



# Comprehensive and multifaceted perspectives on sustainability, urban studies, and entrepreneurship

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**Abstract** While practitioners discuss the phenomena of sustainability, cities, and entrepreneurship, such as living labs and smart cities, alongside sustainable entrepreneurial ecosystems at length, researchers tend to reduce the complexity by considering these phenomena from the perspective of one discipline or by merging two research disciplines at best. This study intends to provide guidance on what is required for the emergence of a transdisciplinary research stream of sustainability, urban studies, and entrepreneurship. By applying design science involving practitioners and scientific experts, we designed a relevant and rigorous future research agenda that considered phenomena, research design, and theoretical foundations. Starting from the basis that sustainable entrepreneurial ecosystems are promising, the agenda integrates the knowledge base and establishes a multifaceted and comprehensive perspective on sustainable entrepreneurship in cities. Furthermore, implementing the research agenda has strong practical implications for realizing the common vision of a transition that ensures the quality of life on Earth.

**Plain English Summary** While practitioners discuss challenges in cities that sustainable entrepreneurship

could address, researchers tend to look at these questions based on their expertise in entrepreneurship, sustainability, or urban studies or, at best, merging two disciplines. Nevertheless, phenomena at the intersection of sustainability, cities, and entrepreneurship are highly complex and call all disciplines involved to devise solutions for current challenges. We provide an overview of the current achievements of research on sustainable entrepreneurship in cities and explain how research should be conducted to ensure transdisciplinary research that offers valuable implications for policymakers. Involving ecosystem actors in understanding challenges and designing solutions that contribute to creating value for the sustainability transition is then key to achieving the common objective of making life in cities and on the one planet we have worth living.

**Keywords** Design science · Entrepreneurial ecosystem · Sustainability · Transition · Urban development

**JEL classification** L26 · M13 · O31 · O32 · O35 · Q01 · Q55 · Q56 · R11

## 1 Introduction

Research can provide profound solutions to grand challenges through collaborative efforts from diverse disciplines. Urgent problems and solutions requiring transdisciplinary research arise at the intersection of

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sustainability, entrepreneurship, and urban studies (Volkman et al., 2021). Sustainability and entrepreneurship have long overcome potential incompatibility issues. The situation has led to sustainable entrepreneurship and its contextualization attracting scholarly and practical attention, justified by its potential to contribute to the transition toward a sustainable economy and to reaching sustainable development goals (O’Shea et al., 2021). Hence, researchers are increasingly studying the drivers of sustainable entrepreneurial activity. Entrepreneurial ecosystems can help explain the support activities of interconnected actors that foster entrepreneurial activity in a region (Kuckertz et al., 2020; Wurth et al., 2022). Answering the call by Cohen and Muñoz (2015) to incorporate place has made sustainable entrepreneurial ecosystems a promising research field (Volkman et al., 2021). Despite that focus on place (Bischoff & Volkman, 2018; Cohen, 2006) and the awareness that most (sustainable) entrepreneurial ecosystems are located in metropolitan areas (Florida et al., 2020), which leads to “the most common unit of analysis for an EE (entrepreneurial ecosystem) [being] a city” (Tiba et al., 2021, p. 3), sustainable entrepreneurship research has largely neglected urban studies when seeking to understand the context of sustainable entrepreneurship. Similarly, urban studies have partially disregarded entrepreneurial actors. Hence, in current intersectional research on sustainability, cities, and entrepreneurship, phenomena linking the two disciplines are well established but largely neglect the third discipline.

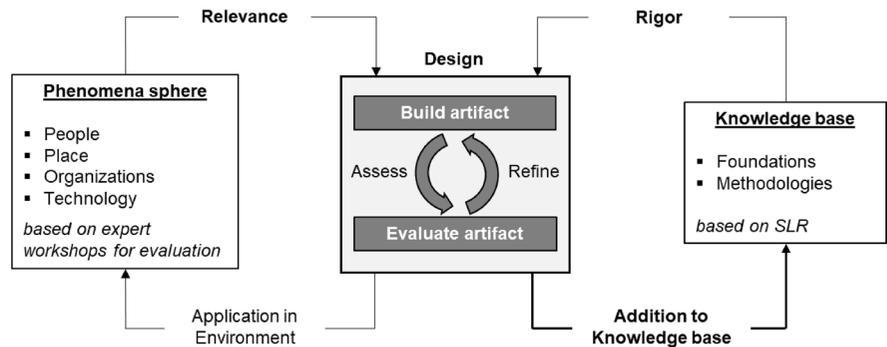
That silo thinking is problematic for two main reasons. First, research overlooking the achievements of other disciplines does not deliver its full potential, leading to reinvention and incompatibility among disciplines. For instance, urban studies with a focus on people or citizen engagement have a long tradition (Bowen et al., 2010). In contrast, the stakeholder participation perspective in entrepreneurial ecosystems is only emerging (Bischoff & Volkman, 2018). Similarly, urban researchers define “urban systems of innovation and entrepreneurship” (Qian, 2017, p. 1655) as a concept very closely resembling entrepreneurial ecosystems; however, they tend not to incorporate the rich insights from that literature stream. Second, segregation based on discipline produces insufficient practical implications to spur a transition toward sustainability. Such silo research fails to

embrace the achievements of diverse disciplines and therefore reveals a relevant research gap. A comprehensive perspective could, in contrast, enable the formation of a new transdisciplinary theory and provide new solutions to help practitioners overcome natural congestion constraints and also offer blueprints for tackling grand (sustainability) challenges throughout countries.

Complex real-world issues require a “shift from mono-disciplinary to interdisciplinary and transdisciplinary concepts and methods” (Lawrence, 2010, p. 112). For instance, looking at green entrepreneurship in cities (merging sustainability and entrepreneurship but reducing urban studies to only providing the context) oversimplifies the phenomenon, as it assumes that urban dimensions are static when cities are dynamic systems. Urban (strategic) planning affects infrastructure, traffic, resource flows, and people, among other things, and can create entrepreneurial opportunities (e.g., Doan, 1998; Franco & Rodrigues, 2020; Yu & Gibbs, 2020). For instance, scrutiny of sustainable entrepreneurship in Dubai over the last 10 years would necessitate considering major urban strategies, such as hosting the World Expo in 2021–2022, and city-level political instruments, such as the *Green Economy* initiative, which fostered sustainable venture activity. Consequently, we accept the call of O’Shea et al. (2021) to better integrate disciplines by transcending discipline boundaries and establishing a transdisciplinary sustainability, urban studies, and entrepreneurship (SUE) research stream. Accordingly, we aim to answer these questions: *What is the state of sustainable urban studies and entrepreneurship research, and what does it take for a transdisciplinary research stream to emerge?*

Aiming to spur transdisciplinary SUE, we applied design science research to combine scientific rigor (using the existing body of knowledge) and practical relevance (applying a real-world lens). To better understand the existing knowledge base, we first analyzed the state of SUE research by conducting a systematic literature review (SLR). Next, we analyzed 60 articles to identify concepts at the core of SUE and to develop a future research agenda for SUE. The findings show that sustainable entrepreneurial ecosystem research serves as the first step toward a transdisciplinary research stream. Based on iterations and the

**Fig. 1** Design science research process based on Hevner et al. (2004) and Romme and Dimov (2021)



involvement of practitioners and scientific experts in the design process, we identified what it takes to develop a transdisciplinary research stream around SUE.

Our findings provide three contributions to theory and practice. First, we analyzed the existing research on SUE by considering all three underlying disciplines. In conducting an SLR, we contribute to the common understanding of SUE as a research stream and provide an overview of the main themes of SUE research. Second, we present an artifact that facilitates a comprehensive and multifaceted understanding of SUE. This perspective contributes to expanding the knowledge base upon which researchers can build. That perspective emphasizes the relevance of collaboration among all stakeholders to drive the transition toward sustainability. Finally, in setting an agenda for research topics and calling for advancements in research design and theory development to arrive at a transdisciplinary research stream, agenda development could serve as a blueprint for other fields in social science; particularly those researchers tend to explore from starting points in different disciplines.

## 2 Methodology

### 2.1 Research design

This study follows a constructive approach to developing a research agenda that enables and fosters SUE integration as a research stream with highly relevant implications for practice. We applied the design science research (DSR) method because it can unite the existing body of knowledge, such as theories

and methodologies, and the practical perspective on a phenomenon. Originating in information systems research and based on the work of Hevner et al. (2004), a central aspect of DSR is the design of artifacts that combine theory and practice. We aimed to design a future research agenda for SUE as an artifact based on the principles of DSR. Considering the existing knowledge base and possible applications relies on three different cycles in the design process: rigor, relevance, and design. The rigor cycle requires consideration of the existing knowledge base in SUE research, including its foundations and methodology. The relevance cycle required us to engage diverse experts in the phenomenon to validate our designed artifact. The phenomenon sphere covers the dimensions of people, organizations, and technology, and we added *place* to incorporate the embeddedness and environment of SUE. The incorporation of the design and evaluation stages throughout the design process (Peffer et al., 2007; Vom Brocke et al., 2020) meant that the research design followed the design cycle, and also the rigor and relevance cycles. The result is an artifact that maximizes its utility (Hevner et al., 2004; Vom Brocke et al., 2020) by integrating the existing knowledge base and needs derived from the phenomenon sphere. As this approach facilitates practice-relevant contributions from the research (Van Aken & Romme, 2012), DSR has become a scientific method (Cash, 2018) beyond the information system field, emerging in many disciplines, including management research (Berglund et al., 2020).

Starting the design process (Fig. 1), we analyzed existing research at the intersection of the disciplines of SUE by conducting an SLR (Tranfield et al., 2003). We mapped the knowledge base of SUE and designed an initial version of a future research agenda

(research agenda 1.0) derived from the findings of the SLR. Following the idea of DSR, we next assessed the initial artifact in the phenomenon sphere with practitioners and scientific experts in two interactive workshops, initiating two iterations of the design cycle (Hevner et al., 2004; Peffers et al., 2007; Vom Brocke et al., 2020).

In our study, the relevance sphere is represented by those who design SUE research, which is the practice of sustainable entrepreneurship in cities being discussed, enacted, and planned along with the researchers involved. The involvement of practitioners and scientific experts from the phenomenon sphere enabled us to integrate perspectives from diverse disciplines and fields (Romme & Dimov, 2021). Researchers working on SUE are expected to be literate in research theory and methods. Thus, they contribute strongly to developing the artifact to set a future agenda of theoretical and methodological work required to foster an emerging integrated SUE research stream. Both types of experts contributed to the design and relevance cycles. The interactive expert workshops provided the basis for the design of research agenda 2.0 and the final artifact (research agenda 3.0), which rests upon the initial knowledge base of the literature (SLR) and the findings from both iterations of the expert evaluations.

The primary objective is the design of the research agenda for SUE, hence adding to the knowledge base. Our research design enables the emergence of a SUE research agenda that combines theory and practice based on this approach. Hence, we followed the general idea of DSR (Hevner, 2007; Peffers et al., 2007; Romme & Dimov, 2021) to link the existing knowledge base (scientific rigor) and phenomenon sphere (practical relevance), thereby expanding the conventional contribution of an SLR.

## 2.2 Rigor cycle: SLR and citation analysis

We conducted an SLR to investigate the current state of research on SUE (Tranfield et al., 2003). The SLR findings provide the knowledge base for the further research process and for the design of the future research agenda in particular. First, the research field was accessed by reviewing the relevant concepts in the three disciplines. The relevant terms were operationalized before the actual SLR to obtain a comprehensive understanding of SUE. Based on

scoping research, we operationalized the possible search terms based on the use of terms in the three disciplines from recent literature reviews (Cao & Shi, 2021; Pedroso et al., 2021; Wimbadi et al., 2021). To identify the SUE literature, we searched for AND-conjunctions of all three disciplines (search strings in brackets): sustainability (sustainab\* OR “triple bottom line”), urban studies (urban\* OR ecosystem\* OR city OR cities), and entrepreneurship (entrepr\* OR start-up\* OR startup\*) in the title or abstract in peer-reviewed journal articles in English using the database *Scopus*, as this bibliographic database is most appropriate for multidisciplinary research (Gusenbauer & Haddaway, 2020). To ensure that all three disciplines of SUE were considered in the sample, we included journal articles in the research areas of social sciences, business, management, accounting, and environmental studies (based on the journal’s scope). The search conducted on June 24, 2021, yielded 599 articles.

We then engaged in screening the abstracts. Two authors independently read a subsample of articles to inductively define further inclusion and exclusion criteria, as detailed in Table 1 of the Appendix. Three selection rounds based on the derived inclusion and exclusion criteria established a substantial interrater reliability of 0.85 using Cohen’s kappa (Landis & Koch, 1977). That reliability rate provided the confidence to separate the remaining sample between the two authors for further analysis (Colquitt & Zapata-Phelan, 2007). As part of the quality assessment, we paid particular attention to potentially predatory journals (Oviedo-García, 2021). We introduced another threshold for papers in those journals based on publication time from the first submission to acceptance of at least 56 days, which we challenged with three senior researchers from the three disciplines. All steps leading to a final sample of 60 articles, visualized using the PRISMA flow diagram (Page et al., 2021), are shown in Fig. 9 in the Appendix.

To understand the knowledge base of the identified articles (and to identify future trends affecting the research front), we undertook citation analysis. Specifically, we undertook co-citation analysis, defined as “the frequency with which two documents are cited together” (Small, 1973, p. 28), a process that reveals how the past literature on a specific topic is structured. In contrast, bibliographic

**Fig. 2** Research steps for designing and evaluating a research agenda for SUE

coupling shows “what researchers are currently working on” (Klavans & Boyack, 2017, p. 2) by linking two articles if they cite the same reference. Therefore, the bibliographic coupling can shed light on the research front and might allow us to speculate about trends and where the research stream is heading. We used VosViewer to perform citation analysis and visualize the results (Van Eck & Waltman, 2017).

### 2.3 Design and relevance cycles

The distinct difference between design science and traditional qualitative research is the link between rigor and relevance (Iivari, 2015). To design the research agenda for SUE, we built on the findings from the SLR and citation analysis and integrated the perspectives of experts as part of the design process. The approach might be understood as a mixed-methods approach, as it integrates SLR and citation analysis with expert workshops for evaluation and extensions in the design process. The various research steps resulted in iterations based on the phases of designing and evaluating the research agenda. Fig. 2 shows the artifact development.

#### ***Step 1: initial research agenda 1.0***

The objective of the first design cycle was to design a research agenda based on the analyzed SUE literature. Plotting the SUE phenomena revealed a pattern concerning the frequent differentiation between causes or drivers and the effects or outcomes of SUE. Based on the identified

commonalities and differences among SUE publications, we identified the need to challenge shared assumptions and bridge the different perspectives of the disciplines (Überbacher, 2014). Hence, we designed the initial research agenda that integrated what it takes to realize a transdisciplinary SUE research stream, including phenomena alongside methodological and theoretical issues.

#### ***Step 2: evaluation of practitioners***

The aim was to incorporate practitioner insights into the relevant phenomena (Straub & Ang, 2011; Van Aken & Romme, 2012) in the SUE area and discuss the potential merits of an integrated SUE perspective. The seven participants selected based on purposeful sampling all worked at the core of SUE but represented different perspectives in the local entrepreneurial ecosystem: entrepreneur, corporate, cluster organization, university, financial capital provider, politician (member of state parliament), and media.

During an interactive online workshop, we presented the status of the research agenda and asked the practitioners to add what was missing from what they observed in their daily work and what they might envision in the near future. Hence, they contributed to the utility of the designed research agenda in practice. After discussing newly emerged topics or phenomena, we asked the practitioners to rate those topics in terms of relevance to their work. In the second part, we asked the participants about the potential of SUE and discussed what each participant could gain and what strategy would facilitate a comprehensive and multifaceted SUE perspective.

### ***Step 3: refined research agenda 2.0***

Using the practitioners' evaluation and the SLR findings as input, we refined the research agenda and designed artifact 2.0. Based on the workshop insights, we recognized that different directions of effects and logics are possible; thus, the driver–outcome logic was not suitable for capturing the complexity of the SUE phenomenon. Instead, we addressed the question of what SUE means when considered holistically. Therefore, we discarded the driver–outcome logic and characterized a comprehensive and multifaceted SUE perspective.

### ***Step 4: the scientific experts' perspectives***

The aim was to integrate both practitioners and scientific experts into the design process (Holmström et al., 2009). Therefore, the refined research agenda was exposed to scientific experts aiming for further refinement and artifact evaluation from a scientific perspective. We used purposeful sampling to recruit four scientific experts well known at the interfaces between two of the disciplines and one with extensive experience with SUE (Romme & Dimov, 2021). We first questioned the experts on the relevance of researching SUE before asking them to evaluate the designed artifact and add new challenging assumptions or bridges necessary to establish SUE as a research stream. After discussing the newly emerged assumptions or bridges, we asked the scientific experts to prioritize them.

### ***Step 5: integrating research and experts' perspectives to arrive at research agenda 3.0***

After the second workshop, we redesigned the artifact and arrived at the final research agenda for SUE (artifact 3.0), which integrates the SLR findings and the perspectives of the practitioners and scientific experts (Straub & Ang, 2011; Van Aken, 2004). In this step, we discarded the challenging assumptions and building bridges approach. Instead, we focused on the embeddedness of SUE and, in particular, on what would be required to enhance SUE as a transdisciplinary research stream. The designed research agenda 3.0 is the main contribution of our research and is presented in Section 4.

## **3 Findings from the SUE literature and citation analysis**

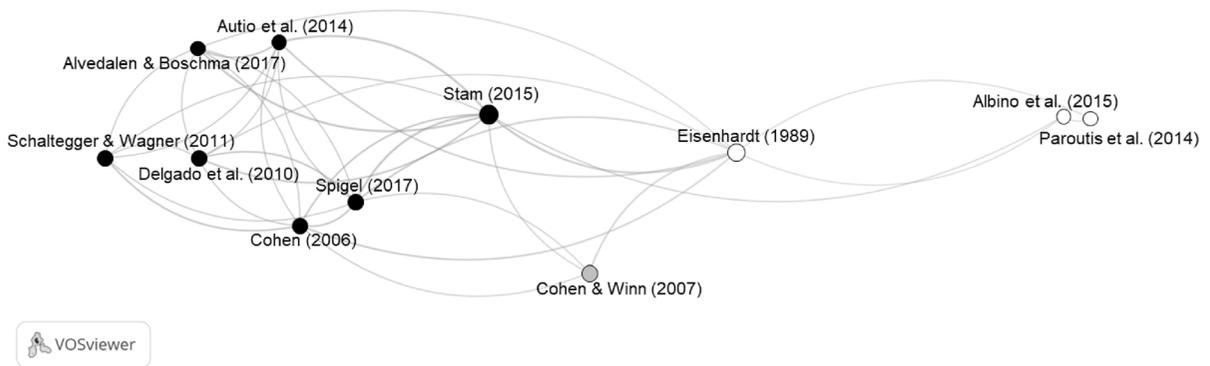
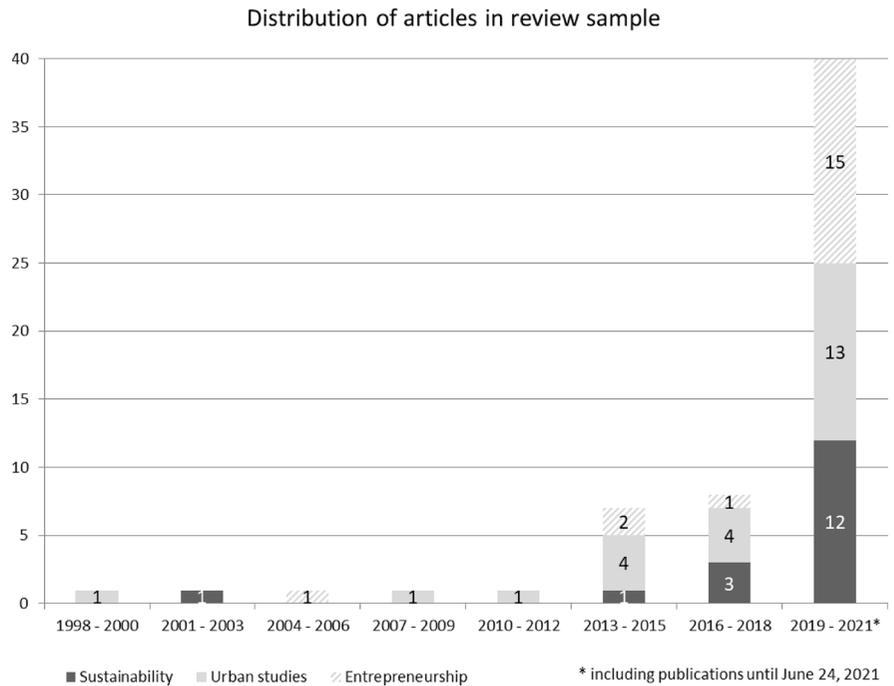
### **3.1 Descriptive analysis**

Sixty articles represented the current research knowledge base at the SUE interface. Most of these were published in the subject area of urban studies ( $n = 24$ ), followed by entrepreneurship ( $n = 19$ ) and sustainability ( $n = 17$ ). The articles were published between 1998 and June 2021. The publications prior to 2012 might be considered outliers, and SUE research gained momentum from 2017 onwards (with 47 of the 60 articles published since that date), as evident from Fig. 3. The *Journal of Cleaner Production* and *Small Business Economics* have published the most SUE papers (see Table 2 in the Appendix).

In total, 156 authors were involved in publishing 60 papers in the sample; see Table 3 in the Appendix for an overview of all articles in the sample. The most cited articles were those of Cohen (2006) and Datta (2015), with 259 and 233 citations, respectively, recorded in *Scopus* by June 2021. Surprisingly, research on SUE lacks distinct hero researchers in terms of article quantity. The papers in the sample were evenly distributed among the various authors. While only six authors had published two papers, one author had published three papers on SUE (either as first author or coauthor). An analysis of the authors' affiliations by region showed that most were affiliated with universities in Europe ( $n = 98$ ), Asia ( $n = 26$ ), and North America ( $n = 22$ ). Studying the institute and department affiliations of coauthor teams revealed that only six articles had interdisciplinary coauthor teams.

Fig. 4 presents the results of the co-citation analysis as a network in which articles are linked if they are cited together by the SUE literature. There were 11 articles in three clusters in total, with 35 links. The black cluster is the biggest and can be assigned to entrepreneurial ecosystems and sustainable entrepreneurship, which are very well connected in general. The white cluster links urban study publications and the case study methodology. The third gray cluster incorporates only one article dealing with market imperfections and sustainable entrepreneurship (Cohen, 2006). Within the network, the case study methodology article (Eisenhardt, 1989) is a crucial link between the three clusters.

**Fig. 3** Trend of publications on SUE divided by discipline



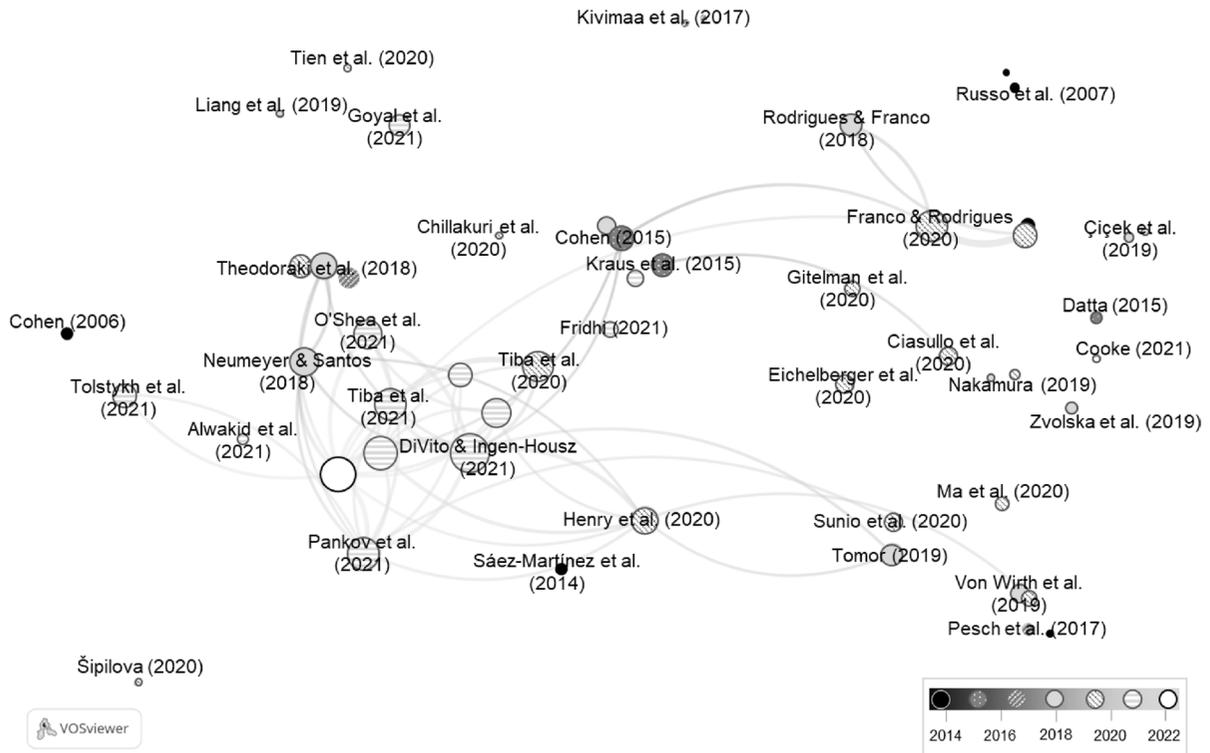
**Fig. 4** Co-citation analysis of SUE, min. 3 citations

The network in Fig. 5 visualizes a network where articles are linked if they cite the same references, which means stronger links indicate that the articles rely on similar literature to develop their arguments. Of the 60 SUE articles, 53 are bibliometrically coupled and can be assigned to seven clusters. The network shows only those links created if two articles have at least five references in common. Additionally, a greyscale was used to visualize the publication dates. The analysis revealed that the SUE research front displayed a clearer structure—in terms of building on the same literature—between 2018 and 2021.

For instance, the cluster around sustainable entrepreneurial ecosystems (e.g., Bischoff, 2021; Cohen, 2006; Neumeyer & Santos, 2018; Theodoraki et al., 2018; Tolstykh et al., 2021) can be easily identified as they build upon the same literature, which indicates a solid base for research grounding and theory development.

### 3.2 Thematic analysis

Using information extracted from the SLR, we clustered the literature to highlight the thematic patterns



**Fig. 5** Bibliometric coupling for articles with at least five links

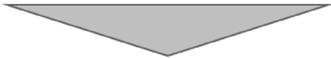
of SUE research. Fig. 6 provides an overview of the clusters and related researched phenomena. Although the publications are identified at the point where the three SUE disciplines overlap, the researched phenomena primarily link two disciplines (in terms of theoretical foundations).

The concepts of the cluster *smart and sharing* unite perspectives from urban studies and sustainability. As smart cities (e.g., Ciasullo et al., 2020; Gitelman et al., 2020) “represent shifting assumptions about the relationship between urban environments and technology” (Baykurt & Raetzsch, 2020, p. 777), research on this concept examines the linkages between smart cities and entrepreneurial opportunities (Kraus et al., 2015), tourism development (Eichelberger et al., 2020), or energy challenges (Gitelman et al., 2020). The studies in this cluster provide insights into the development of smart cities. Ciasullo et al. (2020), for instance, conducted a case study on a smart city and proposed a framework for multi-level governance. The study considers the micro-, macro-, and meso-levels and presents co-innovation strategies. It points to the need for meta-level governance to harmonize

stakeholders’ conflicting interests and orchestrate sustainable growth. This governance model enables a shift from smart cities to smart communities, which go beyond using technology but promote socioeconomic growth based on the collaborative efforts of stakeholders. The work of Baykurt and Raetzsch (2020) provides a meta-view of the smartness of cities and displays how initiatives have developed from tackling issues of climate change to co-creation approaches, such as platforms and living labs. Relating to the idea of smart communities, research focusing on the sharing economy examines how cities can govern urban sharing concepts (Zvolška et al., 2019).

Similarly, articles within the *urban development* cluster study the intersection of urban studies and sustainability and thus focus on ways to overcome urbanization challenges by fostering solutions to sustainable urban development. Research in this cluster examines phenomena such as urban gardening and urban farms and their influence on urban development (e.g., Howard Schutzbank & Riseman, 2013; Ranasinghe, 2003). Yu and Gibbs (2020), for instance, examined the urban sustainability transition

Clusters	Phenomena/Concepts	Exemplary references
<b>Smart and sharing</b>	Smart city, sharing economy	Ciasullo et al., 2020; Eichelberger et al., 2020; Gitelman et al., 2020
<b>Urban development</b>	Urban agriculture, urban communities, urban sustainability	Ranasinghe, 2003; Yu & Gibbs, 2020
<b>Sustainability labs</b>	Urban living labs, place-based enterprises	Gascó, 2017; Greer et al., 2020; Rodrigues & Franco, 2018; von Wirth et al., 2019
<b>Conceptualization of sustainable entrepreneurship</b>	Green entrepreneurship, social entrepreneurship, sustainable entrepreneurship, purpose-driven entrepreneurship	Alwakid et al., 2021; Fridhi, 2021; Tiba et al., 2021
<b>Business model transformation</b>	Sustainable business model, circular business model, circular economy, transformation through green entrepreneurship	Greer et al., 2020; Henry et al., 2020; Neumeier & Santos, 2018
<b>Ecosystem perspective</b>	Entrepreneurial ecosystems, sustainable urban entrepreneurship, sustainable incubators; role of universities, spillover effects; private-public relationships, co-creation and collaboration	Bischoff, 2021; B. Cohen, 2006; O'Shea et al., 2021
<b>Contextual factors</b>	Embeddedness, regulations, policy, dynamics	Tiba et al., 2021; Tolstykh et al., 2021; Tomor, 2019)



**Commonalities:**

- Purpose: Making a better place
- Predominant end—means logic
- Methods: Case studies as the preferred methodological approach
- Practical implications: Addressing policymakers

**Divergent perspectives:**

- Scope of SUE: Defining SUE, inconsistent use of terms, imbalanced phenomena
- Theoretical foundation: little or no theory
- Theoretical contribution: no or unspecified/ unbalanced contribution

**Fig. 6** Researched phenomena, commonalities, and divergent perspectives in SUE

and addressed how green entrepreneurs can function as key creators of sustainable urban development.

The *sustainability labs* cluster explores the idea that experimentation and the creation of new ideas are crucial to fostering SUE. Therefore, research concentrates on the concept of urban living labs and defines them as spaces for public open innovation initiatives (Baykurt & Raetzsch, 2020; Gascó, 2017): “physical regions, virtual realities or spaces of interaction, where all stakeholders join together to create, develop, test and implement new products and services in a real life context” (Rodrigues & Franco, 2018, p. 780). Tackling grand challenges, living labs offer a setting in which diverse stakeholders engage in experimenting with and co-creating sustainable solutions (Gascó, 2017). Research in this cluster primarily conducts case studies to illustrate how living labs

contribute to urban entrepreneurship in cities. That contribution is based on an open network, fostering entrepreneurship, and creating value (Rodrigues & Franco, 2018) and showcases strategies for urban living labs to contribute to the urban sustainability transition (Greer et al., 2020; von Wirth et al., 2019). Furthermore, a major feature of living labs is linking private–public relationships that put the engagement of citizens at the core of social innovation initiatives (Gascó, 2017).

Different *conceptualizations of sustainable entrepreneurship* consider the intersection of entrepreneurship and sustainability research. Green entrepreneurs are identified based on their “initiatives focused on solving environmental problems while following rules and regulations” (Alwakid et al., 2021, p. 4) to handle environmental challenges, such as climate change,

clean energy, and planet overexploitation (Tien et al., 2020). Research on green entrepreneurship examines, for instance, the conditions under which green businesses can transform urban development to foster sustainability. Whereas Alwakid et al. (2021) investigate the role of formal institutions in this context, Ma et al. (2020) provide a model reflecting mechanisms of co-creation, co-evolution, and co-governance that influence the sustainability transformation through green business. Social entrepreneurs direct all their activities toward profit and social objectives (Mehta et al., 2016; Sunio et al., 2020) and create purpose-driven value for society (Vasconcellos et al., 2021). Therefore, they “are change-makers and significant means through which labour market integration, social inclusion, economic development, and environment security together can be achieved” (Tien et al., 2020, p. 2). Like green enterprises, social enterprises foster sustainability transitions, for instance by addressing mobility issues via bike-sharing concepts (Sunio et al., 2020). Furthermore, research on social entrepreneurship investigates the role of social enterprises and how they contribute via collaborative efforts to social innovations (Fridhi, 2021) and entrepreneurial opportunities based on institutional voids (Goyal et al., 2020). The work of Vasconcellos et al. (2021) provides a comprehensive overview of the challenges and opportunities around social enterprises by considering the factors of sustainability, housing, transportation, and sanitation. Sustainable enterprises are often defined as a meta-category of enterprises focusing on either social or ecological issues (Tiba et al., 2021) according to the UN’s sustainable development goals. Research provides insights into the practices of sustainable enterprises (Pankov et al., 2021) and investigates entrepreneurs’ sustainability orientation in fostering sustainable innovations (DiVito & Ingen-Housz, 2021).

With regard to sustainable entrepreneurship, the cluster *business model transformation* focuses on various concepts of how traditional business models can be directed to advance sustainability. Research on sustainable business models (e.g., Neumeyer & Santos, 2018; Raposo et al., 2021) underlines the relevance of co-creation and network density in transforming business models. The circular economy—the concept of extending product lifecycles by reusing, reducing, and recycling (Franco & Rodrigues, 2020; Henry et al., 2020)—offers insights into circular business models. Research provides a typology of different circular

start-ups (Henry et al., 2020) and showcases how circular enterprises connect to transform an industry sector (Greer et al., 2020). Researchers have thus thematized transformation through green entrepreneurship (Alwakid et al., 2021).

Considering the concepts researched over time reveals that all three disciplines started by using different phenomena (e.g., waste management in sustainability, city development in urban studies, entrepreneurs, and innovation in entrepreneurship), but recently, the *ecosystem perspective* cluster has emerged. Rooted in the metaphor of ecological ecosystems, entrepreneurial ecosystems integrate various actors, such as universities and incubators, and consider their interactions to create entrepreneurial services (Bank et al., 2017; Bischoff, 2021; Cohen, 2006; Russo et al., 2007; Špilova, 2020; Theodoraki et al., 2018). In particular, the concept of sustainable entrepreneurial ecosystems (Tolstykh et al., 2021) forms the core of SUE by embracing all three disciplines (Cohen, 2006; O’Shea et al., 2021). The integration of diverse ecosystem actors, emphasizing co-creation and collaboration (e.g., Foley & Wiek, 2014; Gascó, 2017; Kivimaa et al., 2017), enables knowledge flows and spillover effects (Wagner et al., 2021; Yu & Gibbs, 2020). Several articles underline the need to integrate citizens and engage them in the process. As part of the solution, citizens contribute their ideas, such as addressing urbanization challenges through innovative ideas or fostering sustainable development through creativity (e.g., Liang et al., 2019; Mayer & Knox, 2010; Rodrigues & Franco, 2020). Furthermore, private–public relationships (e.g., Doan, 1998) are frequently presented as a useful means to overcome the limitations of public sector solutions. Linkages between the public and private sectors ensure the long-term effects of sustainable urban entrepreneurship and thus rationalize the role of policy for SUE.

The literature largely follows the logic that sustainability is the ultimate goal, whereas urban issues, such as urbanization, are challenges, and entrepreneurship functions predominantly as an enabler to achieve this transformative change. This driver–outcome logic in SUE is embedded in *contextual factors* (e.g., Cohen & Muñoz, 2015). Tolstykh et al. (2021), for instance, underlined the importance of ecosystem embeddedness as actors co-create sustainable solutions. The socioeconomic and social embeddedness of entrepreneurs also builds a framing condition for SUE (Tomor, 2019). Furthermore, social and territorial regulations,

such as the UN's sustainable development goals, are important contextual factors that influence the development of SUE (Tiba et al., 2021). Based on the influence of regulations and governance issues, the policy perspective is a contextual factor fostering or hindering the emergence of sustainable urban entrepreneurship (e.g., Chillakuri et al., 2020; Gifford et al., 2021). Overall, dynamics such as timing and temporality manifest in challenges such as global warming, poverty, and energy crises (e.g., Che, 2021; Gitelman et al., 2020; Pearl-Martinez, 2020), underlining the urgency of delivering sustainable entrepreneurship in cities.

We analyzed commonalities and shared assumptions alongside the identified divergent perspectives evident in extant SUE research (Fig. 6). The starting point for that analysis was the phenomena researched and *how* they were researched in terms of theoretical foundations and the methodology applied.

### 3.2.1 Commonalities

**Purpose** There is consensus that SUE has a future orientation, more specifically, the common vision of making a better place (e.g., Fridhi, 2021; Mayer & Knox, 2010; Pesch et al., 2017). This shared objective is achieved by research enhancing the understanding of SUE and its potential to tackle grand challenges in practice (e.g., Goyal et al., 2020; Pankov et al., 2021; Rodrigues & Franco, 2018).

**Predominant end-means logic** Researchers have repeatedly used the same argument. Both an analysis of the articles by discipline and over time underlined that finding and showed the manifest roles: The overall objective of achieving sustainability justifies the need for action (e.g., Alwakid et al., 2021; Ciasullo et al., 2020; Gitelman et al., 2020; Wagner et al., 2021). Urban agglomeration or the urbanization megatrend is challenging (e.g., Agbaeze et al., 2021; Tien et al., 2020; Zvolska et al., 2019) and unavoidable, and it intensifies the urgency of achieving sustainability. Following this logic, recognizing and realizing entrepreneurial opportunities by individuals, organizations, or other entities enable the actualization of the common vision of a sustainable future in an increasingly urbanized area (e.g., Tomor, 2019).

**Case study as the preferred methodological approach** Most articles applied qualitative methods, particularly case studies, to illuminate the intersection of SUEs. The popularity of the case study method, which is also emphasized by co-citation analysis, emphasizes its appropriateness in capturing the complexity of SUE phenomena. The following units were analyzed as cases: cities (Ciasullo et al., 2020; Datta, 2015; Foley & Wiek, 2014; Russo et al., 2007; Zvolska et al., 2019), ventures such as tech enterprises (Gitelman et al., 2020), green start-ups (Ma et al., 2020) or social enterprises (Ambati, 2019; Goyal et al., 2020), living labs (Gascó, 2017; Greer et al., 2020; Rodrigues & Franco, 2018), projects to develop sustainable solutions via innovation projects or gardening initiatives (DiVito & Ingen-Housz, 2021; Doan, 1998; O'Shea et al., 2021; Ranasinghe, 2003; Tomor, 2019), support programs like incubators or accelerators (Bank et al., 2017; Cohen, 2006; Theodoraki et al., 2018), and ecosystems (Mars, 2020; Tiba et al., 2020; Vasconcellos et al., 2021).

**Practical implications** Another consensus evident from research in SUE is the practical relevance stressed in the majority of articles. Most articles reviewed offered practical implications (49 out of 60), largely addressed to "policymakers" as the primary targets. The exceptions were a few publications addressing educators (DiVito & Ingen-Housz, 2021; Liang et al., 2019), managers (Doan, 1998; Raposo et al., 2021; Tomor, 2019), entrepreneurs (e.g., Mars, 2020; Pankov et al., 2021), academics (Schutzbank & Riseman, 2013; Mehta et al., 2016; Šipilova, 2020; Tolstykh et al., 2021), and papers that identified policymakers as one stakeholder group among others (e.g., Foley & Wiek, 2014; Kivimaa et al., 2017; Raposo et al., 2021; Sáez-Martínez et al., 2014; Tolstykh et al., 2021; Wagner et al., 2021). Vasconcellos et al. (2021), for instance, offered practical implications for the various actors constituting an ecosystem.

### 3.2.2 Divergent perspectives

**Scope of SUE** How the research interface of SUE is understood and studied differs substantially. First, the degree of defining the underlying concepts varies considerably, with most articles lacking definitions, either of one discipline or even of all three. Whereas most articles specify sustainability and entrepreneurship, the term *urban* is rarely defined.

Sustainability is mainly defined by reflection against three pillars: social, economic, and ecological sustainability. The absence of a definition of urban means that the concept of smart cities is that primarily used to address urban issues (e.g., Baykurt & Raetzsch, 2020; Cooke, 2021; Datta, 2015; Eichelberger et al., 2020). Entrepreneurship is defined by new venture creation and realizing opportunities, with different types of entrepreneurship (e.g., social and green entrepreneurship) offered as specifications (e.g., Alwakid et al., 2021; Ranasinghe, 2003; Tien et al., 2020). Where there is a definition of *urban* spaces, it usually specifies the context of a city, and only a few authors address proximity (Schutzbank & Riseman, 2013; Schroeder et al., 2013; Zvolska et al., 2019). Second, the strikingly inconsistent use of terms among the studies is linked to missing or vague definitions. We excluded, for instance, articles that use *sustainable* to express a long-term orientation, without referencing the economy, environment, or society; *entrepreneurship* as a synonym for general business activity; an ecological, not metaphorical, use of *ecosystem* or *urban* only in opposition to rural. Third, an analysis of the researched SUE phenomena showed great diversity. All publications consider phenomena at the core of SUE, but regarding theoretical foundations and contributions, most publications are grounded in or contribute to one or two disciplines at best. A chronological view of the researched phenomena shows that recently sustainable entrepreneurial ecosystems (e.g., Bischoff, 2021; Theodoraki et al., 2018) have become imperative, providing a way to consider the phenomena at the SUE core (Cohen, 2006; Cohen & Muñoz, 2015; O'Shea et al., 2021; Tolstykh et al., 2021).

**Theoretical foundation: little or no (shared) theory** Although the articles in the sample referred to the SUE disciplines, most lacked theoretical foundations. Only 25 of the 60 publications referred to specific theories. Innovation theory ( $n = 3$ ), institutional theory ( $n = 3$ ), and transition theory ( $n = 3$ ) are those most often mentioned. Ten articles claimed to apply the entrepreneurial ecosystem theory. Most papers disregarding theoretical grounding rely on the theoretical principles of entrepreneurial ecosystems (e.g., Bank et al., 2017; Ciasullo et al., 2020). The situation reflects the ongoing debate about whether there is yet such a thing as (entrepreneurial) ecosystem theory

(Scaringella & Radziwon, 2018). Twenty articles positioned entrepreneurial ecosystems at the core of the study, 10 mentioned them, and at least 13 implicitly referred to entrepreneurial ecosystems in their research.

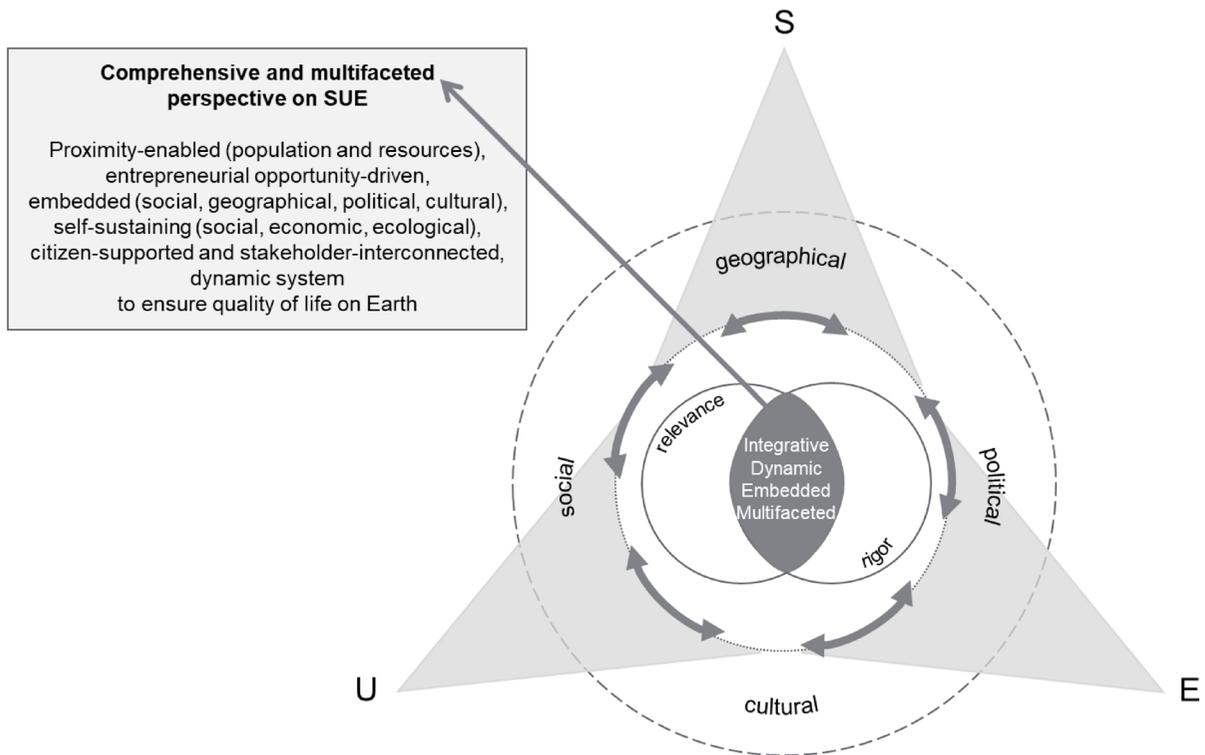
**Theoretical contribution** The theoretical contribution of the SUE literature varies greatly. Twenty-two papers offer no theoretical contributions at all, and the remaining publications mainly contribute to the entrepreneurship and management literature. Cohen and Muñoz (2015) are a notable exception, as they endeavored to build a theory relevant to sustainability, entrepreneurship, and potentially urban studies. Only five papers made specific theoretical contributions to the discipline of sustainability (e.g., Alwakid et al., 2021; Çiçek et al., 2019; DiVito & Ingen-Housz, 2021). Another five publications expressly claim to contribute to the discipline of urban studies and urban development (e.g., Pesch et al., 2017; Rodrigues & Franco, 2018; Tomor, 2019; Zvolska et al., 2019). One reason for the inability of studies to deliver theoretical contributions might be them being based on weak theoretical foundations.

#### 4 Artifact: a future research agenda for SUE

Applying a design science approach enabled us to design a future research agenda for SUE. We propose a comprehensive and multifaceted perspective on SUE that is characterized by the following:

*Proximity-enabled (population and resources), entrepreneurial opportunity-driven, embedded (social, geographical, political, cultural), self-sustaining (social, economic, ecological), citizen-supported and stakeholder-interconnected, dynamic system to ensure quality of life on Earth.*

Fig. 7 shows the proposed SUE artifact. The comprehensive and multifaceted perspective unites the defining attributes of sustainability (self-sustaining dimensions, quality of life), urban (proximity, embedded, citizenship, interconnected), and entrepreneurship studies (entrepreneurial opportunity, creating value). Therefore, SUE is defined as a dynamic system originating in three disciplines and evolving from an interdisciplinary (e.g., sustainable entrepreneurship as an intersectional research understanding) to a transdisciplinary understanding.



**Fig. 7** A comprehensive and multifaceted perspective on SUE

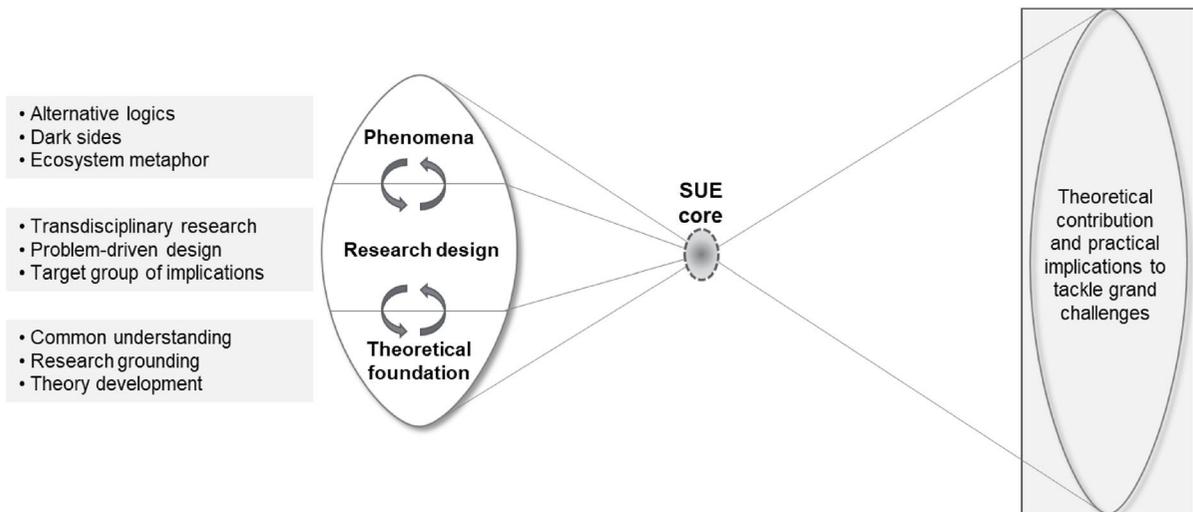
The transdisciplinary understanding of SUE is grounded in the three underlying disciplines, but rather than being additive, SUE transcends the boundaries of mono-disciplinary analyses. Integrating achievements from all three disciplines, SUE is a dynamic research stream influenced by timing, temporality, and the dynamic developments in the underlying disciplines. The research stream is embedded in social, geographical, political, and cultural contexts. Transdisciplinary SUE research integrates knowledge from diverse disciplines and the practice field, while at the same time, the back-flow of newly generated SUE knowledge into the originating disciplines is ensured.

Applying the DSR approach identified three major action fields aiding the development of the transdisciplinary SUE research stream: phenomena, research design, and theoretical foundation. These three fields are not mutually exclusive but reinforce each other. All iteratively foster research at the SUE core, which strengthens the research stream's development (see Fig. 8).

#### 4.1 The SUE core

Research that identifies the SUE core as the focal point will provide strong theoretical contributions and practical implications that tackle the grand challenges examined in research and overcome in practice. The SUE core brings the achievements of all underlying disciplines together and does not simply merge knowledge of the underlying research disciplines but incorporates their research grounding and design, and also relevant issues of SUE in practice.

To date, research has taken the first step toward fostering the emerging SUE core by focusing on sustainable entrepreneurial ecosystems. Considering all three disciplines, research reflects the co-creation of opportunities based on the shared sustainability intentions of all ecosystem actors (O'Shea et al., 2021). Cohen and Muñoz (2015) considered knowledge of entrepreneurship, business sustainability, and territorial development to reflect purpose-driven entrepreneurs and urban areas. The study investigated purpose-driven



**Fig. 8** A SUE research agenda—what it takes

urban entrepreneurship and estimated that urban entrepreneurs could offer entrepreneurial opportunities to link urban complexity (such as sustainable public transportation) with citizens' everyday challenges (such as commuting to work). Cohen (2006) applied entrepreneurial ecosystem research to the emergence of a sustainable community and explored how various elements (such as formal and informal networks and culture) influence the development of a sustainable entrepreneurial ecosystem. Research at the SUE core also provides detailed insights into sustainable entrepreneurial ecosystem evolution. Tolstikh et al. (2021) used a case study approach to present a framework to evaluate the maturity of sustainable entrepreneurial ecosystems. The research highlights how sustainable ecosystems contribute to the sustainable development of entire regions. The research conducted by O'Shea et al. (2021) offers interesting insights into how entrepreneurial opportunities develop in a sustainable entrepreneurial ecosystem. Based on the collaborative engagement of the ecosystem actors, opportunities develop through phases of co-creation and are based on a shared intention toward sustainability. Following this line of understanding, sustainable entrepreneurial ecosystems are artifacts shaped and designed by all ecosystem actors.

#### 4.2 Phenomena

Exploring *alternative means–end logics* in SUE might illuminate new paths and innovative solutions. Although much literature, especially in entrepreneurship journals, such as *Small Business Economics*, perceives sustainability as a goal, urbanization as a challenge, and entrepreneurship as a mechanism to reach the goal, this logic relies on underlying assumptions that might not always hold. For instance, entrepreneurship that produces new services and goods to drive the transition toward a sustainable city also requires infinite growth. Researchers, especially in sustainability and urban studies, have discussed degrowth or green growth as an alternative (Belmonte-Ureña et al., 2021). A question linked to challenging the means–end logic is whether we remain in search of a better future, or whether the transgression of some planetary boundaries detracts from the chance to pursue a better future and leaves researchers and practitioners alike reacting to events to safeguard the quality of life currently enjoyed.

Studying the *undesired outcomes of SUE* phenomena for tradeoffs, paradoxes, or rebound effects will help our understanding of what initiatives and projects are helpful in delivering quality of life. Again, a comprehensive perspective on SUE requires researchers to account for how individual behavior affects

demand–supply equilibrium and induces a rebound effect of measures, which—assessed in isolation—seemingly benefit the sustainability objectives in urban areas (Figge et al., 2014). Tradeoffs characterize sustainability and sustainable entrepreneurship research, especially when trying to achieve efficiency and sufficiency from environmental, social, and economic viewpoints (Bocken & Short, 2016; Kuckertz et al., 2019). Urban studies add a further area of tension when, for instance, the urban–rural link is understood as competitive or requires additional attention (Çiçek et al., 2019). Hence, future research could explore how SUE can facilitate knowledge spillover from urban to rural areas.

The *ecosystem metaphor* appears to be a very promising approach to addressing the complex nature of SUE. Integrating social aspects and shared values (from sustainability), the interaction of actors and spatial proximity (from urban studies), and opportunities and creativity (from entrepreneurship), entrepreneurial ecosystems are at the core of SUE (O’Shea et al., 2021). Relying on the ecosystem approach would enable future research to embrace the contextuality of SUE and explore under-researched perspectives, such as power relationships in ecosystems and stakeholder relationships, for instance, between regulators and companies. How entrepreneurial ecosystems in suburban areas use different governance mechanisms to develop is a relevant research subject in this context. Different levels of population density produce different sustainability challenges (Florida et al., 2017), meaning there may be differences in governance strategies in urban and suburban areas. Ecosystems also offer an appropriate lens for the small-city phenomenon relating to sustainability and entrepreneurship. Urban studies research has been considering small-city systems for quite some time (Çiçek et al., 2019; Mayer & Knox, 2010), whereas entrepreneurship researchers are only now starting to understand small-city entrepreneurial ecosystems (Spigel et al., 2020). This appears to be a promising phenomenon, and researchers could benefit from the rich knowledge base in urban studies.

#### 4.3 Research design

*Transdisciplinary research* designs are especially apt for studying SUE, as they can account for its complexity and a high degree of uncertainty (Peukert

& Vilsmaier, 2021). The goal of transdisciplinary research can be achieved by recruiting researchers from different disciplines or their interfaces, such as sustainable entrepreneurship, sustainable cities, and/or urban entrepreneurship, to integrate divergent theories and methods. As such, completed interdisciplinary SUE research would be a significant milestone on the path to transdisciplinarity. However, passing the boundaries of discipline research requires “a fusion of disciplinary and other kinds of knowledge” (Lawrence, 2010, p. 129). The fusion with other sources of knowledge creates a categorical imperative for involving different (practice-oriented) stakeholders to identify and answer the research questions. Future research should provide solutions to practice-relevant questions by deploying practice stakeholders as co-creators of answers from SUE research.

*Problem-driven research* designs support a comprehensive and multifaceted perspective on SUE. Integrating various stakeholders’ views and including their thoughts in the design of new knowledge and ensuring relevance in rigor-based research will contribute significantly to the practical implications produced. The DSR method can be particularly apt to undertake that endeavor. Based on identifying current SUE issues in practice, future research could provide answers to complex and urgent challenges, such as energy crises and related challenges, for various SUE stakeholders. However, the citizen science approach or other participatory formats, such as the community voice method applied in urban studies, can guarantee a focus on problems and citizen support for SUE measures (Cumming & Norwood, 2012).

*Defining the recipients of SUE research* will also strengthen SUE as a research stream, especially its relevance to practice. Researchers direct their practical recommendations mainly to an undefined group of “policymakers” (e.g., Bank et al., 2017; Eichelberger et al., 2020). While that group can be very broad and blurry, the narrow focus is insufficient to foster a transdisciplinary perspective, as additional target groups for implications must be identified and addressed. Participatory research impels researchers first to identify relevant stakeholders and then to understand practitioners’ viewpoints and the constraints they face. It will also facilitate the determination of how research results can be transferred to the practice sphere. Admittedly, an author writing for the academic

community might only be required to outline the broad potential implications for practice. Ensuring recommendations are relevant to specific stakeholders identified in problem-oriented research may thus require different outlets to elaborate on the findings. In this study, we prepared recipient-centric documentation for the workshop presentations, which resonated well with the participants.

#### 4.4 Theoretical foundation

Transdisciplinary research, including SUE research, requires a *common understanding* of definitions, language, shared terminology, and a common research agenda (Lawrence, 2010). With regard to SUE, the ecosystem literature exemplifies how the lack of definitions in accordance with different disciplines has hindered “the progress of the overall [ecosystem] literature” (Scaringella & Radziwon, 2018, p. 74). Therefore, a more participatory research approach, such as DSR, could nurture the establishment of SUE as a research stream. However, the objective of a common understanding certainly requires first debating underlying assumptions, such as the end or means logic, as mentioned previously.

Fully unfolding the potential of comprehensive and multifaceted SUE research also requires a profound *research grounding*, that is, an acknowledgment of the achievements of the original disciplines. Entrepreneurship research has successfully linked research insights from different disciplines, but an ability to feed back into those disciplines is also required. The process must also allow for “theory spillovers,” which could, for instance, be realized by involving researchers from different disciplines to ensure familiarity with the literature, which would also curtail flaws stemming from interdisciplinary misunderstandings.

Emphasizing *theory development* in the SUE research stream will facilitate theoretical contributions. Such contributions are necessary to enhance the relevance of the stream and develop the theoretical grounding relevant to SUE publications in highly ranked journals that speak to a broad audience. The need for theory building might be realized by integrating the existing theories and developing a new SUE theory. Boundary-spanning theories, such as transition theory (Greer et al., 2020) or institutional theory (Alwakid et al., 2021), could serve as a helpful starting point and should encourage researchers

to embrace the complexity of SUE. In addition, the ecosystem lens might reveal how the various analytical levels and flows in the SUE system are interconnected.

## 5 Discussion

Although the SUE literature considers the three disciplines of sustainability, urban studies, and entrepreneurship, we still identified silo thinking in the research stream. Consequently, we wanted to understand and develop SUE by outlining an initial step toward overcoming the discipline’s research boundaries. Addressing what is required for a transdisciplinary SUE research stream to emerge, we not only identify research gaps but also argue why it is relevant to bridge divergent views and challenge commonalities in the SUE literature. The findings of this research indicate that not only is the transdisciplinary nature of the investigated phenomena important for the emergence of SUE but so too are the research design and theoretical foundations. These three areas iteratively foster research at the SUE core by embracing the complexity of SUE. Hence, we contribute to the SUE research stream in three distinct ways and provide implications for research and practice to emerge SUE further.

### 5.1 Contributions to the SUE research stream

First, we provide an overview of existing SUE research and identify established concepts and phenomena. The findings show that research linking two disciplines (e.g., sustainable entrepreneurship) is well established, whereas studies considering all three SUE disciplines are rare. The thematic analysis identified the perspective on sustainable entrepreneurial ecosystems (Cohen, 2006; O’Shea et al., 2021) as a possibility to ground SUE research in all three disciplines. An analysis of the researched concepts over time confirms this trend, as all disciplines started by merging concepts from mainly two disciplines (such as smart cities or green entrepreneurship) and more recently concentrated on the idea of the ecosystem view.

Second, we develop a novel, comprehensive, and multifaceted perspective on SUE and define the term. Our research, based on the SUE literature and the design process, portrays SUE as integrative,

dynamic, embedded, and complex. Being ingrained in the three disciplines and building on their integration (e.g., Cohen, 2006; O’Shea et al., 2021; Tolstyykh et al., 2021), SUE research develops to ensure rigor and relevance. We defined SUE and provided a SUE perspective, offering a common ground for research that aligns with existing research and is iteratively evaluated by practitioners and researchers from all disciplines. The designed research agenda also contributes to the distinct research disciplines of SUE by highlighting what neighboring disciplines might contribute to the discussion in a multidisciplinary manner (Lawrence, 2010), such as innovation economics and management, ethics, and geography.

Third, we contribute more generally to the social sciences by defining a transdisciplinary research agenda for a phenomenon-informed research stream: an agenda that transcends merely closing research gaps. We propose a self-referential research agenda embracing the complexity and uncertainty inherent in the challenges of SUE that considers what is required for transdisciplinary research to progress. We argue that fostering interdisciplinary research would be a significant step on the path to transdisciplinary SUE (Lawrence, 2010). Expanding the knowledge base by considering non-academic knowledge narrows the relevance–rigor gap in research. Integrating the practical perspective leads to a problem-driven research design. Our research recognizes that practitioners, for example, are increasingly discussing interpersonal perspectives. Questions about how SUE affects each individual or which SUE actor needs to be better aligned arise mainly in joint discussions among various practitioners and emphasize problems that are not clearly presented in the research. The fact that these implicit aspects, in particular, are becoming increasingly important is evident in research on entrepreneurial ecosystems (e.g., Cao & Shi, 2021), for example, and is justified by the fact that this enables the realization of a multifaceted perspective on SUE. Entrepreneurial ecosystems, being a “concept at the heart of a transdisciplinary [...] effort” (Wurth et al., 2022, p. 754), offers promising avenues by integrating scholars and practitioners investigating SUE issues. Accordingly, our research agenda also seeks to advance the entire research approach to SUE by calling for driving and transcending current practices related to phenomena,

theory, and empirics. Therefore, we provide a blueprint for developing self-referential and integrative research agendas for research fields such as transformative change, where academic discussions tend to tame the complexity of real-world issues by adopting a perspective from a specific discipline.

Apart from contributing to SUE, we provide a methodological contribution by showcasing how design science can be applied to set a rigorous and relevant research agenda. As DSR often evolves from real-world problems (e.g., Vom Brocke et al., 2020), the approach offers an initial step to handling the complexity of SUE and addressing corresponding real-world issues. The SUE research agenda builds upon the knowledge base and phenomenon sphere (Hevner et al., 2004) and is thus “field-tested and grounded” (Van Aken, 2004, p. 231). The sampling of the experts ensured rigor and relevance. The practitioners involved worked at the SUE interface and could therefore help determine the issues relevant to a future agenda. The scientific experts employed had experience in various (sub) disciplines of SUE and could therefore suggest how to develop SUE as a research stream, including phenomena alongside methodological and theoretical issues. We integrated the perspectives of experts as part of the design process and showcased how DSR can contribute as a scientific method (Cash, 2018). The work of Gregor and Hevner (2013) indicates that the designed research agenda is the main contribution of our research (indicating nascent design theory as a research agenda).

## 5.2 Implications for entrepreneurship research and practice

The research conducted suggests SUE can best be understood by integrating the original disciplines and linking theory and practice. Including the existing knowledge base and the phenomenon sphere (Hevner et al., 2004; Romme & Dimov, 2021) produced a future research agenda that evolved iteratively (Vom Brocke et al., 2020) as joint efforts of scientific experts and practitioners. The result is a definition of SUE that points to the need for shared sustainability values, the interaction of actors, and joint creativity to realize opportunities and create value. In this case, the term creativity means developing innovative ideas based on the entrepreneurship view and involving

people in innovation, as considered in urban studies (Florida et al., 2017). For instance, social enterprises often start with initiatives that are local but have high relevance to the broader society (Santos, 2012). Closing the gap between institutional arrangements and commercial entrepreneurship, social entrepreneurship, when integrating various ecosystem actors, can be a powerful instrument for realizing the value of SUE. We conclude that fostering SUE in both research and practice calls for social value creation for and with different stakeholders (Dohrmann et al., 2015). Existing research in the original disciplines has already taken this route by discussing entrepreneurship as design (e.g., Berglund et al., 2020), citizen design science in urban studies (e.g., Mueller et al., 2018), or applying design science to assess smart city solutions (e.g., Gimpel et al., 2021).

Although this research focuses on the intersection of SUE (treating sustainability, urban studies, and entrepreneurship equally), we acknowledge that *Small Business Economics* is an entrepreneurship journal and therefore provide suggestions on how entrepreneurship scholars can take the lead in establishing SUE. Entrepreneurship-led development is increasingly perceived as a way to create value for society (Wurth et al., 2022). This is especially promising, as entrepreneurship scholars are active members of entrepreneurial ecosystems and assume unique roles, frequently being active as intermediaries, for instance, in incubators, as educators in teaching entrepreneurship, as investors, as co-founders, or as experts in support institutions. Following this special position, entrepreneurship scholars can drive SUE research by investigating entrepreneurship-based phenomena within SUE. For instance, the complexity of SUE calls for new approaches and the commitment of various stakeholders in SUE practice, and this may also be an essential task for resource acquisition. However, the entrepreneurship discipline is familiar with stakeholder-engaged approaches such as crowdfunding, and thus, entrepreneurship scholars can shed light on research questions concerning financing in SUE. Furthermore, focusing on entrepreneurship education raises the question of how it could address sustainability issues in cities, perhaps by offering formats to students who use the sustainable mobility challenges in cities as triggers for developing entrepreneurial solutions.

Furthermore, university-related entrepreneurial spaces, such as incubators, can function as intermediaries, bridging different entrepreneurial ecosystem actors (Van Rijnsoever, 2022) and fostering a shared vision of sustainable urban development. Membership of an entrepreneurial ecosystem confers a feeling of belonging and poses the question of how this creates a sustainable entrepreneurial identity within the ecosystem (Bischoff, 2021; Prochotta et al., 2022). The dual role of entrepreneurship scholars not only influences the researched phenomena but also the SUE contribution with regard to research design and theoretical foundation. Understanding entrepreneurship scholars as an active part of the entrepreneurial ecosystem, for instance, could make ethnographical research designs especially suitable for studying SUE. Turning to the theoretical foundations, the entrepreneurship perspective is especially suitable for applying the ecosystem concept and spillover theory to SUE. Considering SUE as a complex system and applying a systemic view on how ecosystem actors co-create value for society would confer on entrepreneurship scholars the role of facilitators for transdisciplinary SUE research.

Entrepreneurship research has recognized engaged scholarship as an avenue to overcome the theory–practice gap and realize rigorous and relevant research (Dimov et al., 2021). The use of diverse stakeholders not only as an empirical data source but also their engagement throughout the whole research process ensures considering different perspectives while examining complex phenomena. Entrepreneurship looks back on a long tradition of involving practitioners and entrepreneurs, particularly in teaching, but these stakeholders could further add value to relevant research (Wiklund et al., 2019). As entrepreneurship scholars are members in ecosystems, they are familiar with different perspectives of stakeholders and how to communicate with them. Therefore, scholars can be a key in unfolding the rich potential of practitioners to contribute to relevant research. To establish SUE as transdisciplinary research, scholars have to consider the reciprocity between scholarship and practice (Dimov et al., 2021). Entrepreneurship scholars can actively engage the different stakeholders in SUE research based on their intermediary position in the ecosystem. This would enable SUE

stakeholders to co-define relevant research questions, help scholars address topics of high interest, and facilitate communicating research in such a way that key stakeholders care and take action to foster SUE (Wiklund et al., 2019). The research conducted also offers various practical implications. To unfold the full potential of SUE requires the integration of sustainability achievements, urban studies, and entrepreneurship. Like interdisciplinary research teams, practitioners must cultivate an interdisciplinary mindset. The SUE phenomenon sphere—in the form of sustainable entrepreneurial ecosystems—should use diverse formats to nurture exchange. Some SUE platforms or a SUE congress would enable an active exchange between diverse SUE actors and provide meeting points to ensure rigorous relevance exchange. The integration of the knowledge of researchers and practitioners fosters interdisciplinary SUE and the emergence of a transdisciplinary form. A policy that abandoned the reactive role in favor of an active role in creating appropriate SUE framing conditions could establish structures to facilitate spillovers and exchange, and thus be a game changer. Adopting a creative entrepreneurial mindset is particularly valuable to solve today's crises and provide solutions to complex problems. Such an open mindset would foster integrating all the achievements of the individual disciplines and fields to overcome the grand challenges through joint efforts.

### 5.3 Limitations

The findings of the present research should be interpreted with a view to its limitations. Although the SLR diligently operationalized the search terms based on the use of terms in the three disciplines, the exclusion criteria were a limitation. The analysis excluded papers addressing entrepreneurship without mentioning new ventures; examples would include papers on entrepreneurialism or institutional entrepreneurship. Adding that perspective might uncover additional levers for establishing SUE. Furthermore, SUE could be an even broader research stream, embracing business rather than entrepreneurship or geography rather than urban studies. Future studies could explore the most appropriate boundaries.

Additionally, the practitioners in the evaluation workshop were stakeholders from an entrepreneurial ecosystem in a metropolitan area in a developed country. We are aware that there are significant differences in the urban issues of developed and developing countries, as well as small town and metropolitan ecosystems (Nakamura, 2019; Roundy, 2019). Hence, future research could generate interesting knowledge on SUE by focusing on developing countries and related differences in terms of culture or the maturity of urbanization. Finally, the research agenda is a product of different iterations and offers avenues for developing SUE research following the relevance and rigor cycles. Nevertheless, the test of the research agenda will be the research that follows this publication. However, this is a typical limitation of DSR because a final evaluation requires a further iteration process. Hence, future research in the form of a longitudinal study would enrich SUE and could analyze how research at the SUE core and the research stream develops.

## 6 Concluding remarks

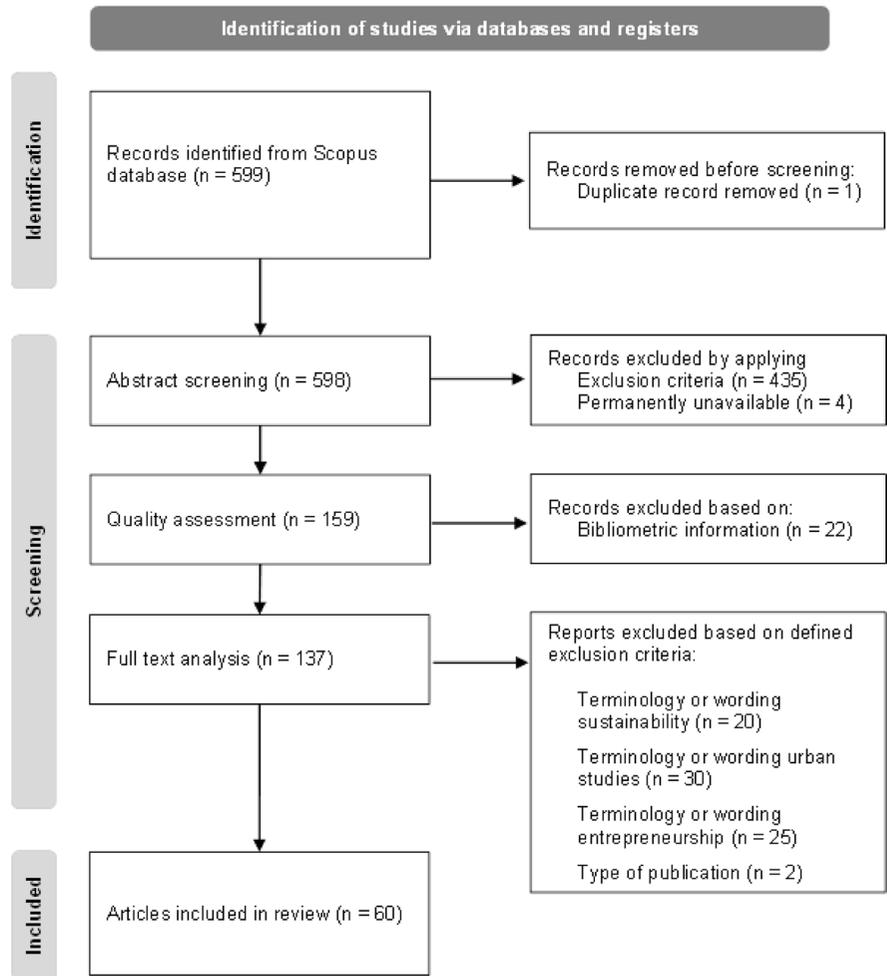
A prerequisite for establishing transdisciplinary SUE research is the integration of the phenomenon, research design, and theoretical foundation of all three disciplines, which far exceeds a simple merging of disciplines. The ecosystem perspective offers a promising path to a holistic approach (Theodoraki et al., 2022), and research on sustainable entrepreneurial ecosystems (Cohen, 2006; Cohen & Muñoz, 2015; O'Shea et al., 2021; Tolstykh et al., 2021) offers initial indications that it can embrace all three disciplines. The present research tries to pave the way for an interdisciplinary or even transdisciplinary SUE research stream by applying design science to set a relevant and rigorous future research agenda (Romme & Dimov, 2021). Existing research on sustainable entrepreneurial ecosystems builds on the current SUE core and offers the first step toward transdisciplinary SUE research. Our research expands the conventional contribution of an SLR by clarifying the thematic findings and embedding them in a comprehensive and multifaceted SUE perspective.

## Appendix

**Table 1** Inclusion and exclusion criteria of SLR

	Inclusion criteria	Exclusion criteria	Underlying rational
General	Original research articles	Editorials, teaching cases, etc.	Focus on scientific publications excluding publication types with no or low theoretical contribution
	Peer-reviewed journal articles	Duplicates	Duplicates removed to ensure non-redundant sample
	English	Matches become of spelling mistakes and typos	Excluding publications that were identified based on typing errors (entrepr*-> enterprise, etc.) or wrong meaning (starting up meaning to start)
Scope and content	Dealing with all three areas of SUE	Missing SUE focus	Only rough mentioning of search terms, not at core
Terminology sustainability		Only economic dimension	Not comprehensive understanding of sustainability in terms of ecologic, economic and social
		Sustainable meaning long-term, “sustainable competitive advantage”	Different use of terms and concepts
Terminology urban studies	Sub-urban	Rural, sub-rural, country ecosystem, cross-country, regions not urban	No focus on urban-specific phenomenon; country perspective to broad to focus on specific urban areas
		City and cities	Referring to the empirical unit of investigation only and not the broader context of f.i. urbanization
		Digital Ecosystem; platform ecosystem	
		Literal/ecological use of ecosystem	Not metaphoric use of ecosystem
Terminology entrepreneurship	Entrepreneurialism (beyond a meta level)  Entrepreneurship implications for stakeholders in the entrepreneurship field (f.i. founders, policy makers) to improve entrepreneurship	Entrepreneurialism, urban entrepreneurialism	Focus entrepreneurship only at meta level
		Entrepreneurship in implications as one topic among many (no specific focus); entrepreneurs as one group of recipients for practical implications	Entrepreneurship and entrepreneurs not at the core of the research
		Private entrepreneur	Indicating business synonym
		Public/civic/institutional entrepreneur	Indicating entrepreneurialism at meta level

**Fig. 9** PRISMA flow diagram of the SLR and results



**Table 2** Publication on SUE by journals and research type: top journals

Journal	Empirical	Qualitative	Quantitative	Conceptual	Total
Journal of Cleaner Production	8	5	3	0	8
Small Business Economics	5	4	1	0	5
European Planning Studies	2	2	0	0	2
Journal of Open Innovation: Technology, Market, and Complexity	2	2	0	0	2

The remaining 43 journals of the sample have only one SUE paper each

**Table 3** Articles included in the systematic literature review on SUE (arranged by citations)

No.	Citations	Years	Author(s)	Title	Area	Journal
1	259	2006	Cohen B.	Sustainable valley entrepreneurial ecosystems	E	Business Strategy and the Environment
2	233	2015	Datta A.	New urban utopias of postcolonial India: 'Entrepreneurial urbanization' in Dholera smart city, Gujarat	U	Dialogues in Human Geography
3	71	2017	Gascó M.	Living labs: Implementing open innovation in the public sector	U	Government Information Quarterly
4	71	2018	Neumeyer X. & Santos S.C.	Sustainable business models, venture typologies, and entrepreneurial ecosystems: A social network perspective	S	Journal of Cleaner Production
5	67	2010	Mayer H. & Knox P.	Small-town sustainability: Prospects in the second modernity	U	European Planning Studies
6	61	2018	Theodoraki C. et al.	A social capital approach to the development of sustainable entrepreneurial ecosystems: an explorative study	E	Small Business Economics
7	61	2019	von Wirth T. et al.	Impacts of urban living labs on sustainability transitions: mechanisms and strategies for systemic change through experimentation	U	European Planning Studies
8	38	2021	Cooke P.	Three disruptive models of new spatial planning: "Attention", "surveillance" or "sustainable" capitalisms?	U	Journal of Open Innovation: Technology, Market, and Complexity
9	35	2020	Henry M. et al.	A typology of circular start-ups: Analysis of 128 circular business models	S	Journal of Cleaner Production
10	31	2015	Kraus S. et al.	Innovating and Exploiting Entrepreneurial Opportunities in Smart Cities: Evidence from Germany	E	Creativity and Innovation Management
11	31	2007	Russo A.P. et al.	Toward a sustainable relationship between City and university: A stakeholdership approach	U	Journal of Planning Education and Research
12	30	2013	Schroeder H. et al.	Novel multisector networks and entrepreneurship in urban climate governance	U	Environment and Planning C: Government and Policy
13	28	2014	Sáez-Martínez F.J. et al.	The role of university in eco-entrepreneurship: Evidence from the eurobarometer survey on attitudes of european entrepreneurs towards eco-innovation	U	Environmental Engineering and Management Journal
14	24	2019	Zwolska L. et al.	Urban sharing in smart cities: the cases of Berlin and London	S	Local Environment
15	23	2017	Bank N. et al.	Sustainability-profiled incubators and securing the inflow of tenants – The case of Green Garage Berlin	S	Journal of Cleaner Production
16	20	2015	Cohen B. & Muñoz P.	Toward a Theory of Purpose-Driven Urban Entrepreneurship	E	Organization and Environment

Table 3 (continued)

No.	Citations	Years	Author(s)	Title	Area	Journal
17	20	1998	Doan P.L.	Institutionalizing household waste collection: The urban environmental management project in Côte d'Ivoire	U	Habitat International
18	18	2019	Liang C. et al.	Personality traits, social capital, and entrepreneurial creativity: comparing green socioentrepreneurial intentions across Taiwan and Hong Kong	U	Studies in Higher Education
19	14	2017	Pesch U. et al.	Niche entrepreneurs in urban systems integration: On the role of individuals in niche formation	U	Environment and Planning A
20	13	2016	Mehta K. et al.	An educational and entrepreneurial ecosystem to actualize technology-based social ventures	U	Advances in Engineering Education
21	12	2019	Nakamura H.	Relationship among land price, entrepreneurship, the environment, economics, and social factors in the value assessment of Japanese cities	S	Journal of Cleaner Production
22	9	2020	Rodrigues M. & Franco M.	Measuring the urban sustainable development in cities through a Composite Index: The case of Portugal	S	Sustainable Development
23	9	2018	Rodrigues M. & Franco M.	Importance of living labs in urban Entrepreneurship: A Portuguese case study	S	Journal of Cleaner Production
24	7	2014	Foley R.W. & Wiek A.	Scenarios of nanotechnology innovation vis-à-vis sustainability challenges	U	Futures
25	7	2021	Tiba S. et al.	Sustainability startups and where to find them: Investigating the share of sustainability startups across entrepreneurial ecosystems and the causal drivers of differences	S	Journal of Cleaner Production
26	7	2021	Wagner M. et al.	University-linked programmes for sustainable entrepreneurship and regional development: how and with what impact?	E	Small Business Economics
27	6	2020	Sunio V. et al.	Social enterprise as catalyst of transformation in the micro-mobility sector	U	Transportation Research Part A: Policy and Practice
28	5	2017	Kivimaa P. et al.	Commercialising university inventions for sustainability-A case study of (non-)intermediating 'cleantech' at Aalto University	U	Science and Public Policy
29	5	2003	Ranasinghe T.T.	A novel living agricultural concept in urban communities: Family Business Garden	S	International Journal of Sustainable Development and World Ecology
30	5	2020	Yu Z. & Gibbs D.	Unravelling the role of green entrepreneurs in urban sustainability transitions: A case study of China's Solar City	U	Urban Studies

Table 3 (continued)

No.	Citations	Years	Author(s)	Title	Area	Journal
31	4	2021	Bischoff K.	A study on the perceived strength of sustainable entrepreneurial ecosystems on the dimensions of stakeholder theory and culture	E	Small Business Economics
32	4	2019	Çiçek M. et al.	The Impact of the Slow City Movement on Place Authenticity, Entrepreneurial Opportunity, and Economic Development	E	Journal of Macromarketing
33	4	2020	Eichelberger S. et al.	Entrepreneurial ecosystems in smart cities for tourism development: From stakeholder perceptions to regional tourism policy implications	E	Journal of Hospitality and Tourism Management
34	3	2020	Baykurt B. & Raetzsch C.	What smartness does in the smart city: From visions to policy	U	Convergence
35	3	2020	Ciasullo M.V. et al.	Multi-level governance for sustainable innovation in smart communities: an ecosystems approach	E	International Entrepreneurship and Management Journal
36	3	2021	DiVito L. & Ingen-Housz Z.	From individual sustainability orientations to collective sustainability innovation and sustainable entrepreneurial ecosystems	E	Small Business Economics
37	3	2020	Greer R. et al.	The diffusion of circular services: Transforming the Dutch catering sector	S	Journal of Cleaner Production
38	3	2013	Howard Schutzbank M. & Riseman A.	Entrepreneurial Urban farms: An Urban farming census of Vancouver, British Columbia	S	International Journal of Environmental Sustainability
39	3	2021	O'Shea G. et al.	The buzz before business: a design science study of a sustainable entrepreneurial ecosystem	E	Small Business Economics
40	2	2021	Gifford E. et al.	The evolution of knowledge-intensive innovation ecosystems: co-evolving entrepreneurial activity and innovation policy in the West Swedish maritime system	E	Industry and Innovation
41	2	2020	Ma Y. et al.	Co-creation, co-evolution and co-governance: understanding green businesses and urban transformations	S	Climatic Change
42	2	2020	Tien N.H. et al.	Green entrepreneurship understanding in Vietnam	E	International Journal of Entrepreneurship
43	2	2021	Tolstykh T. et al.	An assessment of regional sustainability via the maturity level of entrepreneurial ecosystems	U	Journal of Open Innovation: Technology, Market, and Complexity
44	1	2020	Goyal S. et al.	Social entrepreneurship for scalable solutions addressing sustainable development goals (SDGs) at BoP in India	E	Qualitative Research in Organizations and Management: An International Journal
45	1	2020	Mars M.M.	Inter-organizational dynamics and the ecology of localized entrepreneurship	U	Community Development

**Table 3** (continued)

No.	Citations	Years	Author(s)	Title	Area	Journal
46	1	2020	Ttba S. et al.	The lighthouse effect: How successful entrepreneurs influence the sustainability-orientation of entrepreneurial ecosystems	S	Journal of Cleaner Production
47	1	2019	Tomor Z.	The Citipreneur: How a local entrepreneur creates public value through smart technologies and strategies	U	International Journal of Public Sector Management
48	0	2021	Agbaeze E.K. et al.	Influence of Entrepreneurial Innovation on Sustainable Solid: Waste Recycling in Abuja, Nigeria	E	Periodica Polytechnica Social and Management Sciences
49	0	2021	Alwakid W. et al.	The influence of green entrepreneurship on sustainable development in Saudi Arabia: The role of formal institutions	S	International Journal of Environmental Research and Public Health
50	0	2019	Ambati N.R.	Social innovation practices in sustainable waste management: Case study of successful social enterprises in Ahmedabad	U	International Journal of Scientific and Technology Research
51	0	2021	Che D.	Green placemaking on the peripheral prairie following a natural disaster	U	Tourism Geographies
52	0	2020	Chillakuri B. et al.	Linking sustainable development to startup ecosystem in India - A conceptual framework	E	International Journal of Business and Globalisation
53	0	2020	Franco M. & Rodrigues M.	Indicators to measure the performance of sustainable urban entrepreneurship: an empirical case study applied to Portuguese cities and towns	S	Smart and Sustainable Built Environment
54	0	2021	Fridhi B.	Social entrepreneurship and social enterprise phenomenon: toward a collective approach to social innovation in Tunisia	E	Journal of Innovation and Entrepreneurship
55	0	2020	Gitelman L.D. et al.	Technology entrepreneurship as a factor of sustainable energy in smart cities	S	WIT Transactions on Ecology and the Environment
56	0	2021	Pankov S. et al.	Advocating sustainability in entrepreneurial ecosystems: Micro-level practices of sharing ventures	E	Technological Forecasting and Social Change
57	0	2020	Pearl-Martinez R.	Global trends impacting gender equality in energy access	U	IDS Bulletin
58	0	2021	Raposo M. et al.	We dreamed a dream that entrepreneurial ecosystems can promote sustainability	S	Management of Environmental Quality: An International Journal
59	0	2020	Šipitova V.	Sustainable activities of universities: Experience from the open access articles in the economic subject area	U	Academic Journal of Interdisciplinary Studies

Table 3 (continued)

No.	Citations	Years	Author(s)	Title	Area	Journal
60	0	2021	Vasconcelos E.F. et al.	Challenges and opportunities for social entrepreneurs in civil engineering in Brazil	E	International Journal of Organizational Analysis

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#### Declarations

**Conflict of interest** The authors declare no competing interests.

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