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 of 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 [1]. 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

1. Introduction

Addressing the multifaced nature of the climate crisis means a requirement for more than legislative changes and technological advancements, additionally systemic, people-centred strategies are also essential to empower individuals and communities to drive meaningful change [2,3]. 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 call 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 which can challenge traditional divides between the public, experts, and policymakers.

What's more, 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, solution which 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 embedding social innovation within the landscape of broader sustainability transitions.

EC looks to emphasis the moral and social duties of individuals and groups towards ecological sustainability and social equality, duties which go beyond more conventional ideas and notions of citizenship connected to legal rights and obligations [10]. As such it challenges the more passive role often assigned to citizens in positive climate action policies, instead positioning members of the public as active agents of change who co-create and implement solutions within their own communities [11]. EC is rooted in the recognition that environmental issues are a collective challenge which requires cooperative responses, rather than individualistic or market-based approaches alone [12]. The principles and foundation stone of EC align closely with participatory governance models, frameworks which look to emphasise collaborative decision-making processes involving multiple stakeholders. Stakeholders including policymakers, businesses, civil society organisations, and local communities [13]. Co-design stands out in this context as a crucial route and approach which could and can make EC possible in varied communities and locales. As detailed by Sanders and Stappers [14], co-design offers an approach which places the user at the centre of an iterative approach, that 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 and agency of sustainability focussed action and projects. In doing so, the first steps towards co-designing an EC mindshift 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. Therefore, 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 [13].

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 looking to creative problem-solving through collaborative idea generation and feedback loops, ensuring solutions were rooted in user experiences. Plus, the third method of a voluntary, community, and social enterprise (VCSE) session designed provided 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 that it is founded on the notion of shared responsibility for ecological well-being, acknowledging that environmental concerns call for social solutions operating at a range of scales, rather than individualistic or market-driven ones. This contrasts with traditional conceptions of citizenship that place an emphasis on state-based rights [11]. As such this more expansive view is consistent with deliberative democracy models that seek to prioritise active participation, dialogue, and co-creation in decision-making processes [15] and also with environmental justice theories, which focus on contending that the costs and rewards of environmental policies must be fairly distributed throughout society [16]. What's more EC promotes localised, context-sensitive methods to social, economic and environmental complexities by providing an alternative framing, and alterative to top-down policies through participatory design and governance structures [12].

To provide a framing for our exploration of EC, we look to social innovation, and the concept that fresh concepts, procedures, and institutional structures that tackle urgent societal issues in innovative ways, can provide an essential route to enabling meaningful change [6, 9]. Social innovation is becoming more widely recognised as a major force behind systemic change in the context of sustainability, allowing communities to jointly develop solutions that are specific to their own social and environmental circumstances [4]. Along with permitting varied stakeholders to come together in a cooperation environment, with thoughtful and inclusive participatory procedures [8]. Building on this, social innovation also stresses group problem-solving by utilising a variety of knowledge systems and life experiences, in contrast to traditional innovation models that place more emphasis on technology or market-driven solutions [5]. This strategy is in harmony with EC's foundation stone and tenets, which emphasise the significance of bottom-up involvement in creating sustainable futures. Additionally, there is an intersection of social innovation and transition management, which studies how societies may handle challenging socio-technical transitions towards sustainability [17]. This intersection emphasises the need for learning, experimentation, and adaptive governance in

promoting long-term change. Plus, it also stresses the necessity of adaptable, collaborative strategies to address changing social and environmental circumstances [18]. Our mixed method of roundtables, workshops and HMW sessions look to offer circumstances 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 channel this input into structured, solution-oriented ideation. This iterative process not only generates innovative approaches but also strengthens civic engagement, supporting communities to drive systemic change. As Segales, Hewitt, and Slee [19] highlight, roundtables serve as a key social innovation method, facilitating democratic participation and guiding principles for just and sustainable transitions. By embedding EC within this participatory framework, we look to enhance our understanding of how social innovation catalyses sustainability transitions.

Within this discussion and framing, we also forefront co-design and the notion that co-design is essential because it actively involves stakeholders and end users in the creation of pertinent, user-centred, and contextually suitable solutions [14]. From this perspective co-design promotes shared ownership of ideas by emphasising group brainstorming for instance, along with prototyping, and iterative refinement, in contrast to traditional design methods, which are frequently expert-driven, or are deemed to require "professional" expertise [13]. Our framing here is that co-design is a crucial tool for involving citizens in sustainability projects in the framework of EC. In this sense co-design promotes knowledge sharing and a feeling of collective agency by bringing together a variety of stakeholders, such as local communities, industry practitioners, policymakers, and civil society organisations [5]. Due to the fact climate action requires solutions that may be tailored to various social, economic, and environmental situations, this participatory approach is, in our view, especially pertinent [20]. What's more, co-design aids in the removing of obstacles to public participation in sustainable transitions, for instance a lack of public support, restricted accessibility, and inadequate user needs assessment are the main reasons why many climate initiatives fail [3]. Policymakers and practitioners may create more inclusive, responsive solutions that appeal to a variety of populations by incorporating co-design ideas into climate action plans [6]. Additionally, by highlighting the part that design plays in creating sustainable socio-technical systems, the idea of "design for transition" expands upon social innovation and transition theory [21, 22]. It acknowledges that systemic changes in society structures, practices, and behaviours are necessary to address sustainability issues, which cannot be solved by discrete initiatives [5].

Combined, this perspective views EC as a process of envisioning and creating a new, more sustainable type of citizenship that fosters both ecological and social belonging. By integrating EC with co-design and social innovation, we present here a route, which can develop participatory sustainability models that empower individuals to actively shape their environments [13]. Recognising that sustainable transformation is an ongoing, adaptive journey, design for transition stresses the importance of experimentation and continuous learning [8], and there in this spirit this study offers a foundation for understanding how participatory methods can drive systemic sustainability change, placing EC within broader frameworks of social innovation, co-design, and design for transition.

3. Research design

The research design was structured around three primary data collection methods. 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 preferable futures over simply reacting to existing barriers.

3.2 'How Might We' workshops

HMW workshops followed a participatory co-design approach [23], 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's 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 toward meaningful environmental and social change.

4. 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 1).

Table 1. Ecological citizenship dimensions

Dimension of EC	Roundtable discussions	*'How Might We'* workshop	VCSE session	Common threads
Place-specific EC	Focus on integrating local ecological knowledge into actions. Participants emphasised that sustainability efforts must be rooted in the specific cultural, ecological, and social contexts.	Highlighting of the need to customise ecological citizenship proposals to local needs, focusing on community-driven models such as urban green spaces and rural rewilding projects.	Participants focused on localised, bottom-up approaches to sustainability, with community-led initiatives such as neighborhoods-level biodiversity mapping and community gardens.	Localised approaches, community-driven models, and place-based knowledge.
Legacy-Focused EC	Emphasis on the need for longer-term ecological stewardship, with a noting that short-term gains can regularly take precedence over sustainability and future generations.	Focus on intergenerational projects such as programs involving youth-led environmental initiatives alongside elder mentorship on sustainable practices.	Discussions centred on how legacy-focused EC could be embedded in community action, with ideation looking to create local climate resilience plans that balance current needs with future sustainability goals.	Sustainability across generations, long-term planning, and intergenerational knowledge-sharing.
Web-of-Life EC	Emphasis on the interconnectedness of human well-being with ecosystem health. Session trends called for policies that considers biodiversity and ecosystem services in urban planning and agriculture.	Discussions pinpointed nature-based solutions, such as using wetlands for flood management and developing resilient agricultural practices that recognise the need for ecosystem health.	Discussions highlighted community-led conservation, ecosystem restoration, and nature-based solutions like tree planting and water conservation to enhance resilience.	Emphasis on ecological interconnection, biodiversity conservation, and nature-based solutions across different contexts.

Diversity in EC	EC strategies must be adapted to various socio-economic contexts. Participants acknowledged the diversity of pathways available, from policy advocacy to grassroots action.	EC should focus on people in various social, cultural, and economic situations. As such EC should adapt to varying priorities (e.g. access to green spaces or affordability of sustainable goods).	Focus on the need for diversity in EC by showcasing the range of local sustainability projects. Some participants focused on low-cost, community-driven initiatives, such as shared composting systems, while others advocated for more structured policy changes and systemic interventions.	Socio-economic diversity, accessibility, and varying community needs
Social Justice EC	Clear link made between environmental action and social justice. Participants stressed the importance of ensuring that sustainability efforts do not leave behind marginalised communities, and that equity must be integral to any environmental policy.	Focus on the intersectionality of social justice and EC. Participants crafted strategies for embedding social justice in environmental action, such as campaigns for equitable access to clean energy and the recognition of environmental racism in urban policy.	Session showcased several community-led initiatives where sustainability was framed within a social justice context. Examples included programs advocating for energy justice, such as helping low-income households access renewable energy, and initiatives that aimed to fight environmental discrimination in underserved areas.	Equity, access, and justice were central to all discussions, with a focus on policy changes and grassroots initiatives.
Adaptability EC	Discussions emphasised the need for flexible, adaptive environmental solutions, highlighting iterative learning and community feedback to adjust to evolving ecological conditions.	Participants explored adaptability through case studies focused on responsive policies and community resilience amid climate challenges. Feedback emphasised the need for easy accessibility and the removal of digital, cultural, and personal choice barriers.	Session showcased community adaptability to climate challenges, with energy projects evolving alongside technology and funding, and food sovereignty initiatives adjusting to local conditions.	Flexibility, iterative learning, and responsive community-led initiatives

As can be appreciated from the seven EC tenants detailed in table 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, 17].

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264 *4.1. Place-specific ecological citizenship: Localised knowledge and community-driven action*

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

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

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293 *4.2 Legacy-focused ecological citizenship: Intergenerational responsibility and long-term*
294 *stewardship*

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

309 Participants also emphasised the importance of longer-term economic incentives for
310 sustainable practices. A roundtable participant remarked, *"I believe an ecological citizen is*
311 *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 [15].

4.3. Web-of-life ecological citizenship: Interconnected thinking and systemic interconnections

In terms of view EC form 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 offered a highlighting of 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 as an area which can fostering 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 [17, 24], 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.

4.4 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 [16]. 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.

4.5 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 [11]. 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 toward social equity.

4.6 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, 17]. 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.

5. 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.

5.1 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. Involving individuals in decision-making at all governmental levels is deemed essential to removing implementation obstacles, and indeed obstacles of sustaining meaningful EC over time. Establishing forums for public participation where a range of perspectives, particularly those of marginalised and young people, may actively participate in sustainability planning and decision-making should be a top priority for local governments and legislators. In order to ensure that solutions are suited to the particular requirements and values of various communities, co-design methods should particularly incorporate cultural and social factors in addition to the technical components of sustainability to ensure that both place-based, and cultural intricacies are embedded in design. This perhaps is of particular note, when we consider the severe extent to which varying communities globally have lost more traditional way of knowing and understanding.

5.2 Create policy frameworks that bridge local and global EC practices

Integrating local sustainability practices into national and international policy frameworks seems to remain a hurdle and a challenge, despite these practices being recognised as essential for addressing urgent environmental issues, especially with the majority of local authorities declaring a climate crisis for instance. To overcome this, there is a call to create adaptable frameworks that incorporate place-based EC practices into broader sustainability objectives. As one VCSE session participant noted, *"We should be working towards both local and global initiatives, I suppose our approach is viewing social justice as something for all global inhabitants."* Grants, incentives, and legal frameworks that recognise and amplify the importance of community-driven environmental efforts could help support local projects. Policies should also create pathways for scaling successful localised practices to larger settings while preserving their essential ecological and cultural significance, ensuring these frameworks are flexible enough to adapt as environmental, political, and economic conditions evolve.

5.3 Foster intergenerational dialogue and collaboration

Establishing spaces where younger and older generations can collaborate on sustainability projects was deemed essential, particularly given the intergenerational nature of EC. Programs such as intergenerational mentorship, cross-generational seminars, and initiatives that facilitate knowledge exchange between senior stakeholders and young people could and can foster these connections. As one HMW workshop participant shared, *"A key thing for me is the skills, the cooking, sewing, 'waste not, want not', frugality, and decision-making, things you only really get from intergenerational knowledge."* To ensure sustainability is seen as both an urgent issue for the present and a long-term responsibility for future generations, policymakers should actively support these projects through funding and institutional recognition, creating a foundation for shared wisdom and collective action.

5.4 Support community-led, nature-based solutions

In addition to nature-based solutions like habitat restoration, rewilding, and ecosystem-based urban design, the study emphasises the need for comprehensive, systems-based approaches to sustainability. However, it was also noted that the success of these initiatives is often constrained by short-term political funding cycles, which prioritise immediate returns over long-term ecological resilience [25, 26]. Rather than investing with a 10- to 25-year vision, there has been a commentary that local governments tend to allocate resources based on election cycles and shifting political priorities [27]. To drive

meaningful change, funding and institutional support for community-driven ecological restoration and urban greening must be embedded into stable, long-term policy frameworks [28]. These initiatives should not only advance key sustainability goals, such as biodiversity conservation and climate change mitigation, but also empower communities to take an active role in environmental stewardship beyond the limits of short-term political agendas.

5.5 Develop inclusive sustainability policies

EC should embed both social justice and equity alongside environmental action. Policymakers must create policies that address the interconnectedness of social and environmental challenges, particularly in economically marginalised communities, to ensure that EC frameworks are inclusive of both human and more-than-human communities. As one VCSE session participant noted, *"I think maybe we should adopt more critical engagement too, how we should be questioning and challenging traditional methods of citizen engagement to ensure they are inclusive, effective, and representative of diverse viewpoints."* Sustainability projects could and should prioritise creating fair access to resources, which in practice advances social justice, and addresses the structural injustices that shape environmental outcomes. Supporting grassroots initiatives, such as community-led food systems, mutual aid networks, and cooperative energy projects, can enable communities to tackle both environmental and socio-economic issues simultaneously, a focus of several VCSE organisations within this study. From a justice perspective, these projects should be empowered to influence policy and practice through a bottom-up approach, challenging traditional methods and ensuring that diverse perspectives are represented in the decision-making process.

5.6 Embed EC in education and public awareness campaigns

Fostering a culture of sustainability and environmental stewardship requires integrating EC into public awareness campaigns and school curricula. As one roundtable participant pointed out, *"EC should be about ecological education from an early age."* The moral and ethical dimensions of environmental challenges must be emphasised by embedding EC values into the curricula of educational institutions, an embedding which could have a presence in mainstream education along with more alterative provision. Public awareness campaigns should highlight EC as a shared responsibility, one that goes beyond individual actions and motivates communities to collaborate in the sustainable transition and take ownership of their ecological futures. The ethical foundation of EC should also be reinforced by media and educational institutions, highlighting its role in addressing the climate crisis and ensuring a just future for all.

5.7 Leverage digital tools for community engagement and data collection

Enhancing community participation in EC can be significantly supported by technology and digital tools, which are already foundational to much of society. As one VCSE session participant noted, *"One thing community groups could be doing is looking at the importance of digital tech in creating communities that have more tools to tackle climate change and its impacts."* Policymakers and sustainability professionals should encourage the creation, implementation and use of digital platforms that enable individuals to actively engage in environmental monitoring, data collection, and decision-making. These platforms provide a route to support collaborative initiatives such as local climate action plans, urban greening projects, and community-led biodiversity mapping. Additionally, these tools could and perhaps should bridge the gap between local efforts and larger

governance structures, providing citizens with the means to gather and analyse data. This would help integrate localised practices more effectively into national sustainability frameworks.

5.8 Integrate EC into climate action plans

Lastly, reaching carbon neutrality requires incorporating EC into regional and national climate action programs. Instead of viewing individuals as passive beneficiaries of policies, governments should acknowledge their role as active participants in climate action. With particular policies that promote and assist community-driven solutions, EC needs to be positioned as a crucial part of climate action plans. This entails offering monetary rewards for environmentally friendly local operations, making sure that legislative frameworks give citizens' involvement in climate action top priority, and establishing channels for cooperation between enterprises, government organisations, and local communities. In doing so, the bridge between climate action and social justice is embedded throughout strategies of change.

6. 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, 29]. 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 for sustainability frameworks that incorporate intergenerational equity, ensuring that the needs of future generations are given equal weight in policy and decision-making [12], 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

toward environmental governance that is mindful of both current and future generations [4, 10].

The data also generated varied thread 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 [17], 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 [11]. 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 [13]. 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.

6. Conclusion

In conclusion, our route to expose the multifaceted nature of EC, this study highlights the vital role of participatory, people-centred strategies in discussing and addressing the complex challenges of climate action and sustainable transitions. While large-scale technological solutions and legislative frameworks are essential, on the one hand, for reducing carbon emissions, they as a stand-alone cannot catalyse the profound and potentially fundamental societal and behavioural changes necessary for sustainable living, and a society that needs to be supported to tread more lightly. This research emphasises the integration of EC into the wider sustainability discourse, positioning individuals and communities as active agents in co-creating solutions. The findings underscore that EC, when combined with co-design processes, can drive a shift towards more inclusive, locally tailored, and socially innovative approaches. By incorporating community-driven insights, social innovation, and collaborative problem-solving, EC principles can be operationalised to support the transition to a low-carbon society. The roundtable discussions, HMW workshops, and VCSE events offered valuable perspectives from industry practitioners, community organisations, and grassroots efforts, demonstrating how EC can be embedded within both local practices and broader governance frameworks. In addition to the participatory nature of EC, this study identifies seven key dimensions that emerged from the data: place-specific EC, legacy-focused EC, web-of-life EC, diversity in EC, social justice EC, adaptability EC, and wider systems EC. These dimensions reflect the varied and multifaceted nature of EC and goes some way to detail its versatility in addressing both local and global sustainability challenges.

Social innovation plays a key role in this shift towards the promotion and prevalence of EC, with a focus on potentially practical, people-centred solutions to environmental and social challenges. It offers a forefronting of local knowledge, inclusivity, and long-term collaboration, core principals we see recurrent within the EC findings here. We present here the contributions from diverse participants and stakeholders highlighting the need for flexible, context-specific approaches that address the unique needs of different communities while promoting fairness and sustainability. This approach aligns with EC principles, emphasising our shared responsibility to future generations and the environment by linking sustainability to social justice, ecological resilience, and intergenerational equity. The research reinforces and looks to support the idea that building a sustainable future isn't just the regard and concern of governments or private industry, it's a collective effort that relies on active citizen participation. EC provides a strong framework for empowering communities to take part in sustainability efforts, co-design solutions, and work toward a more just and sustainable world. By applying EC's seven dimensions, we can better navigate environmental and social challenges, ensuring sustainability efforts remain inclusive, adaptable, and rooted in shared responsibility.

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