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Article

Ecological Citizenship and the Co-Design of Inclusive and Resilient Pathways for Sustainable Transitions

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Abstract: Achieving climate neutrality and the provision of a route to reduce greenhouse gas emissions to zero or below requires a significant shift from a focus on top-down technological solutions to a more holistic, people-centred approach. The research presented here explores the role of ecological citizenship (EC) in this shift, and specifically how a socially innovative, co-designed approach to facilitating EC and the systemic changes needed for carbon neutrality could or should take place. The paper presents EC as an evolving practice that emphasises the responsibility of individuals and communities towards ecological sustainability and social equity. The study examines how various stakeholders, such as industry practitioners, third-sector organisations, and community members, communicate, understand, and implement EC practices, projects, and solutions, using a mixed-methods approach that includes roundtable talks and workshops. As such, the study emphasises the value of user-centred, co-designed proposals that enable individuals to actively participate in positive climate action. It also looks at the opportunities and challenges of incorporating EC into wider societal and legislative norms. At the municipal, regional, and national levels, we feel the results offer useful insights into how design processes, environmental programs, and participatory governance approaches may promote more sustainable, inclusive transitions and support achieving carbon neutrality.

Keywords: ecological citizenship; multi-method; social innovation; citizen participation

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1. Introduction

Addressing the multifaceted nature of the climate crisis requires more than legislative changes and technological advancements; systemic, people-centred strategies are also essential to empower individuals and communities to drive meaningful change [1–3]. Whilst top-down approaches, utilising legal frameworks and infrastructure improvement, for example, play a crucial role in reducing carbon emissions, they often fall short, and fail to meaningfully engage citizens in the long term, resultantly, there are calls for increased participatory processes for an inclusive sustainable transition [4]. To offer a bridge to this gap, approaches like social innovation and co-design offer valuable and innovative pathways for fostering collaborative problem-solving and developing locally relevant proposals tailored to specific community needs [5,6]. These strategies offer a pathway to promote shared agency, knowledge exchange, and collective participation, routes that can challenge traditional divides between the public, experts, and policymakers.

Achieving climate neutrality requires more structural transformations across sectors such as urban planning, energy, industrial supply chains and transportation, to name a few. More traditional policy efforts have prioritised more technological solutions, such as renewable energy and carbon capture, but there are suggestions that these alone cannot drive the societal and behavioural shifts essential for true sustainability [3,7]. Consequently, existing research emphasises the need to integrate social and cultural dimensions, including community engagement and participatory governance, into the transition to a low-carbon society [8]. Social innovation plays a crucial role in this shift, as it seeks to foster bottom-up, people-centred solutions to environmental challenges [9]. In contrast to more top-down technological fixes, social innovation enables communities to co-design and integrate sustainable practices into daily life, solutions that are more suited to community contexts [5]. Ecological citizenship (EC) offers a further reinforcement of this approach, proposing a viewpoint which redefines the role of individuals and communities in environmental stewardship and embeds social innovation within the landscape of broader sustainability transitions.

EC broadens the definition of citizenship to encompass social, ethical, and ecological obligations to the environment and future generations in addition to legal and political obligations. Based on environmental justice, sustainability, and participatory governance, EC empowers people and communities to actively support sustainable practices, push for structural change, and practise environmental stewardship outside of the bounds of the law [10]. In contrast to traditional citizenship, which emphasises national rights and obligations, EC adopts an international and intergenerational viewpoint, highlighting the close ties between ecological and human well-being. EC is changing in tandem with technology in a sustainable digital society. Digital platforms make it possible for more people to get involved in environmental activism, share knowledge, and work together to develop solutions for sustainability issues. People can more easily participate in climate action and environmental advocacy on a local and global level thanks to open data, smart technologies, and digital governance structures that improve participatory decision-making. Supporting inclusive and transparent governance that cuts across national boundaries, socioeconomic divides, and political ideologies, EC is consistent with the values of deliberative democracy [11], social innovation [12], and environmental ethics [13]. EC challenges consumerist norms in the digital age by utilising digital tools for circular economies, responsible consumption, and cooperative sustainability initiatives, in addition to encouraging resource-conscious decision-making and sustainable lifestyles. Additionally, it highlights how technology can help create accessible and equitable sustainability transitions, ensuring that digital solutions enrich diverse communities rather than exacerbate pre-existing disparities [14].

The principles and foundation stone of EC align [15–17] closely with participatory governance models, frameworks that look to emphasise collaborative decision-making processes involving multiple stakeholders. Stakeholders include policymakers, businesses, civil society organisations, and local communities [18]. Co-design stands out in this context as a crucial route and approach that could and can make EC possible in varied communities and locales. As detailed by Sanders and Stappers [19], co-design offers an approach that places the user at the centre of an iterative approach, which involves stakeholders in the development, testing, and improvement of proposals and solutions. This offers a strategy to make sure proposals are applicable, efficient, and generally acceptable. The study presented here investigates how participatory techniques might promote ecological responsibility and agency by combining EC with co-design processes, offering a route to empower people and communities to take charge of and have agency in sustainability-focused action and projects. In doing so, the first steps towards co-designing an EC mind shift are being developed, promoting ownership of the design process.

Via the utilisation of data collected from roundtable talks and workshops, this research investigates how EC can be imagined and implemented through co-design processes. There-

fore, this study is set out to investigate how EC might be operationalised and implemented to promote social innovation and propel sustainable transitions by including a variety of stakeholders, such as community individuals and groups, third-sector organisations, and industry practitioners [18]. The data collection involves several methods: firstly, roundtable discussions designed to gather qualitative insights from industry practitioners, highlighting key concerns and challenges in implementing EC. Secondly, "*How Might We*" (HMW) workshops on creative problem-solving through collaborative idea generation and feedback loops, ensuring solutions are rooted in user experiences. Plus, the third method of a voluntary, community, and social enterprise (VCSE) session, designed to provide valuable insights into grassroots EC efforts, exploring how community organisations interpret and promote EC, and underscoring the importance of local knowledge in driving sustainable change.

By employing these three methodological approaches, this article looks to build a more comprehensive understanding of EC as a practice influencing and interacting with a variety of different groups, from industry to communities, to social action professionals. The design looks to delve into industry practitioners' viewpoints, offering pragmatic insights shaped by environmental and economic imperatives, VCSE organisations focusing on advocacy and fostering community-driven solutions and community groups contributing through their lived experiences, reflecting localised and personal engagements with and of EC.

2. Theory

The foundation of EC is built upon the principle of shared responsibility for ecological well-being, recognising that environmental challenges require collective social responses across multiple scales rather than purely individualistic or market-driven solutions. This perspective diverges from traditional citizenship models, which typically emphasise state-based rights [15]. Instead, EC aligns with deliberative democracy frameworks that prioritise active participation, dialogue, and co-creation in decision-making [19], as well as environmental justice theories, which argue that the costs and benefits of environmental policies must be equitably distributed [20]. Furthermore, EC promotes localised, context-sensitive approaches to social, economic, and environmental complexities, offering an alternative to top-down policy models through participatory design and governance structures [16].

To frame our exploration of EC, we turn to social innovation—a concept that emphasises novel ideas, processes, and institutional structures as pathways for addressing urgent societal challenges [6,9]. Social innovation is increasingly recognised as a key driver of systemic change in sustainability contexts, enabling communities to collaboratively design solutions suited to their specific socio-environmental conditions [4]. By fostering an environment where diverse stakeholders engage in cooperative problem-solving through inclusive participatory processes [8], social innovation shifts away from traditional innovation models that tend to focus on technology or market-driven solutions [5]. This approach aligns with EC's core tenets, emphasising bottom-up engagement in shaping sustainable futures. Additionally, social innovation intersects with transition management, a field examining how societies navigate complex socio-technical transitions towards sustainability [21]. This intersection underscores the importance of learning, experimentation, and adaptive governance in fostering long-term transformation [22].

However, critiques of participatory governance and co-design methodologies highlight challenges related to scalability, resource intensity, and equitable representation. While participatory approaches aim to democratise decision-making, they may inadvertently reinforce existing power dynamics if not carefully structured. Recent studies point to difficulties in ensuring that all voices, especially those from marginalised communities, are adequately represented, with some participatory initiatives failing to translate engagement into tangible influence over policy outcomes [23,24]. Additionally, co-design methods,

while fostering inclusivity, sometimes struggle with scalability, particularly when transitioning from localised pilot projects to broader systemic change [25]. Scholars have also noted that participatory governance can be time-consuming and resource-intensive, making it difficult to sustain over extended periods without strong institutional support [26]. By acknowledging these critiques, our study seeks to explore strategies for mitigating these challenges, such as designing participatory processes that incorporate feedback loops to ensure continued engagement and employing hybrid governance models that balance grassroots participation with institutional backing.

Our mixed-method approach—including roundtables, workshops, and HMW (How Might We) sessions—aims to create conditions for social innovation by fostering inclusive dialogue, collective problem-solving, and the co-creation of actionable solutions. Roundtables encourage diverse stakeholder engagement, ensuring multiple perspectives are considered, while HMW sessions structure this input into solution-oriented ideation. This iterative process not only generates innovative approaches but also strengthens civic engagement, enabling communities to drive systemic change. As Segales, Hewitt, and Slee [23] emphasise, roundtables function as key social innovation mechanisms, facilitating democratic participation and guiding principles for equitable and sustainable transitions. By embedding EC within this participatory framework, we seek to enhance our understanding of how social innovation catalyses sustainability transitions while remaining attentive to potential limitations and areas for refinement.

Within this discussion, we also foreground co-design as a crucial element in participatory sustainability models. Co-design actively involves stakeholders and end-users in the development of relevant, user-centred, and contextually appropriate solutions [18]. Unlike traditional design methods, which are often expert-driven or reliant on professional expertise [17], co-design fosters shared ownership of ideas through collaborative brainstorming, prototyping, and iterative refinement. This approach is particularly relevant for climate action, where solutions must be adaptable to diverse social, economic, and environmental contexts [24]. Co-design also plays a role in overcoming barriers to public participation in sustainability transitions, such as limited public support, restricted accessibility, and inadequate assessment of user needs, challenges that have contributed to the failure of many climate initiatives [3]. Policymakers and practitioners can create more inclusive, responsive solutions by integrating co-design principles into climate strategies, ensuring that policies resonate with a broad spectrum of stakeholders [6,27].

Emerging criticisms of co-design, however, draw attention to issues with power disparities, the possibility of tokenistic participation, and the difficulty of converting co-developed concepts into workable policies. According to some research, if co-design processes are not properly facilitated, they may marginalise under-represented groups and disproportionately magnify the viewpoints of more privileged participants [28]. Additionally, while co-design encourages collaborative knowledge production, it does not automatically guarantee equitable influence over decision-making processes [29]. To address these concerns, our study incorporates strategies such as structured facilitation techniques to mitigate power imbalances and iterative feedback mechanisms to ensure that co-design outputs are meaningfully integrated into policy frameworks.

Building on these observations, the idea of "design for transition" places co-design in the context of larger frameworks for social innovation and transition theory [25,26]. In contrast to discrete interventions, this viewpoint recognises that systemic changes in societal structures, practices, and behaviours are necessary to address sustainability challenges [5]. Incorporating EC with social innovation and co-design, we offer a participatory sustainability governance model that allows people to influence their surroundings while critically recognising the drawbacks and possible unforeseen consequences of these approaches. Ulti-

mately, this study conceptualises EC as an evolving process of envisioning and constructing a more sustainable form of citizenship, one that fosters both ecological and social belonging. We stress the significance of constant learning, experimentation, and reflexivity because we acknowledge that sustainability transformation is a continuous, adaptive process [8]. Through placing EC in the larger contexts of social innovation, co-design, and design for transition [30,31], this study advances a more sophisticated comprehension of participatory sustainability governance by recognising both its transformative potential and the obstacles that must be overcome in order to bring about fair and long-lasting change.

3. Research Design

The research design was structured around three primary data collection methods (Table 1). These methods were chosen to balance in-depth qualitative insights with interactive, proposal-oriented engagements that foster meaningful discussions on EC in practice.

3.1. Roundtable Discussions

Roundtable discussions were designed and structured to foster dynamic yet open-ended conversations, providing space for participants, who were a diverse group of industry practitioners with expertise in sustainability measures and future-focused design, to explore the concept of EC through lived experiences, sector-specific challenges, and visions for the future. Framed as a scoping exercise, the session looked to invite professionals from various fields to deconstruct potential scenarios, identify critical touchpoints, and explore pathways towards a more accessible, sustainable digital society. Rather than focusing solely on immediate solutions, participants engaged with a "What if we did X, Y, and Z?" mindset, encouraging expansive and innovative thinking around sustainable transitions. The discussions centred on how EC could be effectively integrated into materials and resource use, prioritising the creation of preferred futures over simply reacting to existing barriers.

3.2. 'How Might We' Workshops

HMW workshops followed a participatory co-design approach [27], encouraging participants to think expansively about solutions to barriers identified in roundtable discussions. Rather than narrowing ideas too quickly, participants were guided through a discovery process that fostered divergent thinking, exploring a wide range of possibilities before refining them into actionable solutions. Using design thinking methodologies, the sessions included mind mapping, scenario mapping, and collaborative exercises to stimulate innovative responses to challenges in EC adoption. Framing EC as a response to a broader question, "If ecological citizenship is the answer, what is the question?", helped participants reimagine sustainability not just as a policy goal but as an accessible practice embedded into our daily lives. It is a tool designed to facilitate the discovery process and encourage expansive thinking within an intentionally broad mindset, rather than a reductive one. A brief was broken down into four HMW questions or statements: creating accessible activities and skills, establishing sustainable practices, addressing ecological inequalities, and focusing on community needs. Participants from community groups (collectives of community members completing social and environmentally positive activities within the local area to the workshop), businesses, NGOs, and local governments played a key role in shaping propositions, ensuring they were grounded in real-world needs, and within geographically bounded locales. The HMW sessions also reflected the principles of EC itself, embracing collective responsibility, resource-conscious decision-making, and community-driven action. Through this process, participants not only designed potential interventions but also embodied EC in their approach, mobilising diverse perspectives to create meaningful, lasting impact.

3.3. VCSE Session

The VCSE session offered an occasion and platform for voluntary, community, and social enterprise (VCSE) organisations to connect and collaborate, recognising their vital role in grassroots sustainability efforts. The session brought together a variety of groups engaged in place-based climate action, social innovation, and ecological engagement, with discussions fostered around knowledge-sharing and the exchange of practical insights on EC. Participants explored how EC principles could be integrated into their work while identifying opportunities for future collaboration. Community-led initiatives, sustainability advocates, and voluntary sector representatives contributed diverse perspectives, helping to strengthen networks and build collective momentum towards meaningful environmental and social change.

Table 1. Details of participants.

Event Type	Number of Attendees	Participant Background	Location Context
VCSE Event	18	Mix of VCSE organisations: social action, youth work, community growing, cooperatives	Within a 10-mile radius of Northern UK city
How Might We (HMW) Research	30	Community action and local activities participants	One city in Wales
Round Table	25	Design professionals	UK national context

4. Data Analysis

The data analysis process in this study was designed to systematically identify the key dimensions of EC through qualitative methods, ensuring transparency and rigor in thematic derivation. The seven dimensions of EC emerged from a structured and iterative coding approach applied to the data collected through roundtable discussions, 'How Might We' (HMW) workshops, and a VCSE session.

4.1. Thematic Analysis and Coding Process

To derive the dimensions of EC, the research team followed a multi-phase qualitative data analysis approach, incorporating both inductive and deductive coding methods. The initial phase involved an open coding process, where raw data from transcripts and session notes were systematically reviewed (Table 2). This allowed researchers to identify recurring concepts, patterns, and key phrases that reflected participants' perspectives on EC. Axial coding was used following the open coding stage, creating links between emerging themes and more general conceptual frameworks of citizenship and sustainability. According to participant descriptions, codes were grouped into broad categories that encapsulated the essence of EC. This step was crucial in ensuring that the derived themes reflected the depth and complexity of the discussions.

Table 2. Data analysis stages.

Phase	Process	Example Extracts
Open coding	Raw data from transcripts and notes were systematically reviewed to identify recurring concepts, key phrases, and patterns.	"*Sustainability must be rooted in local culture and ecology*". "*Marginalised communities are often the most affected by climate change*".
Axial coding	Initial codes were refined and grouped into broader categories by establishing links between emerging themes and conceptual frameworks of EC.	"*Community-driven urban green spaces help people connect with nature*". (Grouped under *Place-Specific EC*) "*We need long-term policies, not just short-term wins*". (Grouped under *Legacy-Focused EC*)
Systematic theme development	A cross-comparative analysis was conducted across multiple data collection methods to validate themes and ensure coherence.	"*Access to green spaces is an equity issue*". (Confirmed in both roundtable discussions and VCSE events, leading to *Social Justice EC*)
Cross-referencing and validation	Thematic matrices were used to compare insights across different datasets to ensure themes were not derived from a single source.	"*Human well-being is directly linked to ecosystem health*". (Observed in various sessions, strengthening *Web-of-Life EC*)

4.2. Systematic Theme Development

A cross-comparative analysis of the three data collection techniques was carried out in order to improve transparency and consistency. This strengthened the findings' credibility by ensuring that emerging themes were confirmed by several sources. The research team identified areas of convergence and divergence by methodically comparing participant insights from each method using thematic matrices. For instance, throughout all three data collection events, numerous references to localised sustainability initiatives were used to derive the Place-Specific EC dimension. Similarly, conversations about long-term ecological commitments and intergenerational stewardship gave rise to Legacy-Focused EC. In order to make sure that the seven dimensions were not only influenced by one dataset but rather represented a logical synthesis of insights, each one was meticulously validated by cross-referencing participant contributions. To further ensure the reliability of these findings, an additional step involved participant validation. Selected participants were given summaries of the thematic findings for their input, enabling modifications in light of their observations. This step strengthened the thematic analysis's legitimacy and verified that the derived dimensions aligned with the viewpoints and lived experiences of the study participants.

4.3. Strengthening Credibility Through Systematic Analysis

By employing a rigorous and transparent coding process, the study ensured that the seven dimensions of EC were not arbitrarily defined but emerged organically from qualitative data. The structured approach, encompassing open and axial coding, cross-method comparison, and participant validation, bolstered the robustness of the findings. This systematic methodology not only strengthened the credibility of the research but also provided a clear framework for future studies exploring EC and sustainability practices through qualitative means.

5. Findings

Overall, the findings of this study illustrate that EC is a complex, evolving, and multi-dimensional practice, a practice which is deeply embedded in social, cultural, economic, and institutional and deeply personal contexts, along with having an intergenerational time element. Data analysis of the three data collection events identified seven key dimensions of EC: place-specific EC, legacy-focused EC, web-of-life EC, diversity in EC, social justice EC, adaptability EC, and wider systems EC (Table 3).

Figure 1 illustrates the interconnected dimensions of EC, with EC at the centre linking the seven tenets grouped into three clusters. Foundations of EC include *Place-Specific EC*, rooted in local knowledge and action, and *Legacy-Focused EC*, emphasising intergenerational responsibility. Mechanisms of EC cover *Web-of-Life EC*, recognising human-nature connections, *Diversity in EC*, reflecting varied socio-economic pathways, and *Social Justice EC*, ensuring equity and inclusion. Systemic and Adaptive EC includes *Adaptability EC*, focusing on resilience, and *Wider Systems EC*, connecting EC to governance and policy. The connections in Figure 1 highlight how *Place-Specific EC* and *Legacy-Focused EC* underpin all dimensions, while *Web-of-Life EC* and *Social Justice EC* are closely linked in addressing ecological and social fairness. *Diversity in EC* bridges localised efforts with systemic change, while *Adaptability EC* and *Wider Systems EC* drive governance and policy transformation.

As can be appreciated from the seven EC tenants detailed in Table 3 and Figure 1, the findings suggest that EC is not a fixed, one-size-fits-all framework but a dynamic, evolving process shaped by local contexts, historical legacies, and systemic structures. Rather than following a predefined model, EC is shown to emerge through lived community experiences, adapting to the unique social, cultural, and environmental conditions in which it develops.

Across sectors, participants consistently emphasised the importance of bottom-up engagement, knowledge-sharing, and adaptive governance in fostering EC. As one HMW workshop participant put it, "*Political understanding of ecological citizenship should be that it is a bottom-up necessity*". This resonates with established theories of social innovation, transition management, and co-design, all of which underscore the power of citizen agency, collaborative problem-solving, and decentralised decision-making in driving sustainability transitions [4,21].

Table 3. Ecological citizenship dimensions.

Dimension of EC	Roundtable Discussions	'How Might We' Workshop	VCSE Session	Common Threads
Place-specific EC	Emphasised local ecological knowledge and context-based sustainability.	Focused on customising EC to local needs through community- driven models.	Highlighted bottom-up, localised sustainability efforts.	Localised approaches, community-driven models, place-based knowledge.
Legacy-focused EC	Stressed long-term stewardship over short-term gains.	Explored intergenerational projects linking youth and elder mentorship.	Focused on climate resilience planning, balancing present and future needs.	Sustainability across generations, long-term planning, intergenerational knowledge-sharing.
Web-of-life EC	Advocated for biodiversity and ecosystem-based urban planning.	Discussed nature-based solutions for resilience.	Focused on community-led conservation and restoration.	Ecological interconnection, biodiversity conservation, nature-based solutions.
Diversity in EC	Acknowledged varied socio-economic EC pathways.	Emphasised adaptability to different social and economic contexts.	Showcased diverse local sustainability projects.	Socio-economic diversity, accessibility, varying community needs.
Social justice EC	Linked sustainability to equity and marginalised communities.	Developed strategies for embedding justice into EC, such as energy equity.	Focused on community initiatives addressing environmental discrimination.	Equity, access, justice in both policy and grassroots efforts.
Adaptability EC	Highlighted the need for flexible, evolving solutions.	Explored case studies on adaptive policies and resilience.	Showcased evolving community-led initiatives.	Flexibility, iterative learning, responsive solutions.

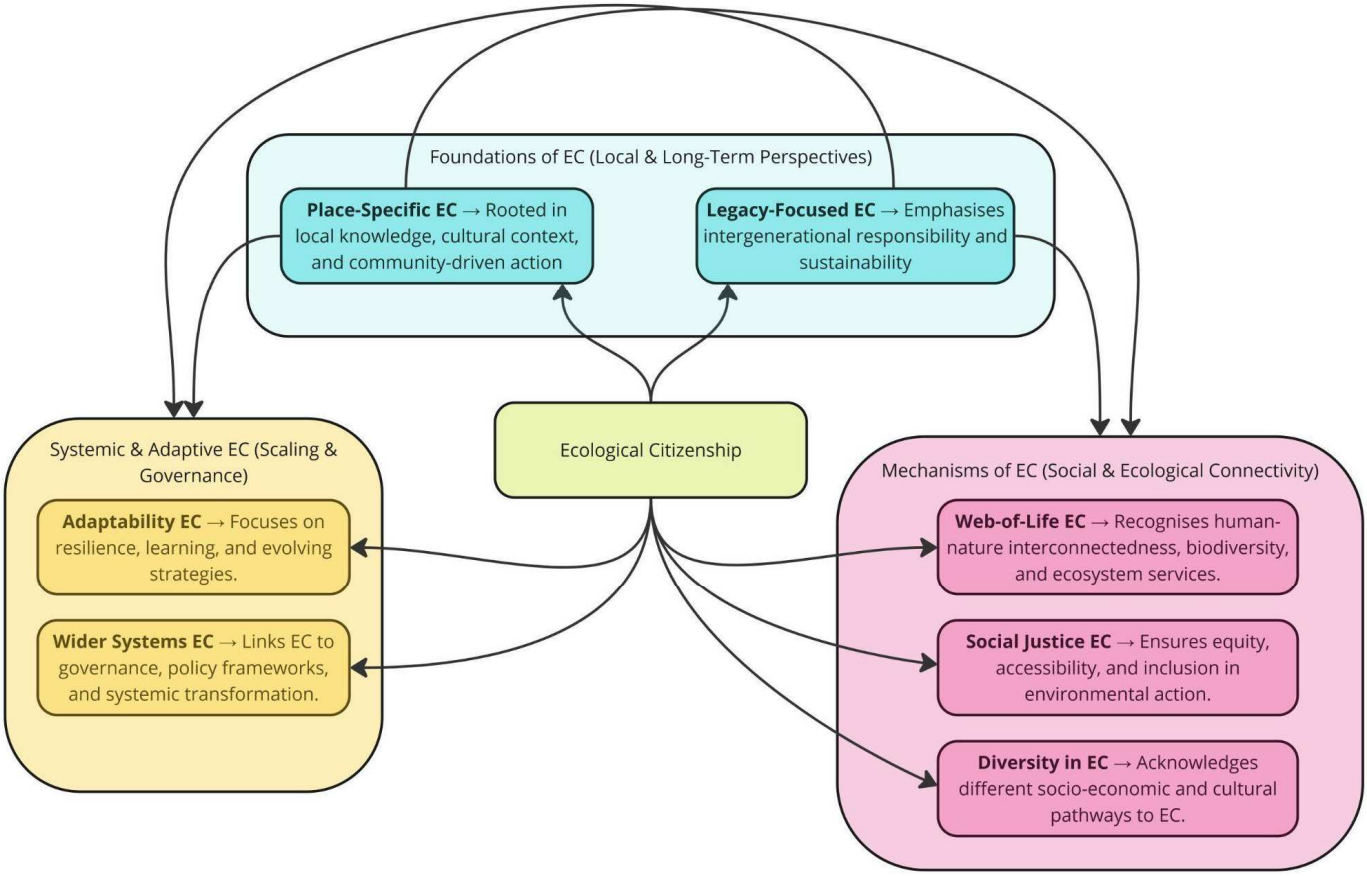

Figure 1. Connecting the seven EC tenants.

5.1. Place-Specific Ecological Citizenship: Localised Knowledge and Community-Driven Action

A core and central finding across the data collection sessions was that EC is inherently place-based and tied to locales, requiring environmental action to be tailored to specific ecological, cultural, and economic contexts of a specific locale. As such, participants repeatedly discussed and detailed that sustainability efforts designed at the national or international level often overlook local nuances and differences, underscoring the need for community-driven, context-sensitive approaches. This was particularly evident in discussions where themes such as land management, resource conservation, and cultural resilience were emphasised, not to mention where ideas of place-connectedness surfaced. Such considerations are not consistently prioritised at the policy level. Multiple participants, for instance, shared experiences of reviving traditional farming techniques and using native plant species for reforestation and waterway restoration. As one roundtable participant suggested, "*Local knowledge of native species can guide restoration efforts, ensuring blue spaces are cleaned through ecologically appropriate methods, supporting species recovery and improving water quality*".

Discussions in reference to urban contexts, by contrast, framed EC as a way to reclaim public spaces for environmental and social action, a route to allowing alternative and innovative ways of using sites and places. Several citizen-led initiatives were highlighted, including community-driven biodiversity mapping, neighbourhood composting programs, and pollinator-friendly urban greening projects. The VCSE session spoke to these types of initiatives, with one attendee suggesting, "*There could be zero-waste initiatives, where edible food goes directly to a community pantry and inedible food goes to compost, keeping the growing going*". This sentiment reflects broader calls for integrating sustainability into city planning processes (and indeed wider), with participants advocating for collaborative approaches that prioritise green infrastructure, access to nature, and citizen involvement in decision-making. These findings align with social innovation theories, which emphasise that sustainability transitions must be participatory, adaptive, and grounded in real-world challenges [8].

5.2. Legacy-Focused Ecological Citizenship: Intergenerational Responsibility and Long-Term Stewardship

Another key theme emergent from multiple participants was the intergenerational nature of EC, emphasising the need and desire for long-term ecological and social stewardship over short-term economic gains, which can dominate political landscapes. Many participants voiced a frustration with mainstream centralised environmental policies driven by short-termism, arguing that governance structures prioritise immediate economic growth at the expense of planetary health, which was commented to often leave younger generations behind, and indeed more vulnerable and marginalised groups. This concern was reflected in calls for greater youth engagement in sustainability efforts, particularly through existing community groups. As one VCSE session attendee noted, "*I think we need to be doing more with out-of-school groups, like Scouts, Guides, and faith groups, who are already engaging with youth. How can we enable more interactions with nature from those groups?*". This sentiment seeks to highlight the potential for established networks (such as those detailed above) to integrate environmental education and hands-on ecological activities, fostering the potential for lifelong engagement with sustainability.

Participants also emphasised the importance of longer-term economic incentives for sustainable practices. A roundtable participant remarked, "*I believe an ecological citizen is someone who supports local economies and businesses practicing ecological methods. We should be doing more to help businesses do the right thing*". This view was echoed and embedded within broader discussions advocating for tax incentives for sustainable businesses, stronger legal protections for biodiversity, and regenerative land-use policies designed to safeguard ecosystems for future generations. Consequently, these perspectives align with deliberative democracy models, which argue that sustainability transitions must be built on inclusive dialogue, participatory decision-making, and co-created policy solutions [19].

5.3. Web-of-Life Ecological Citizenship: Interconnected Thinking and Systemic Interconnections

In terms of viewing EC from a web-of-life perspective, participants across different sectors and data collection sessions emphasised that human well-being is deeply connected to ecosystem health and that sustainability challenges must be addressed through recognition of interconnected practices. Discussions within the HMW and VCSE sessions highlighted the critical and important role of nature-based solutions, including rewilding, habitat restoration, and ecosystem-based urban planning. These initiatives and approaches were seen as valuable and indeed essential for enhancing biodiversity, strengthening climate resilience, and fostering ecological stewardship. A key takeaway was the role of ecological citizens in actively shaping these efforts. As one VCSE session attendee noted, "*ecological citizens should be involved in habitat restoration projects, where they can help educate the public about local biodiversity and encourage participation in citizen science projects to track species and environmental changes*". This perspective underscores the need for community-driven engagement, where individuals are not only contributors to restoration efforts but also raise awareness and inspire wider participation, view methods such as citizen science. By integrating local knowledge and citizen science, for instance, these projects can become more inclusive, looking to ensure that conservation efforts are informed by the people who interact with and depend on these ecosystems daily. EC-focused education as an area of focus also plays a crucial role in this process, as an area that can foster skills, knowledge, and mindsets which may be needed to navigate ecological challenges with creativity and resilience. This can take place through experiential learning, interdisciplinary approaches, and hands-on engagement, which can lead to a cultivation of a deeper understanding of interconnected systems, equipping individuals to take meaningful action in their communities.

VCSE participants also discussed and highlighted the importance of cultivating ecological literacy within communities, stressing how initiatives like biodiversity mapping projects, community science programs, and collaborations between environmental groups and local businesses can strengthen public engagement with sustainability issues. These insights align with transition management frameworks [21,28], which emphasise that sustainability solutions should prioritise interconnected, participatory, and socially embedded approaches [7]. As one VCSE participant stated, "*We believe that EC should be about promoting public awareness, working towards engagement in raising environmental literacy through education and communication efforts*". This perspective underscores the role of ecological citizenship not only in fostering individual responsibility but also in building community-wide understanding, encouraging active participation in sustainability practices, and empowering people to address environmental challenges collectively.

5.4. Diversity in Ecological Citizenship: Multiple Pathways to Sustainability

EC emerged as a flexible and inclusive framework rather than a rigid set of practices, with participants highlighting its adaptability across different cultural, economic, and social contexts. The ways in which communities engage with sustainability varied widely, while VCSE participants saw EC as a tool for advancing policy change and holding institutions accountable, economically marginalised communities emphasised practical, grassroots initiatives. Mutual aid networks, shared composting systems, and cooperative energy projects were cited as key examples of community-driven sustainability efforts that directly address local needs. As such, ecological citizenship could be considered as a framework for championing diversity and inclusivity in the sustainable transition, ensuring that all voices are heard. This diversity of approaches reinforces the argument that sustainability transitions must be inclusive and responsive to different socio-economic realities [20]. As one VCSE session participant put it, "*EC is about diversity, sustaining a multitude of life from all walks of life*". This perspective underscores the importance of ensuring that EC remains

adaptable, allowing diverse communities to define and practice sustainability in ways that align with their lived experiences and priorities.

5.5. Social Justice Ecological Citizenship: Linking Environmental and Social Equity

Linked to the diversity element detailed above, participants also linked EC to broader struggles for social justice, emphasising that environmental issues disproportionately impact marginalised communities. Roundtable discussions explored climate displacement, unequal access to green spaces, and environmental racism, underscoring the need for EC frameworks that prioritise equity and inclusion. Community-led projects within the HMW session showcased EC as a bridge between environmental action and social justice movements. These initiatives demonstrated how participatory governance can address both ecological and social inequalities, reinforcing the idea that sustainability must be embedded within broader systems of justice [15]. As one workshop attendee noted, "*EC across the longer term can generate action to promote social justice and create a transitional system*". This perspective highlights EC's potential to drive systemic change by integrating environmental stewardship with collective efforts towards social equity.

5.6. Adaptability and Wider Systems Ecological Citizenship: The Need for Structural Change

Across all sectors and data collection occasions, participants emphasised the need for EC to remain flexible and responsive, evolving alongside shifting environmental, economic, and political landscapes. Many discussions underscored the importance of policy frameworks that enable decentralised decision-making and adaptive governance, empowering local communities to take ownership of sustainability efforts. This aligns with transition management and design for transition theories, which highlight the role of experimentation, learning, and iterative problem-solving in navigating change [5,21]. As one HMW workshop attendee put it, "*The act of being an ecological citizen is about being flexible, resilient, and adaptable*". More than ever, there is a growing need to find comfort in complexity, a recognition that uncertainty and rapid change are constants, and that true sustainability lies in embracing this fluidity rather than resisting it. EC must not only respond to emerging challenges but also cultivate a mindset that sees transformation as an opportunity rather than a disruption.

6. Recommendations

These suggestions aim to promote inclusive, sustainable transitions at the local, regional, and national levels by addressing the obstacles that have been found as well as the possibilities that present themselves. Of note, this may apply to a UK context, as this is where the data presented here was gathered.

6.1. Promote Co-Design and Participatory Governance

The significance of co-design and participatory governance in integrating EC into communities is one of the study's main conclusions. Removing implementation barriers and guaranteeing long-term, meaningful EC requires involving people in decision-making at all governmental levels. The Participatory City Initiative in Barking and Dagenham, London, is one effective example [32]. Here, locals actively co-design sustainability projects, like waste reduction plans and community gardens, to make sure they serve the community's unique needs. Policymakers should prioritise creating platforms for public participation, especially for youth and marginalised groups.

6.2. Create Policy Frameworks That Bridge Local and Global EC Practices

Although their crucial role is acknowledged, incorporating local sustainability practices into national and international policy is still difficult. One model for integrating place-based EC practices into more general sustainability goals is the Transition Towns Movement [33],

which got its start in Totnes, UK. This has served as inspiration for other local governments around the world, like the Barcelona Superblocks initiative [34], which has effectively expanded community-led urban sustainability initiatives to the level of national and EU policy. It is recommended that governments implement policy incentives, like tax breaks and grants, to promote the wider adoption of community-driven sustainability solutions while maintaining their flexibility in response to changing economic and environmental circumstances.

6.3. Foster Intergenerational Dialogue and Collaboration

As evidenced by Japan's Satoyama Initiative [35], which shares traditional agricultural knowledge across generations to promote sustainable land use, it is crucial to create spaces where younger and older generations can work together on sustainability projects. In a similar vein, Scotland's Climate Ready Classrooms [36] initiative has paired students with senior environmental specialists to foster a long-term outlook on sustainability. Priority should be given to programs like skills-sharing programs, intergenerational mentorship programs, and policy-backed funding for environmental projects involving multiple generations.

6.4. Support Community-Led, Nature-Based Solutions

Long-term investment is necessary for nature-based solutions like urban greening, rewilding, and habitat restoration. With steady policy support, the Great Fen Project [37] in Cambridgeshire has successfully restored more than 3700 hectares of wetland habitat, highlighting the effectiveness of community-led ecological restoration. Furthermore, Copenhagen's Climate-Resilient Neighbourhoods [38] initiative combines social infrastructure and urban greening initiatives to guarantee sustainability over the long run, independent of political cycles. To ensure continuity for community-driven environmental projects, governments should set up funding structures that last beyond election terms.

6.5. Develop Inclusive Sustainability Policies

As evidenced by Bristol's Black & Green Ambassadors Program [39], which enables under-represented groups to participate in environmental activism, EC should integrate social justice with environmental action. Accessible green areas, locally driven food systems, and collaborative energy initiatives should be given top priority in policies to guarantee that sustainability initiatives tackle both ecological and socioeconomic inequalities. Governments can establish a more equitable and inclusive approach to EC by assisting grassroots initiatives like Repowering London [40], which builds community-owned renewable energy projects.

6.6. Embed EC in Education and Public Awareness Campaigns

For long-term environmental stewardship, EC integration into education is essential. A prime example is Finland's Ecosocial Education Framework [41], which incorporates ecological values into every academic subject. In a similar vein, the Eco-Schools initiative [42], which operates in more than 60 nations, offers a replicable template for integrating EC into both traditional and alternative education. Governments ought to fund community education programs that promote public participation in sustainability initiatives and require EC principles to be taught in school curricula.

6.7. Leverage Digital Tools for Community Engagement and Data Collection

In order to promote EC, technology can be extremely helpful. The potential of digital engagement has been demonstrated by the Earth Challenge 2020 initiative [43], which has successfully crowdsourced global environmental data. Nearer to home, the FixMyStreet app [44] in the UK increases community involvement in ecological governance by allowing citizens to report local environmental issues directly to councils. Investing in comparable digital platforms could improve policy engagement and citizen-led environmental monitoring.

6.8. Integrate EC into Climate Action Plans

Strategies for combating climate change must include EC as a fundamental element. In order to maintain social equity during sustainability transitions, the Amsterdam Doughnut Economy Model [45] incorporates citizen-led environmental action into economic and climate policies. Similar to this, the Future Generations Act [46] of the Welsh government offers a model for legislation that puts long-term ecological health ahead of immediate financial gain. By providing funds for locally driven sustainability initiatives, enacting laws requiring public participation in policymaking, and guaranteeing corporate responsibility in environmental governance, governments should incorporate EC into their climate policies.

7. Discussion

This study has sought to critically engage with the concept of EC as a dynamic, context-dependent framework for sustainability transitions. EC in this sense is not a static or universally applicable model or approach; rather, it must be tailored to specific socio-cultural, ecological, and economic conditions to be meaningful and effective [4,47]. The findings from the three data collection routes emphasise, in their own differing ways, that sustainability requires more than technical innovations or top-down policies; it demands the integration of participatory governance, local knowledge, and long-term EC/stewardship. By recognising EC as this multifaceted practice, this research underscores the requirement for approaches that are flexible, inclusive, and importantly rooted in the lived experiences of communities. As such, a central theme emerging from the data presented here is the central and critical role of local context in shaping the implementation of schemes promoting and looking to facilitate EC. Building on this, participants consistently emphasised that sustainability initiatives must integrate local ecological knowledge and community-driven action, acknowledging that strategies tailored to the specific cultural, ecological, and social conditions of an area are essential for long-term success [8]. This aligns with social innovation theories, which look to advocate for solutions that prioritise collaboration, adaptability, and a deep understanding of local challenges [6]. By embedding sustainability efforts in the unique needs and strengths of local communities, EC has the potential to challenge the notion that environmental issues can be addressed through a "one-size-fits-all" approach. Instead, it provides a call for solutions that emerge from the collective wisdom and engagement of those directly affected by the environmental challenges they face [5], adopting a local or indeed hyper-local approach. Furthermore, this study revealed the importance of an intergenerational perspective within EC, particularly in relation to long-term sustainability. Participants expressed concern about the short-termism prevalent in current environmental policies, which often prioritise immediate economic returns over long-term ecological well-being [16]. This critique points to the necessity of sustainability frameworks that incorporate intergenerational equity, ensuring that the needs of future generations are given equal weight in policy and decision-making [16], and promotes practices such as having a proxy for future generations present at decision making occasions. Participants also forefronted the importance of youth and community networks, such as youth groups and faith-based organisations, in fostering intergenerational dialogue and resultant action. By weaving social justice and long-term ecological goals into the fabric of EC, this approach offers a more inclusive, resilient path towards environmental governance that is mindful of both current and future generations [4,10].

The data also generated varied threads talking to the interconnected nature of EC, emphasising the need to address sustainability challenges from a systemic perspective. Participants detailed the deep interconnections between human well-being and ecosystem health, thereby advocating for solutions that recognise the inseparability of environmental, social, and economic factors and forces. In line with transition management frameworks,

which stress the importance of systems thinking and participatory governance [21], participants argued that nature-based solutions, such as rewilding and habitat restoration, must be integral components of EC. These solutions not only promote ecological resilience but also raise public awareness and engage communities in collective action. In this sense, EC offers a route to move beyond theory into practice, offering a framework that turns sustainability from an abstract concept into concrete, locally driven efforts.

With participants also highlighting the diverse pathways to sustainability, pointing to grassroots initiatives, such as cooperative energy projects or shared composting systems, as well as at the other end of the scale and the necessity for broader policy reforms and systemic change, there is also a reflection of the need for sustainability frameworks that are adaptable to the diverse socio-economic, cultural, and geographic realities of different communities [15]. EC must, therefore, evolve to fit the needs of the communities it seeks to serve, ensuring that it is relevant, inclusive, and capable of addressing the unique challenges faced by marginalised or underserved groups [17]. Just as ecosystems evolve and adapt in response to environmental shifts, EC must be fluid, learning to respond and rebalance itself in the face of the ongoing polycrisis, ensuring it remains a resilient and relevant model for sustainability moving forward.

8. Recommendations for Future Research

Even though this study offers insightful information about EC, there is room for improvement and development in subsequent studies. The geographic scope is one important area that needs improvement. Despite having a wide range of stakeholders, the UK continues to be the study's main focus. The findings may be more broadly applicable if the study is extended to include a wider range of international contexts. Given that EC is influenced by regional sociocultural and ecological factors, a more comprehensive and nuanced understanding of how EC appears in various contexts would be possible by integrating viewpoints from various geographical areas. A comparative international approach could help create a more comprehensive framework by shedding light on regional differences in EC practices as well as common principles.

Furthermore, taking a longitudinal approach might provide a more in-depth understanding of the long-term effects of EC programs. Researchers could assess the sustainability, adaptability, and transformative potential of suggested solutions with a time-sensitive analysis that tracks EC-related interventions over long periods of time. A better understanding of how well EC practices promote long-lasting ecological and social benefits may be obtained by looking at how they change, persist, or evolve over time. Understanding EC as a dynamic and changing concept would be strengthened by such an approach, which would also assist in identifying the critical elements that propel sustained engagement and structural change.

Recognising this study's possible limitations is also crucial. The use of qualitative data, which is useful for capturing depth and complexity but may be prone to interpretive biases, is one significant limitation. Because people who participate in EC-related discussions may already be inclined towards environmental and civic action, the recruitment process for study participants may also introduce selection bias, which could limit the representation of broader societal perspectives. Future studies could overcome these constraints by using mixed-method techniques, like combining experimental designs or quantitative surveys, to triangulate results and strengthen the conclusions' resilience. Furthermore, broadening participant recruitment tactics to include under-represented perspectives would improve the generalisability and inclusivity of EC research.

By addressing these areas, future research can continue to build on and refine the insights generated by this study, ensuring a more comprehensive and empirically grounded exploration of EC.

9. Conclusions

The complexity of EC and its critical role in sustainable transitions are highlighted by this study. Large-scale technological fixes and regulations are crucial for cutting carbon emissions, but they are insufficient to bring about the behavioural and societal changes required for long-term sustainability. Our results demonstrate the value of people-centred, participatory approaches that empower communities and individuals to actively participate in the co-creation of solutions.

By incorporating EC into larger sustainability initiatives, we highlight the necessity of locally specific, socially creative strategies. Place-specific, legacy-focused, web-of-life, diversity, social justice, adaptability, and systems-based EC are the seven principal dimensions of EC identified in the study, which illustrates how versatile it is in tackling both local and global issues. These characteristics demonstrate the need for adaptable, situation-specific solutions that support justice, resilience, and intergenerational equity while also being in line with community needs.

Incorporating EC into practice requires social innovation, which places emphasis on cooperation, inclusivity, and local knowledge. Diverse stakeholders' perspectives confirm that creating a sustainable future requires teamwork and is not just the province of the public or private sectors. EC offers a strong framework for enabling communities to co-design solutions, take part in sustainability projects, and promote a low-carbon and equitable society.

By utilising EC's seven dimensions, sustainability initiatives can continue to be flexible, inclusive, and grounded in shared accountability, guaranteeing that environmental action is efficient and fair in a variety of settings.

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