The Determinants of Eco-System Sustainability; A Systematic Review

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Abstract: *Concerns with system sustainability have arisen because entrepreneurial, innovative, business systems, social-enterprise systems, and regional systems must create long-lasting systems and value while preserving the environment, social systems, and participation, as well as maintaining the legitimacy of various institutions and the ability to adjust. This systematic review aims to identify, classify, and integrate determinants of system sustainability. The review was guided by the PRISMA framework, and studies were selected from high-ranking scientific databases and published within the predefined review period. The selected studies also included citation searches and a systematic review approach. The final sample was comprised of 55 studies, of which seven were from the targeted search. The thematic coding review and the binary approach to the literature review identified 16 determinants, grouped into nine higher-order categories. The synthesis highlighted the determinants that shaped the innovation ecosystem and the emerging sustainability from the integration of various systems. The synthesis also highlighted the lack of evidence regarding the determinants of digital governance and circularity, and developed a detailed agenda for future research on the integration of various systems.*

Keywords: eco-system sustainability; determinants; systematic literature review; entrepreneurial ecosystem; innovation ecosystem; thematic synthesis; evidence mapping.

1. Introduction

Sustainability of ecosystems hinges on interdependence and collaboration versus separateness and individuality. Entrepreneurial ecosystems as well as business, social, and regional ecosystems incorporate diversity of institutions and communities and embrace the interrelationships and the capacity of integrated systems. Ecosystem sustainability is viewed as the ability of integrated socioeconomic systems to endure, adapt, and change over time with various degrees of social, environmental and institutional sustainability and resilience, and, in addition, of ecosystem interdependence and collaboration. Thus, the number of firms, the volume of investments, and the degree of technology are not good indicators of sustainability. Sustainability assumes the flow of resources and the degree to which the participants are engaged and learning within the system. It also concerns the system-level effect and the value it has to the system, and whether it reinforces the social exclusion, and the degradation of the ecosystem (Theodoraki et al., 2022). There is not much evidence in the Marguerite literature, and what there is can be found in the circular economy and sustainability literature. Much of the literature discusses entrepreneurial ecosystems and has many different

designations, such as, sustainable entrepreneurial ecosystems, inclusive entrepreneurial ecosystems, green innovation ecosystems, and digitally enabled ecosystems. The definition of sustainability may also include the outcomes of legitimacy, resilience, social value, environmental orientation, circular resource use, and so forth. While the breadth of this literature may add depth, it simultaneously creates a greater challenge in terms of comparing the determinants due to the different names used for similar concepts, the boundaries of the systems, and the theories and methods employed. The literature has also discussed the advancements on the digital, value, and transformational frameworks in relation to sustainable entrepreneurship. There is a specific need for a coordinated research agenda to identify the gaps and overlaps in sustainable entrepreneurship and transformational frameworks and the determinants of sustainability (Gregori et al., 2025).

The primary concern is the lack of an integrative and thorough assessment of the factors that impact ecosystem sustainability. Most research considers a small number of factors for particular countries, industries, regions, platforms, institutions, and/or populations. The few that do provide a broad assessment of their ecosystems do not a distinguish the sustainability of the economy, environment, society, institutions, and adaptive capacity. Consequently, the governance component, networks, knowledge and financing, support services, innovation and digital infrastructures, as well as the green values, circularity, demand, inclusiveness, legitimacy, and resilience are hardly examined in the same context. A systematic literature review is necessary because it permits the identification of the scope of research, justification for the inclusion and exclusion of research, and the collection of research in a structured manner. It also permits the definition of a unified terminology and the integration of research, all without the imposition of a unifying research context (Page et al., 2021; Snyder, 2019). Therefore, the present review articulates the key factors that have been discussed in the literature, in a conceptually justifiable manner, and identifies the primary and secondary concern of scholars. It examines the available evidence and its contextual limitations. What are the key determinants of ecosystem sustainability, and how are they categorized? Which factors are preferred (e.g. discussed, researched, studied) in comparison to others that are less preferred (e.g. discussed, researched, studied) and which factors are preferred (e.g. discussed, researched, studied) in comparison to others that are less preferred? What are the remaining theoretical, methodological, geographical, sectoral, temporal, and metrics gaps? The contribution is a framework of evidence on determinants based on 55 studies published within the predefined review period, including 7 studies included in a focused case study. The review deliberately dissociates the frequency of discussion of a given factor from the quality of evidence on that factor to ensure that factors studied most frequently are not given the status of causal factors or of factors that are necessary and/or sufficient. This paper is structured in the following sections: methodology; innovation; integrated discussion; research gaps; and conclusion.

2. Methodology

Given the conceptual and methodological diversity of the existing literature, yet sufficient evidential breadth for rational literature identification, filtering, and narrative synthesis, a systematic literature review framework was employed (Snyder, 2019), with reporting aligned with PRISMA (Page et al., 2021). The review included English-language publications dated from January 1, 2015, through December 31, 2025, in order to embrace the recent consolidation of the ecosystem literature and its extensions related to sustainability, digitalization, circularity, inclusion, legitimacy, and resilience in the near future. The databases of Scopus, Web of Science Core Collection, ScienceDirect, SpringerLink, and IEEE Xplore were interrogated with entrepreneurial, innovation, (social) business, (social) regional, and ecosystem terms in combination with sustainability, digitalization, circularity, inclusion, resilience and related terms of determinants, barriers, drives, antecedents, and enablers.

The selection of academic search systems was informed by comparative evidence on retrieval quality (Gusenbauer & Haddaway, 2020). Recent studies meeting the eligibility criteria were included in a targeted recent studies update, and backward and forward citation analysis.

Eligibility required substantive analysis of the transactional components of the entrepreneurial, innovation, business, social-enterprise, regional, or closely related organizational ecosystems, and at least one condition pertaining to the persistence, adaptation, environmental or social value, institutional continuity, legitimacy, inclusion, circularity, or resilience. Studies of firms in isolation, pertaining to sustainability, without consideration of the ecosystem, studies in the natural ecology, editorials, abstracts form, research reports that lack substantive analysis, redundant reports, reports lacking full text, and publications out of the period of review, were excluded. 776 records were found, of which 742 were in the database and 34 were found by citation searches. After removing 268 duplicates, 508 titles were screened, and 130 reports were reviewed, after which 48 reports were found to meet the original requirements. This is represented in Figure 1, which also indicates the enhanced target, which incorporated 7 studies, to provide a total of 55 studies.

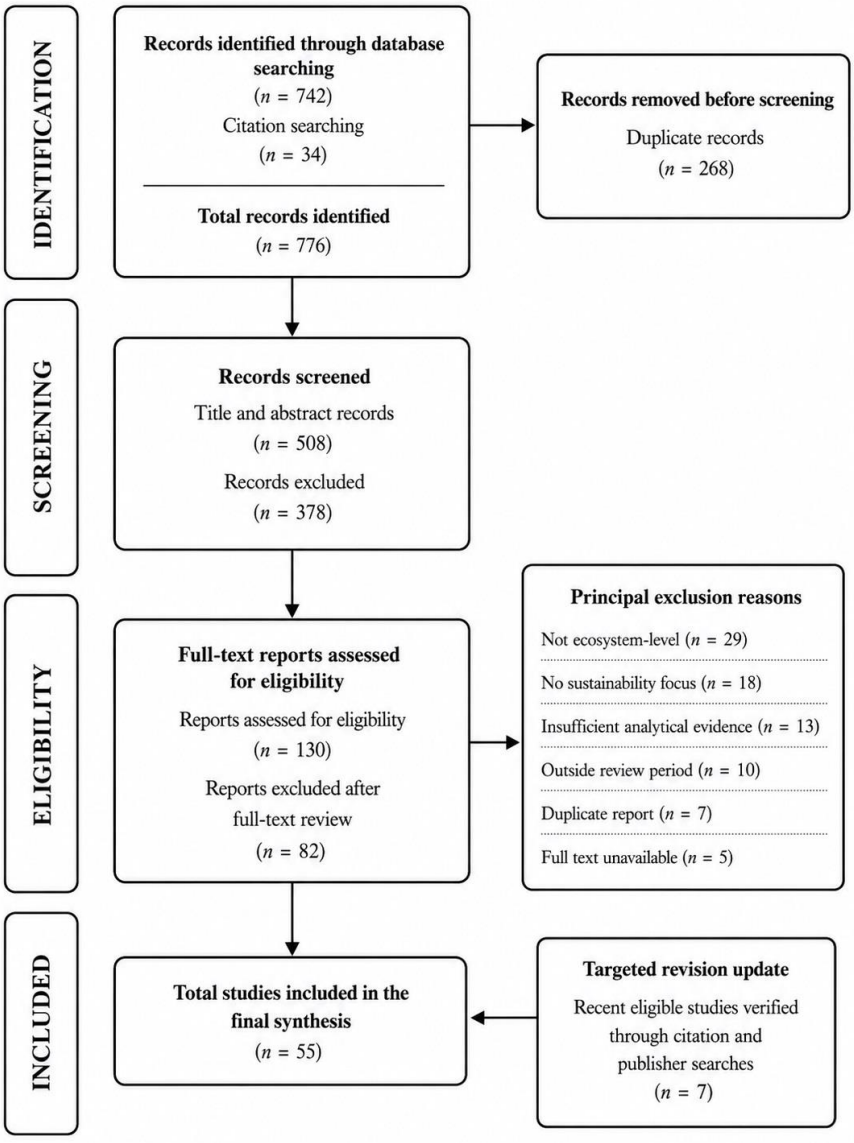

Figure 1: The Systematic Review Process

Selection for Inclusion distinguished between the initial and updated searches and exhibited the mathematical relationship for identification, screening, eligibility determination, exclusion, and final inclusion. The data extraction form collected bibliographic information, year, geography and sector, type of unit, type of research, design, theory, sustainability, expressions of determination and outcome, and limitations. The expressions of determination were coded inductively and compared by definition and function. Standardization was performed when the meanings were sufficiently overlapping. Sixteen determinants were retained, and the remaining expressions were grouped under these determinants. The remaining, higher order expressions were grouped using an inductive-deductive approach to form nine categories. The presence of a determinant was recorded across the studies using a binary matrix. One count for each determinant was recorded for each study. The matrix was interpreted as an evidence map. Therefore, the supportive, contradictory, and null determinations as well as the conditional findings were synthesized narratively and with caution.

3. Eco-System Sustainability

The main contribution of this review is the construction of a determinant architecture integrated directly with the phenomenon of eco-system sustainability. Most earlier ecosystem models focus on some dimensions of productive entrepreneurship, innovation, resource endowments, or regional competitiveness. However, sustainability concerns the durability, direction, distribution, and legitimacy of value creation at the system level. This review combines 16 determinants into nine macro categories: governance, connectivity, knowledge, resources, climate, digital, sustainability, legitimacy, and resilience. This macro categorization relates the foundational elements of ecosystems (in particular, the services of finance, skills, and supportive services) with the levers of learning, coordination, directedness, social accessibility, market, circularity, and resilience. A sustainable ecosystem is treated as a system that has a capacity to reproduce its core functions, eliminate damaging processes, and adapt to changes without being concerned with the sustainability of entrepreneurial activities or the continuity of the programs or services offered (Gregori et al., 2025; Moggi et al., 2022; Theodoraki et al., 2022). A second innovation distinguishes research focus from evidential strength. The literature review matrix notes whether each determinant is developed, examined, or referenced in a study. However, a notation does not denote a positive correlation, statistical significance, effect size, causal research, or methodological strength. This innovation allows for comparison of different types of evidence (conceptual, qualitative, and quantitative research, study design, and review) but does not allow for comparison of their different levels of inferential strength. Conceptual studies define constructs and mechanisms; qualitative studies capture processes and limits; quantitative studies evaluate relationships under constraints; and reviews highlight and integrate macro trends. The matrix, therefore, is an evidence map and not a vote counter. It indicates which determinants are primarily researched, which are co-researched, and which are researched less, thereby allowing for reasoned statements about research focus and oversight while preventing the misinterpretation of research frequency for research importance.

A third innovation comprises the temporal contextualization and expansion of the evidence base through the inclusion of seven verified studies published during the targeted update period. These studies highlight stakeholder culture, university-based initiatives, sustainability pathways, local infrastructure and local capital, cleantech incubation, national ecosystems, and systems-based transformations (Chaudhary et al., 2023; Pierrakis et al., 2024; Ratajczak-Mrozek et al., 2025; Villegas-Mateos, 2023; Wagner et al., 2021; Weerasekara & Bhanugopan, 2023). These studies also expand geographical, institutional, and sectoral representation of the corpus while retaining the existing determinant taxonomy and counting rules. Table 1 provides a 55-study matrix and illustrates

how generic enabling conditions integrate with sustainability values, markets, inclusion, legitimacy, circularity, digital, and resilience. The framework provides an unambiguous link to each individual study and the comprehensive synthesis which follows, and contributes to the review's overall transparency of analysis.

Table 1: Literature Review Matrix

No.	Author(s) and year	Policy / stability	Actor / diversity	Network / density	Human / capital	Finance / access	Support / services	Green / values	Market / demand	Social / inclusion	Legitimacy	Resource / circularity	Digital / infrastructure	Institutional / support	Innovation / climate	Knowledge / sharing	Resilience / capacity
1	Stam (2015)	✓	✓	✓	✓	✓	✓							✓	✓	✓	
2	Isenberg (2016)	✓	✓	✓	✓	✓	✓		✓					✓	✓		
3	Steinz et al. (2016)	✓		✓		✓		✓	✓		✓			✓	✓	✓	
4	Ács et al. (2017)		✓	✓	✓	✓					✓			✓	✓	✓	
5	Audretsch and Belitski (2017)	✓		✓	✓	✓	✓		✓				✓	✓	✓	✓	
6	DiVito and Bohnsack (2017)							✓	✓		✓	✓		✓			✓
7	Adner (2017)		✓	✓					✓		✓				✓	✓	✓
8	Autio et al. (2018)			✓	✓		✓		✓				✓		✓	✓	
9	Spigel and Harrison (2018)			✓	✓	✓	✓								✓	✓	✓
10	Theodoraki et al. (2018)		✓	✓	✓	✓	✓				✓					✓	✓
11	Neumeyer and Santos (2018)		✓	✓				✓	✓	✓	✓	✓					
12	Thompson et al. (2018)		✓	✓			✓			✓	✓					✓	✓
13	Debnath and Bardhan (2018)				✓	✓		✓		✓		✓				✓	✓
14	McMullen (2018)		✓	✓				✓	✓	✓	✓						
15	Malecki (2018)	✓		✓	✓	✓	✓							✓	✓	✓	✓
16	Antolin-Lopez et al. (2019)							✓	✓		✓	✓					✓
17	Doblinger et al. (2019)	✓		✓		✓		✓			✓			✓	✓	✓	
18	Sunny and Shu (2019)			✓		✓		✓	✓					✓	✓		
19	McAdam et al. (2019)		✓	✓	✓					✓	✓					✓	
20	Markman et al. (2019)		✓	✓				✓	✓	✓	✓						✓
21	Long et al. (2019)	✓		✓	✓	✓		✓	✓					✓		✓	✓
22	Tiba et al. (2020)		✓	✓				✓	✓		✓						✓
23	Johnson and Schaltegger (2020)	✓			✓	✓		✓	✓		✓	✓		✓		✓	✓
24	Audretsch et al. (2021)	✓		✓	✓	✓	✓				✓			✓	✓		
25	Stam and van de Ven (2021)	✓		✓	✓	✓	✓		✓					✓	✓	✓	
26	DiVito and Ingen-Housz (2021)		✓	✓				✓			✓	✓				✓	✓
27	O'Shea et al. (2021)		✓	✓	✓		✓	✓			✓					✓	✓
28	Volkmann et al. (2021)	✓	✓	✓	✓	✓	✓	✓		✓	✓			✓	✓	✓	✓
29	Pankov, Schneckenberg, et al. (2021)		✓	✓				✓			✓	✓	✓			✓	
30	Pankov, Velamuri, et al. (2021)	✓		✓				✓	✓		✓		✓	✓			✓
31	Tiba et al. (2021)	✓			✓	✓		✓	✓		✓			✓	✓		
32	Zhao et al. (2021)	✓	✓	✓					✓	✓	✓		✓	✓			
33	Aliabadi et al. (2022)	✓		✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓
34	Theodoraki et al. (2022)	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	✓
35	Moggi et al. (2022)		✓	✓				✓		✓	✓					✓	✓
36	Thomas and Ritala (2022)		✓	✓							✓					✓	✓
37	Meurer et al. (2022)			✓			✓			✓			✓			✓	✓
38	Urbaniec et al. (2022)			✓		✓		✓	✓		✓	✓		✓	✓	✓	
39	Audretsch et al. (2023)	✓			✓	✓		✓			✓			✓	✓		✓

No.	Author(s) and year	Policy / stability	Actor / diversity	Network / density	Human / capital	Finance / access	Support / services	Green / values	Market / demand	Social / inclusion	Legitimacy	Resource / circularity	Digital / infrastructure	Institutional / support	Innovation / climate	Knowledge / sharing	Resilience / capacity
40	Siqueira et al. (2023)	✓		✓	✓	✓	✓	✓			✓		✓	✓	✓	✓	
41	Hameed et al. (2023)	✓	✓	✓	✓	✓	✓			✓	✓			✓			✓
42	Holzmann and Gregori (2023)			✓			✓	✓	✓		✓	✓	✓		✓	✓	
43	Bakry et al. (2024)	✓		✓	✓	✓	✓	✓			✓		✓	✓	✓	✓	✓
44	Audretsch and Fiedler (2024)	✓						✓	✓		✓	✓		✓	✓	✓	
45	Gregori et al. (2024)			✓			✓	✓	✓		✓	✓	✓			✓	✓
46	Gregori et al. (2025)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
47	Ninh and Hue (2025)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
48	Leendertse and van Rijnsoever (2025)	✓		✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓
49	Wagner et al. (2021)		✓	✓	✓		✓	✓						✓	✓	✓	
50	Bischoff (2021)		✓	✓			✓	✓			✓				✓		
51	Villegas-Mateos (2023)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓
52	Weerasekara and Bhanugopan (2023)			✓		✓	✓							✓	✓		
53	Chaudhary et al. (2023)		✓	✓	✓		✓	✓	✓		✓			✓	✓	✓	
54	Pierrakis et al. (2024)		✓			✓	✓	✓						✓			✓
55	Ratajczak-Mrozek et al. (2025)		✓					✓		✓				✓			✓

The matrix shows that the study of ecosystem sustainability relies more on relational, legitimacy, and knowledge mechanisms than on isolated resource endowments. The widest coverage is network density, then legitimacy, knowledge sharing, green values, and institutional support. This shows the main elements for the development of a sustainable system are cooperation, acceptance, and learning as well as a normative and institutional perspective. Finance is often studied in combination with other elements, such as institutions, human capital, networks, support services, or market demand. This substantiates the notion that resources are end of the line value, and their worth is derived from combination with other elements. Green values appear more often than measurable circular practices. Digital infrastructures, resource circularity, and social inclusion remain comparatively under-integrated. These elements should be interpreted as rankings of causal influence. The matrix integrates multiple frameworks, designs, and types of evidence. Rather, it identifies the established elements, and from a systems perspective shows the lack of clear operationalization and strong outcome measurement as well as an absence of directional effect and contextual analysis along the domains of vertical integration (i.e., sector and stage of development) and horizontal integration (i.e., geography and the institutional space). It also indicates a lack of analysis of the interacting causal mechanisms over time.

4. Discussion

Evidence indicates that the nexus of sustainability, governance, and resource availability fails to operate effectively as separate entities. Rationality and consistency in policy can offer stability and predictability. However, sustainability is the combined product of capable institutions and formal policies. These policies and the required institutional frameworks can provide varied systems. The degree to which these frameworks promote the advancement of sustainable systems relies on persistent dedication of institutions, stable policies, and the active participation of various stakeholders. The quality of institutions may also impact the extent to which the sustainability-oriented priorities endorse innovation. Commitments to sustainability of institutions will be

ineffective without the backing of supporting organizations within the dynamic innovation ecosystems (Leendertse & van Rijnsoever, 2025). Sustainability may be incorporated within the public private policy continuum, alongside numerous support services and various supportive infrastructures (Pierrakis et al., 2024). It is also important to understand that the sustainability goal cannot be attained with the currently available interventions. An assessment of the interventions is critical to understand access equity, adaptability, and additionality as the actors, markets, and technologies change.

Network connectivity and knowledge capacity articulate how potential resources become actual opportunities. Close-knit networks may foster trust, referrals, recognition of opportunities, collaborative problem solving, and flow of knowledge. Bridging networks connect entrepreneurs to universities, investors, government agencies, established firms, users, and members of organizations in civil society. However, networks may not always be beneficial. Closed, centralized, or homogenous networks may reproduce privilege, restrict novel information, and, in effect, make peripheral networks dependent on powerful brokers. The diversity of actors is important only when diverse actors are provided access to resources, decision-making, markets, and appropriate benefits. Substantive participation, as opposed to mere numerically representation, is critical to the success of inclusive ecosystem research (Zhao et al., 2021). Knowledge capacity extends beyond universities, patents, training, and even skilled labor. Learning, innovation and knowledge integration require trust and the presence of multiple interfaces through which various forms and types of knowledge may be integrated and recombined. Research in the fields of knowledge-intensive entrepreneurship and sustainable ecosystem design demonstrates that shared resources and collaborative practices are necessary to combine disparate knowledge and expertise (Siqueira et al., 2023). Evaluations should address the extent and nature of networks as well as the brokerage and reciprocity of networks and the access and benefits afforded to peripheral network actors. In addition, knowledge should be assessed based on the processes of transfer, integration, and joint knowledge construction as opposed to input assessment.

The orientation toward innovation, the digital economy, and sustainability shapes the evolution of ecosystems. An innovation ecosystem may channel a high degree of innovation while remaining socially exclusionary and ecologically unsustainable. Directionality is present when there are incentives, opportunity for deliberate and evaluative experimentation, users, and a set of values that align innovations with ecologically and socially constructive purposes. Much of the existing literature emphasizes green values, while practices of the circular economy especially the ones that can be evidenced materially are often overlooked. It is easier to declare green values, than it is to change practices and operations. Many of the same assertions can be made with regard to digital technologies. There is a dichotomy of positive and negative impact of digital technologies on the circular economy. Digital technologies can facilitate the sustainability of ecosystems, provided there is safe and secure infrastructure (Gregori et al., 2024). Of crucial importance is whether practices focused on sustainability will be legitimized by the market and prove to be flexible and sustainable. Demand is the adoption, purchase, investment, or payment for a value proposition. Legitimacy addresses the credibility and appropriateness of the actors, technologies, configurations, and organizations making sustainability claims. Ways to connect demand and legitimacy include standards, certifications, public procurement, demonstrations, lead users, storytelling, and other apparent successes that help to diminish uncertainty. The legitimacy of a claim is often disputed. Establishing new businesses, government entities, investors, and the general public may all consider groundbr eaking innovations to be equally valid. Legitimacy is said to be established by social interactions and negotiations of collective actions, and not by claims of self-promotion (Thomas & Ritala, 2022). Including and resilient systems contribute the distributional and temporal dimensions, respectively. Sustainability cannot be presumed from the mere fact that harmful structures are made inclusive, or that inequitable

or unsustainable burdens are made to afford disadvantaged groups the peace of unsustainable operations. The persistence, adaptability, transformation, and regenerative functions of systems should be framed by their sustainability, and should literally ask who's functions are preserved, what are the costs of the changes, and is the alteration a net benefit for the social and environmental systems. Research dedicated to inclusiveness within ecosystems and thrivability indicates that governance, intersectionality, and access go hand-in-hand with regenerative relationships (Moggi et al., 2022). Consequently, for ecosystems to be sustainable, they must possess a social license and the capability to transform systems that produce illegitimate inequitable and ecologically destructive value.

The determinants, when considered together, are revealed to operate collaboratively, recursively, and across levels. Foundational capacity is established by governance, finance, human capital, infrastructure, and support services; capacity is transformed into coordinated activity through networks, knowledge, and an innovation climate, together with legitimacy; and the green values, circularity, inclusion, digital governance, and resilience frameworks shape the direction, the distribution, and the persistence of outcomes. These frameworks are not sequential. Institutions shape networks; legitimacy influences demand and finance; digital technologies change means of access; and knowledge shapes policy; while the outcomes of ventures provide feedback to public discourse and institutional frameworks. The influence of context is especially important for understanding the determinants. The rural, urban, community, and cross-sectoral ecosystems, as well as the university and platform ecosystems, have different resources and governance domains, and as a result, have different contextual meaning for the determinants. Therefore, rather than stipulating universal frameworks, the evidence suggests the use of a portfolio-based approach for interventions and comparative rationales. Rather than assessing net effects, researchers should investigate configurations and boundary conditions. Sustainability of the ecosystem is an emergent quality resulting from the alignment of conditions enabling value creation that is legitimate, and that entails learning, without causing ecological degradation or social exclusion. No combination of determinants can conceal ineffective coordination, unreachable resources, absence of legitimacy, and unsustainable material practices (Hameed et al., 2023).

5. Research Gaps and Future Research Directions

The major research gaps identified in the literature include an inadequate definition of the construct, poor measurement, temporal insufficiency, and contextual applicability. Many studies use venture activity and sustainability-oriented investments and innovations to analyze sustainability of eco-systems. However, these indicators fall short of capturing environmental additionality, equitable inclusivity, institutional stability, circular flows of materials, and adaptive social changes. The evidence is largely conceptual and retrospective and, in comparison, lacks designs explaining the emergence and interaction of impacts. The varied definitions and measurements of the constructs affect the comparison of positive, negative, no, mixed, and conditional results. Digital governance, circularity of materials, and social inclusion are the relatively most under integrated. Resilience is commonly used, but lacks differentiation between persistence, adaptation, change, and regeneration. The concentration of studies in visible urban, regional, technology-focused, and developed countries contexts limits the confidence in the determinant frameworks when applied to rural, informal, impoverished, and constricted resource contexts.

Future studies should construct multidimensional outcome measures to evaluate impacts in various dimensions, including economic, environmental, social, and institutional impacts and resilience, developed singly before assessing their potential integration. Longitudinal, process-oriented, and event-centered studies should capture the entry and exit of actors, network restructuring, changes in

policies, shifts in legitimacy, transformations in resources, and changes in the system after a disruption. Comparative, multilevel studies should be designed to explicitly define the boundaries of ecosystems and assess how the configurations of the determinants of sustainable system outcomes vary across countries, rural and urban areas, different sectors and economic activities, and varying levels of development and integration. A combination of qualitative comparative analysis, social network analysis, process tracing, material flow analysis, digital trace research, and other rigorously designed mixed methods is recommended for exploring the complementarity, substitution, mediation, and boundary conditions of the determinants of sustainable system outcomes. Researchers in this area should also standardize the definition of the core determinants, report the absence of results, and contradictory results, assess the measurement of the core determinants, and distinguish the availability of digital infrastructures from the governed and equitable use of the digital infrastructures. These proposed avenues would help to create more rigorous and reliable postulates in the field.

6. Conclusion

The objective of this systematic review was to identify the factors associated with eco-system sustainability in the literature and to classify and synthesize them. This review covered 55 studies published within the predefined review period. From these studies, nine categories containing 16 factors were identified. These categories were: governance quality, network connectivity, knowledge capacity, accessibility of resources, climate of innovation, digital inclusion, sustainability orientation, market legitimacy, and inclusive resilience. Studies on sustainable ecosystems indicated that sustainable ecosystems cannot simply be described as the density of ventures, the presence of investments, technology, novelty and support programs. The sustainable ecosystems described in the studies depend on the conversion of governance and resources through networks, learning, and experimentation, as well as legitimacy of the creation of value for the environment, circularity of resources, and equity and adaptive resilience. Using a binary matrix review of the literature combined with a transparent selection process, this review created an evidence-based framework while avoiding conflating frequency of citations with support quality. It seeks to clarify fragmented terminology without exaggerated and simplistic notions of causality among the varied evidence, both qualitative and quantitative, and different types of research and designs.

The review identifies implications beyond the case analysis. First, while assessing available literature, relational, legitimacy, knowledge, institutional, and normative mechanisms are the most discussed. However, mechanisms of digital governance, circularity, inclusion, longitudinal change, multilevel measurement, and context-sensitive explanation are mostly ignored. The analysis favors a configurational perspective where factors at different levels and contexts interact. The analysis also justifies research of a longitudinal, comparative, mixed-methods, network, and material flows approach based on clearly defined ecosystem boundaries and multidimensional results. The analysis, however, is more geared toward practitioners. It suggests participants in the ecosystem and policymakers work together to establish credible institutions, financial resources, knowledge interfaces, inclusive networks, market-building tools, digital safeguards, circular methods, and adaptive feedback. Isolated interventions need to be avoided. It also explains that eco-system sustainability is based on the dynamic interaction of conditions, which depend on the Alignment, Accessibility, Direction, Distribution, and Context. Sustainability of connected systems relies on evidence of which factors are present, and more importantly, how they interact and for whom they create value, while also assessing whether they do so in a responsible manner.

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