributions are due to stakeholder engagement, which drives consensus building. Third, there is a lack of evidence that SVC contributes to achieving the SDGs 5, 14, and 15, needing further exploration in theoretical and empirical studies.

The qualitative analysis conducted in this subsection detailed the characteristics of the dyadic phenomenon of SVC contribution to achieving the SDGs. The following subsection explores the dyadic phenomenon links identified in Research Synthesis by highlighting the SDGs to which SVC has contributed the most.

### 4.2. Quantitative analysis

This subsection comprises three parts. The first part has an NA of a directed graph with links from the 35 sample studies to the 17 SDGs. The identified characteristics synthesized and identified in the qualitative analysis were the source for establishing the dyadic phenomenon links and generating the directed graphs matrix. Second, EDA was performed to objectively scrutinize sample distribution characteristics, and find outliers, i.e., mainly the SDGs with substantial contributions from SVC. Third, we provided a summary of the quantitative results.

#### 4.2.1. Network Analysis

Table 2 presents the network properties. The SDGs 11, 17, 9, and 8 have Eigen Centrality higher than 0.5 within the network, indicating that these are consecutively the SDGs with which the literature indicates that SVC can most contribute. Also, there is no SVC contribution at the city level for achieving SDGs 5 and 14; for this reason, these two SDGs underperformed in all network measures.

Fig. 4 depicts the network by considering the nodes' size as the DC measure under the Frunchterman-Reingold algorithm (Fruchterman and Reingold, 1991).

Also, Fig. 3 reveals two extremes: on the one hand, SDGs 11, 17, and 8 are, respectively, the biggest nodes at the center of the network; on the other hand, SDGs 5 and 14 are isolated by not receiving any contribution from the SVC literature cluster. Although SDGs 13 and 12 are closer to the center, they are neither central nor peripheral. In turn, SDGs 4, 15, 6, 3, 7, 10, 2, 16, and 1 have, respectively, peripheral positions within the network. Therefore, NA revealed that SVC is more helpful in achieving the SDGs 11, 17, 9, and 8.

#### 4.2.2. Exploratory Data Analysis

We used EDA to inspect the network centrality measures objectively. First, we used EDA to explore the distribution of the centrality measures in the whole network, as depicted in the boxplots in Fig. 5. In short, EDA results for the entire network revealed that: first, SDGs 11, 17, 9, and 8 are outliers in In-DC, DC, PR, and EC measures; second, the SDGs 12, 13, 7, 3, 6, and 16 are outliers only in In-DC, PR, and EC measures; third, the SDG 10 is the only outlier in In-DC and EC measures; fourth, the SDGs 1, 2, 4, and 15 weakly scored in all measurements and are not outliers; and fifth, the SDGs 5 and 15 score only in PR measure, but insignificantly because they do not have any connections.

By applying EDA for only the SDGs within the network (as shown in Fig. 6), the results reveal that: SDG 11 is an outlier in In-DC, DC, PR, and EC; and SDG 17 is an outlier only in PR measure. In other words, SVC contributes significantly to achieving SDGs 11 and 17 at the city level. Nonetheless, although SVC helps to achieve SDGs 1, 2, 4, and 15, the SVC contribution is not significant.

Therefore, EDA results objectively refined the NA results by revealing that SVC contributes significantly to achieving SDGs 11 and 17 at the city level.

#### 4.2.3. Summary of the quantitative analysis

In essence, the quantitative analysis revealed that SCV can strongly contribute to achieving the SDGs 11, 17, 9, and 8 (as revealed by NA), and to a more significant extent to the SDGs 11 and 17 (as revealed by EDA).

### 4.3. Meta-inference

Overall, the meta-inference suggests that: on the one hand, SVC at the city level can help to achieve most SDGs, mainly the SDGs 11, 17, 9, and 8; on the other hand, SVC has not helped enough to achieve the SDGs 5, 14 and 15. Thus, *more efforts should be made to increase the salience of nature and non-human stakeholders and gender equality in the SVC paradigm at the city level*. Fig. 7 illustrates these meta-inference results.

In turn, the debate on these neglected approaches should be expanded in the context of sustainable cities and communities and urban partnerships since SVC has contributed most to achieve the SDG 11 and 17.

**Table 2**
Network properties.

| Label | Cluster | In-DC | Out-DC | DC | PR | EC |
|---|---|---|---|---|---|---|
| SDG 11 | SDG | 28 | 0 | 28 | 0.11706 | 1 |
| SDG 17 | SDG | 25 | 0 | 25 | 0.097139 | 0.892857 |
| SDG 9 | SDG | 19 | 0 | 19 | 0.070463 | 0.678571 |
| SDG 8 | SDG | 16 | 0 | 16 | 0.063435 | 0.571429 |
| SDG 12 | SDG | 7 | 0 | 7 | 0.026019 | 0.25 |
| SDG 13 | SDG | 7 | 0 | 7 | 0.024287 | 0.25 |
| SDG 7 | SDG | 4 | 0 | 4 | 0.018991 | 0.142857 |
| SDG 3 | SDG | 3 | 0 | 3 | 0.019164 | 0.107143 |
| SDG 6 | SDG | 3 | 0 | 3 | 0.02003 | 0.107143 |
| SDG 10 | SDG | 3 | 0 | 3 | 0.016071 | 0.107143 |
| SDG 16 | SDG | 3 | 0 | 3 | 0.018669 | 0.107143 |
| SDG 1 | SDG | 2 | 0 | 2 | 0.014586 | 0.071429 |
| SDG 2 | SDG | 1 | 0 | 1 | 0.013101 | 0.035714 |
| SDG 4 | SDG | 1 | 0 | 1 | 0.014314 | 0.035714 |
| SDG 15 | SDG | 1 | 0 | 1 | 0.013967 | 0.035714 |
| Atkočiūnienė and Siudikienė (2021) | SVC | 0 | 2 | 2 | 0.012235 | 0 |
| Beck and Storopoli (2021) | SVC | 0 | 7 | 7 | 0.012235 | 0 |
| Brandt et al. (2017) | SVC | 0 | 2 | 2 | 0.012235 | 0 |
| Camboim et al. (2019) | SVC | 0 | 12 | 12 | 0.012235 | 0 |
| Chebo and Wubatie (2021) | SVC | 0 | 3 | 3 | 0.012235 | 0 |
| Coenegrachts et al. (2021) | SVC | 0 | 6 | 6 | 0.012235 | 0 |
| Cuno et al. (2019) | SVC | 0 | 1 | 1 | 0.012235 | 0 |
| Das (2020) | SVC | 0 | 2 | 2 | 0.012235 | 0 |
| de Kervenoael et al. (2020) | SVC | 0 | 5 | 5 | 0.012235 | 0 |
| De Tuya et al. (2017) | SVC | 0 | 1 | 1 | 0.012235 | 0 |
| Fotino et al. (2018) | SVC | 0 | 3 | 3 | 0.012235 | 0 |
| Gammelgaard et al. (2017) | SVC | 0 | 3 | 3 | 0.012235 | 0 |
| Hiltunen et al. (2021) | SVC | 0 | 4 | 4 | 0.012235 | 0 |
| Kankaala et al. (2018) | SVC | 0 | 4 | 4 | 0.012235 | 0 |
| Lange and Bürkner (2013) | SVC | 0 | 3 | 3 | 0.012235 | 0 |
| Ma and Chang (2019) | SVC | 0 | 5 | 5 | 0.012235 | 0 |
| Mayangsari and Novani (2015) | SVC | 0 | 3 | 3 | 0.012235 | 0 |
| Miller (2018) | SVC | 0 | 2 | 2 | 0.012235 | 0 |
| Mouraviev and Kakabadse (2015) | SVC | 0 | 1 | 1 | 0.012235 | 0 |
| Neumann et al. (2019) | SVC | 0 | 4 | 4 | 0.012235 | 0 |
| Pardo-Bosch et al. (2021) | SVC | 0 | 5 | 5 | 0.012235 | 0 |
| Park and Shin (2021) | SVC | 0 | 5 | 5 | 0.012235 | 0 |
| Pedersen et al. (2021) | SVC | 0 | 2 | 2 | 0.012235 | 0 |
| Richards (2021) | SVC | 0 | 2 | 2 | 0.012235 | 0 |
| Robaeyst et al. (2021) | SVC | 0 | 2 | 2 | 0.012235 | 0 |
| Romão et al. (2018) | SVC | 0 | 2 | 2 | 0.012235 | 0 |
| Ruiz-Lozano et al. (2021) | SVC | 0 | 7 | 7 | 0.012235 | 0 |
| Rust (2020) | SVC | 0 | 2 | 2 | 0.012235 | 0 |
| Sacco and Crociata (2013) | SVC | 0 | 3 | 3 | 0.012235 | 0 |
| Simeone et al. (2017) | SVC | 0 | 2 | 2 | 0.012235 | 0 |
| Su et al. (2021) | SVC | 0 | 3 | 3 | 0.012235 | 0 |
| Swagemakers et al. (2018) | SVC | 0 | 6 | 6 | 0.012235 | 0 |
| Velsberg et al. (2021) | SVC | 0 | 3 | 3 | 0.012235 | 0 |
| Winslow and Mont (2019) | SVC | 0 | 4 | 4 | 0.012235 | 0 |
| Yang et al. (2018) | SVC | 0 | 2 | 2 | 0.012235 | 0 |
| SDG 5 | SDG | 0 | 0 | 0 | 0.012235 | 0 |
| SDG 14 | SDG | 0 | 0 | 0 | 0.012235 | 0 |

*Note: DC* = "Degree Centrality"; *EC* = "Eigen centrality"; SDG = "Sustainable Development Goal"; PR = "PageRank"; and SVC = "Stakeholder Value Creation". This table was set in the descending order of the Eigen centrality measure.

## 5. Conclusion

This study explored how SVC contributes to achieving the SDGs at the city level by performing the CNIA protocol. The main findings revealed that *SVC helps achieve most SDGs, mainly the SDGs 11, 17, 9, and 8*. As for these four last SDGs, *consensus building*, *smart sustainable cities*, and *innovation ecosystems* are at the core of the SVC contribution when considering the sample research (general worldwide context). Conversely, *SVC cannot help enough to reach the SDGs 5, 14 and 15*. Notwithstanding, SDG 11 has significant synergy with other SDGs, such as SDG3, SDG4, and SDG 5. Hence, improving Sustainable Cities and Communities can foster better Good Health and Well-being, Quality Education, and Gender Equality. Nevertheless, attention should be paid to SDG12 (Responsible consumption and production) which is the goal strongly associated with trade-offs (Fonseca et al., 2020).

Accordingly, this study's theoretical implications align with Beck and Ferasso (2023b) concerning better integrating the environmental dimension into a Sustainable-SVC framework. For instance, the SDGs to which SVC most contributes (the SDGs 11, 17, 9, and 8), emphasize the socioeconomic and institutional dimensions more than the environmental ones. Thus, it reinforces the argument of Beck and Ferasso (2023b) to foster Smart Sustainable Cities and Environmental Management, which is practical for sustainable development.

The policy implication of this study is that policymakers, urban managers, urban planners, urban governance, scholars, and other practitioners need to focus more attention on *including non-human stakeholders, the environment, and gender diversity in their organizational processes and systems, and core values of partnerships*. Thus, value creation could embrace the SDGs 5, 14, and 15, leading cities through more robust sustainable development and democratic societies.

The main theoretical contribution of this study is providing explanations about the dyadic phenomenon of SVC contribution to reaching the SDGs and, thus, sustainable development processes in cities. These explanations aggregate knowledge advancements on the construct of SVC, which is at the cornerstone of *Stakeholder Theory in Urban Studies* (Beck and Storopoli, 2021), and sustainable development processes by exploring SVC in these processes at the city level, which is vital in *Sustainability Sciences* (Purvis et al., 2019).

Also, this research has two main academic implications: First, it reveals that SVC can contribute not only to reach *sustainability* (as previously demonstrated by Beck and Ferasso, 2023b) but also can contribute to *sustainable development* processes and agenda, such as the SDGs. Second, this study reinforces the need of better integrating the environmental dimension of sustainability within the SVC paradigm (Beck and Ferasso, 2023b) by demonstrating that the SDGs 14 and 15 regarding non-human stakeholders and the environment need more attention in the sustainable development processes.

Beyond the suggestions for future studies provided in the results and discussion section, further studies should also consider to: first, explore the interrelations of SVC with the sense of community in Smart Sustainable Cities (Macke et al., 2019); second, investigate on how SVC can influence the intention of cities to become Smart Sustainable Cities regarding the regional and local differences (Machado et al., 2018); third, explore if SVC can improve the citizens' perception of Smart Sustainable Cities attributes (Macke et al., 2019); and fourth, we recommend to practitioners, such as urban managers, to adapt the EFQM 2020 Model to the context of public management and policy-making when targeting the SDGs and managing sustainability performance (Fonseca, 2022). Although the EFQM 2020 Model was conceived for for-profit organizations, urban managers can benefit from superior efficiency and performance outcomes if adapting and addressing this model, especially regarding SDGs implementation. Moreover, the same EFQM 2020 Model can help urban managers regarding the digital transformation, e.g., e-Government.

This study has two major *limitations*. The first relates to the terms and the database chosen to collect the literature on SVC in cities since other

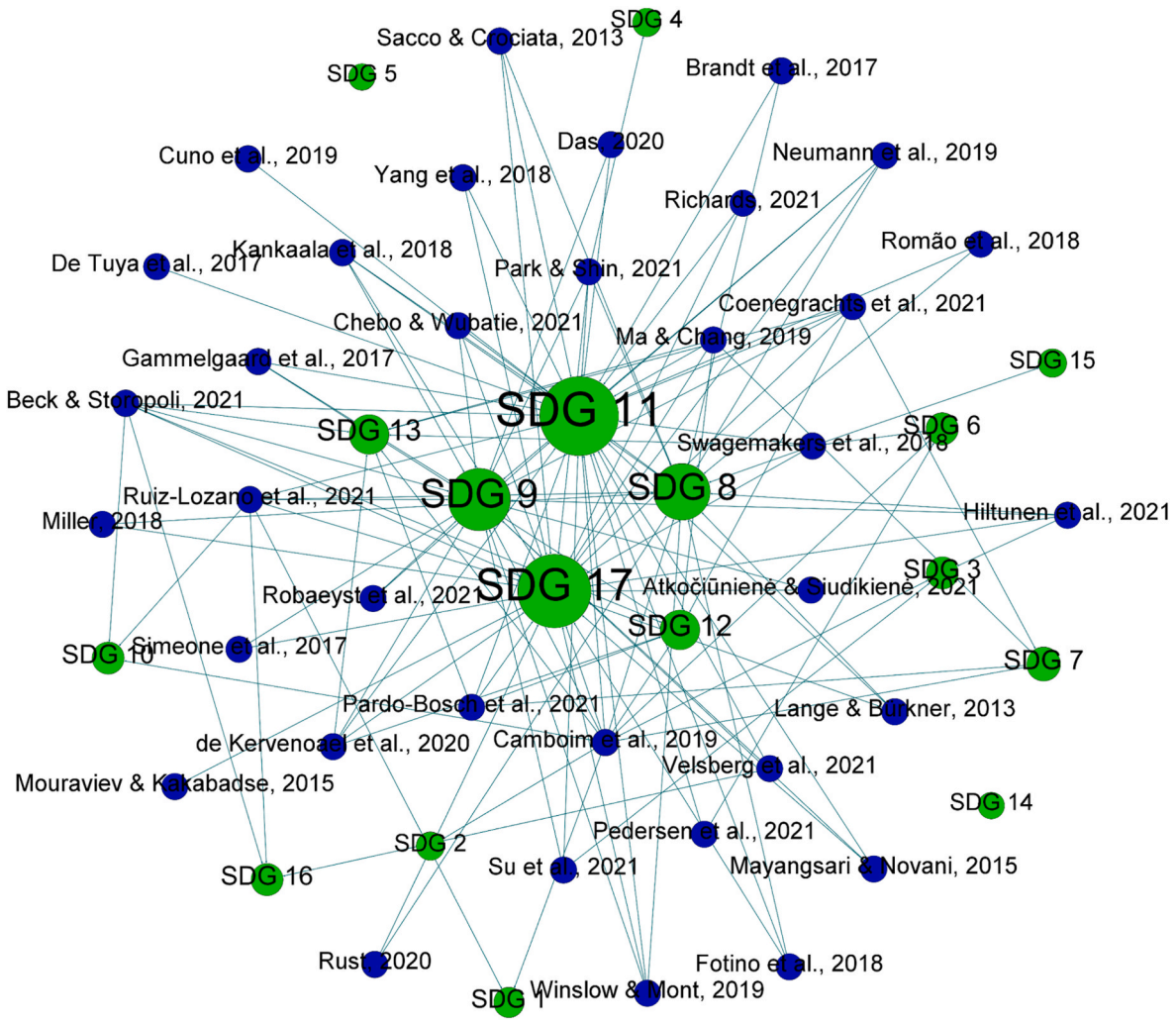


**Fig. 4.** Network visualization.
*Note*. The arrows from the sample studies to the SDGs were excluded from this directed network visualization because they impeded reading the labels of the nodes.

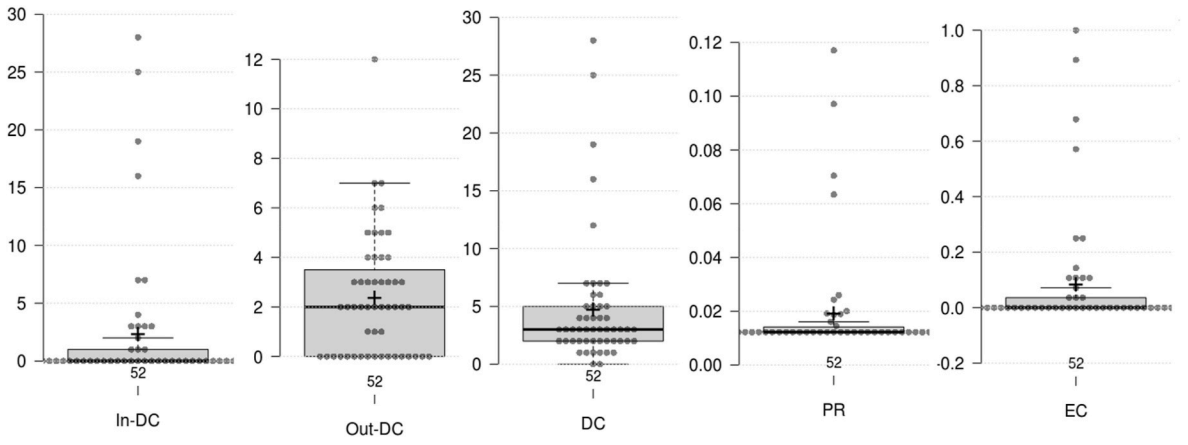


**Fig. 5.** Box Plots for EDA visualization of the network properties.

similar terms and databases can provide varied results. However, we chose Scopus because it gathers research from a broader spectrum of high-quality journals in social applied sciences (Mongeon and Paul-Hus, 2016; Martín-Martín et al., 2018a, 2018b). Finally, although we conducted our qualitative analysis objectively and made an effort to avoid personal judgment, the second limitation is the possibility of some bias as in all qualitative research.

## CRediT authorship contribution statement

**Donizete Beck:** Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation,

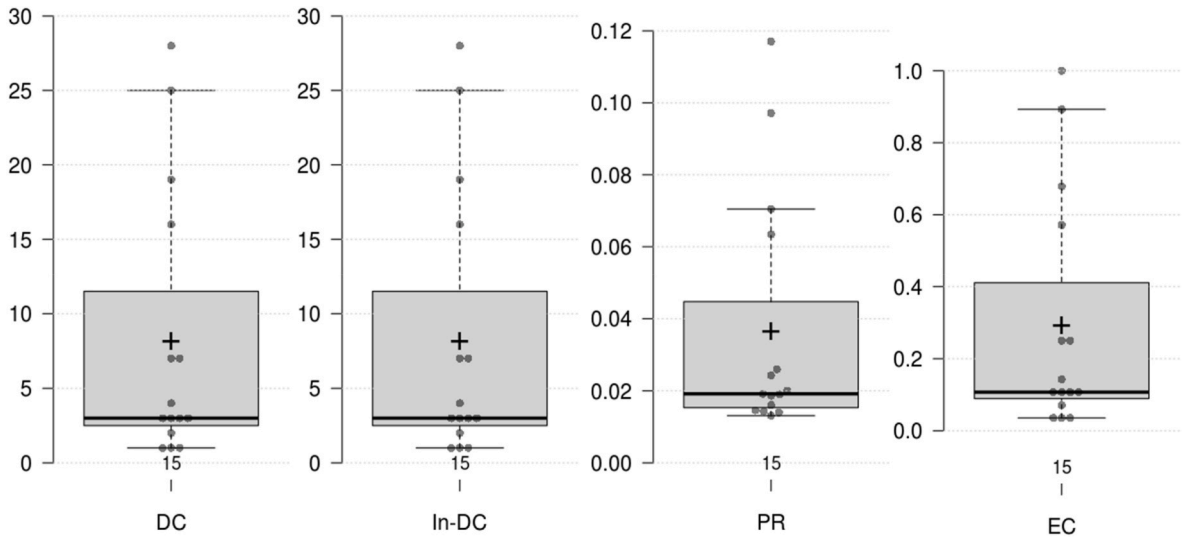


**Fig. 6.** Box Plots for EDA visualization with only the SDG cluster nodes of the network.

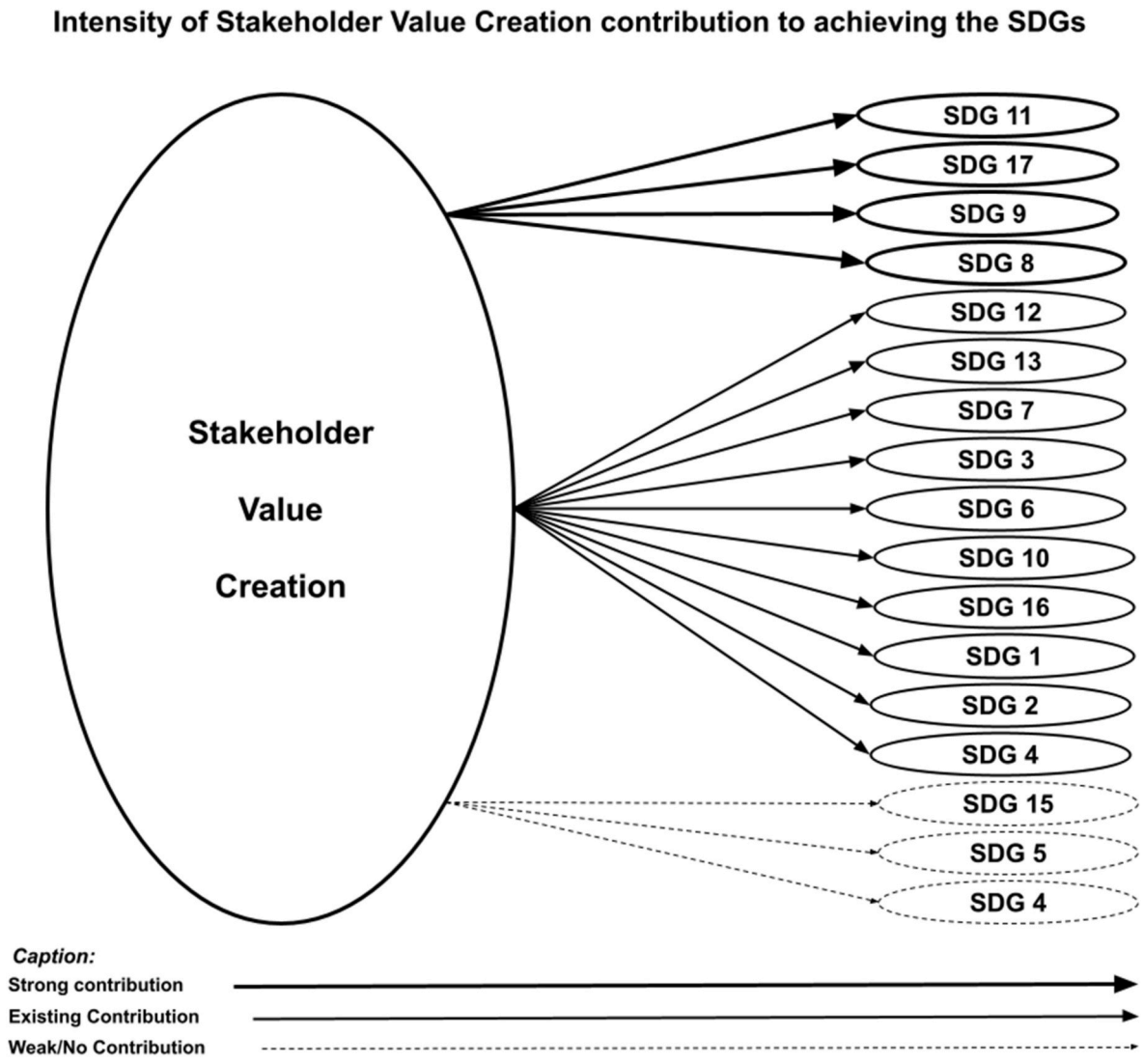


**Fig. 7.** Flowchart of the meta-inference results.

Writing – original draft, Writing – review & editing, Visualization, Supervision, Project administration, Funding acquisition. **Marcos Ferasso:** Methodology, Validation, Writing – review & editing. **José Storopoli:** Writing – review & editing, Funding acquisition. **Eran Vigoda-Gadot:** Writing – review & editing, Funding acquisition.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

The dataset was gathered from the Scopus Database and the Boolean Search Expression was provided in the Research Design section. Also, the dataset, the matrix used in categorization, and the files about the edges and nodes used in the Gephi software are available at our project in the Open Science Framework repository: https://osf.io/xm697/?view_only=ef227728f7a8449f84fe83be1b0477bc.

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