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Toward Just Smart Cities: Community-based Arts Organisations as Partners in Design Justice

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Abstract

The smart city paradigm has had a prominent role in urban planning, management, and operations for the last two decades; it is seen as a potential solution to challenges stemming from fast urban growth, and considered to be essential for a sustainable future. Initially taking the shape of optimistic top-down projects in which technology is deemed to solve all social issues, it has recently faced considerable criticism. Shift towards the so-called "human-centric design", which places the end-user at the centre of the design process is however not realising its promises: introducing "co-creation" processes with pre-determined manners of interaction with users often leads to pseudo-participation. A particular danger lies in applying this approach to marginalised communities, where the one-size-fits-all logic fails to encompass the full complexity of identities and of needs at stake, and of the various levels of oppression exhibited by the existing power relationships. Sensitivity of marginalised groups calls for different approaches to tech innovations in smart cities, as those focusing on concepts such as intersectionality and principles of social justice. Frameworks such as Design Justice are in particular intended to promote community-led practices and collaboration between designers and social movements. The paper introduces a series of critical questions reconsidering the Design Justice framework in the context of digital innovation and smart cities. Furthermore, attempting to reintroduce art and culture into the discussion on sustainable urban development, the paper elaborates by means of a few examples on whether community-based arts organisations can play a role in design justice, suggesting that they could become key partners in this endeavour.

Keywords

smart cities, co-creation, social justice-informed design, data justice, digital inequality, innovation policies, social inclusion, design justice, participatory design, community-based art organisations, ethical design

CEUR-WS.org/Vol-3901/paper_8.pdf

1. Introduction

Over the past two decades, we have witnessed an expansion of technological innovations in the field of urban planning, management, and operations, with the intent to improve citizens' lives and to address social issues. Indeed, social and economic problems in cities have been generally traced back to a lack of adequate innovation. As a result, large transnational, national, and city authorities have adopted comprehensive innovation programs, one of the dominant concepts being the "smart city". Typically, smart cities are envisioned to employ information and communication technologies to improve the quality of life for their citizens, the local economy, transport, traffic management, environment and interaction with government. These technologies may include, among others, big data analytics, cloud computing, IoT, blockchain, robotics, 3D printing, 5G and Artificial Intelligence (AI) [1]. Implementation of these solutions is generally enabled by cooperation among governments, knowledge institutions and businesses. In a systematic review of literature centred on an information systems (IS) perspective of smart cities, Ismagilova et al. (2019) [2] argue that the technological aspects of smart cities have been extensively researched within the literature (therefore, the concept emerges primarily within a technological discourse). Yet, more recent studies (after 2012) have taken a wider IS perspective,

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focusing on aspects such as citizens, quality of living and sustainability.

Despite its futuristic imaginary, the development of smart cities entails inherent risks and challenges that require further ethical examination. The uncritical introduction of technological solutions may exacerbate problematic aspects of existing solutions while also creating new challenges. From a systematic review of ethical concerns, Ziosi et al. [3] identify four dimensions that stem from the current debate on smart cities: (1) *network infrastructure*, with the corresponding concerns of control, surveillance, and data privacy and ownership; (2) *post-political governance*, embodied in the tensions between public and private decision-making and cities as post-political entities; (3) *social inclusion*, expressed in the aspects of citizen participation and inclusion, and inequality and discrimination; and (4) *sustainability*, with a specific focus on the environment as an element to protect but also as a strategic element for the future.

The various factors contributing to power imbalances in design processes include disproportionate stakeholders' influence, inadequate representation leading to products that do not meet diverse needs, disparities in expertise that minimise practical contributions of marginalised communities, information asymmetry creating understanding gaps [4], hierarchical structures and time constraints undermining collaboration, corporate influences prioritising profit over communities' needs, all of which collectively hinder equitable participation, ultimately undermining smart cities' aims [5]. This paper aims to investigate a particular ethical aspect of the smart city paradigm, specifically focusing on social inclusion (3) as encapsulated by the concept of "co-creation".

While citizen engagement in smart city processes is complex and varied, it also includes challenges that existed long before the emergence of the smart city concept. The "problem of citizen participation" that highlights the need for genuine, empowered engagement of citizens in decision making processes, moving beyond superficial or tokenistic involvement was elaborated in the seminal work of Sherry Arnstein in 1969 [6]. The complexities of citizen participation are similarly reflected in the context of smart cities. Frahm et al. caution that narratives surrounding participation in digital transformations are not neutral; rather, they are normative and performative framings that advance particular agendas [7].

The issue of the so-called "pseudo-participation" [8] is particularly pronounced when attempting to involve marginalised communities in technological innovations in cities. The complexity and layers of marginalisation require alternative approaches to citizen's engagement. A potentially relevant framework for engaging marginalised communities in ethical digital innovation processes in smart cities is the Design Justice framework, which prioritises community-led innovation and emphasises the importance of social justice in design processes. Design Justice underscores the significance of continuity, trust, and closeness with communities, suggesting alliances between designers and community-based organisations to achieve the best outcomes for the community. Looking for practical integrations of the framework within technological design processes, we observed that non-profit arts and culture organisations have a long tradition of working within communities and offer potentially relevant grounds to build upon. Therefore, this paper seeks to elaborate on whether community-based non-profit arts and culture organisations can act as stakeholders in Design Justice processes.

The paper is positioned in the intersection of critical social studies, urban studies, public policy and innovation, cultural policy, and ethical and inclusive design of smart cities, information systems, and AI. It begins with a semi-structured literature review, focusing on co-creation in smart cities, and co-creation for marginalised communities (section 2). It then proposes an evaluative framework for ethical design based on the principles of Design Justice (section 3). The subsequent section discusses how facets of community-based arts organisations align with the evaluative framework of Design Justice (section 4), giving some European and international examples of work on an intersection of community, art and technology. The document concludes with suggestions for further research directions.

2. On Co-Creation

Conventionally, co-creation involves the collaboration of diverse actors from civil society, academia, policy, and industry to collectively address challenges related to sustainability or innovation [9]. Despite its historical origins, the concept of "co-creation" extends across various fields involving multiple stakeholders but lacks clear practical guidelines.

2.1. Facets of Co-Creation

Brandsen and Honingh [10] reflect on the confusion around co-terminology and attempt to make relevant distinctions between co-production and co-creation. The term “co-production” originates from the work of a Nobel prize winning economist Ostrom and other economists who positions it in the public sector, examining the collaboration between public departments and citizens [11]. Furthermore, the term “co-production” finds its critical meaning in academic contexts, specifically within science and technology studies (STS) [9]. This notion is recently additionally appropriated by policies of international organisations to mainstream their innovation agenda [7]. In contrast, “co-creation” initially originated in the commercial business sector and has only recently become dominant across various fields, including the public sector.

Whether one asserts that both terms are synonymous, or posits that co-creation serves as a more comprehensive term encompassing all forms of citizen input in public services, or subscribes to the perspective that they represent two distinct concepts, in practical application, these terms are often used interchangeably.

Furthermore, the two mentioned terms represent only a subset of concepts indicating similar practices, including “collaborative governance”, “community involvement”, “participation”, and “civic engagement” [12]. Voorberg et al. describe attempts to define these terms across various scientific disciplines such as sociology, economics, political science, public administration, marketing, and management, but also that interdisciplinarity additionally contributed to their ambiguity. Therefore, when discussing “co-creation” in the context of smart cities, it is relevant to remain aware of the complexities around co-terminologies that can lead to misinterpretations among various stakeholders [9].

In urban management, citizen participation is often considered essential, but this concept is as contested today as it was in 1969 when Sherry Arnstein in her *Ladder of Citizen Participation* [6], one of the most widely referenced and influential models in the field of democratic public participation, argued that any legitimate participation requires the redistribution of power. Citizen participation is citizen power, argues Arnstein.

Critics have also pointed out that practitioners often struggle to set aside their own preconceived notions about how a co-creation should look like, often seeing it as inherently positive. Voorberg et al. [12] argue that co-creation and co-production are often perceived as virtues without the need for external legitimization through specific evaluation. Mackinnon et al. [13] similarly label co-creation as an “empty signifier” that can mean anything.

2.2. Co-Creation and the Smart City

Smart cities embody contemporary phenomena where modern technologies—such as IoT and AI, relying on data, sensors, and specialised algorithms—are positioned as technical fixes for complex urban challenges, and expected to improve citizens’ quality of life [14]. Governments all over the world are aiming to adopt a ‘smart city’ paradigm relying on a belief in technological solutions [15] as a means to address and optimise various urban governance challenges. Discourse of futurism, connectivity and active citizenship is elevated through the top-down management approach of smart city agendas [16]. Because of this elevation, smart cities are becoming an emerging domain of study [17]. Being both a theoretical and practical concept, there is no consensus on a definition of a smart city [18].

However, the scope of citizen engagement in these projects is often limited. Cardullo and Kitchin argue that in many cases, citizen-focused projects often only concern inputs related to predetermined

solutions [19]. Additionally, authors are addressing the critique that smart cities are overly state- and market-centric, rather than citizen-centric [20].

Despite growing criticism of techno-optimistic narratives [21], the political imagination is still dominated by claims that technical solutions can be uniformly applied to complex social problems [22]. Smart urbanism remains rooted in pragmatic, instrumental and top-down discourses and practices [19]. However, many authors call for a deep and meaningful grounding of smart initiatives within existing spatial and social contexts, shaping place as a whole [23]. Cardullo and Kitchin argue that if smart cities are to become truly 'citizen-focused', an alternative conception of smart citizenship is needed, one that enables an effective shift of power and ideals beyond the market [19].

To foster genuine participation, traditional top-down governance systems in smart cities should be re-evaluated by focusing on context-specific knowledge and experience from local actors and communities [24], a "bottom-up" approach that draws on social justice thinking. Some authors expand beyond the dichotomous top-down/bottom-up view by exploring two intermediary groups that are not neatly classified as either top-down or bottom-up. The first group, positioned between the top and bottom of the smart city hierarchy, includes community associations, non-profit organisations, and ad-hoc task groups. The second group comprises entities with diverse digital practices, whose experiences of marginalisation influence the articulation and pursuit of digital systems [25]. In these two groups, we see the potential for active involvement of community-based art protagonists in technology transformation, as presented in section 4.

Although smart cities have been extensively studied, there has been an imbalance in the attention given to physical and technological aspects, neglecting considerations of social justice and democratic principles [19]. To fill this gap, several authors recently suggested new concepts such as "societal smart city" [26], "alternative smart city" [27], "insurgent smart city' [28], aiming for the "right to the city" [29] to all its inhabitants, or propose moving beyond smart city discourse focusing on broader questions of urban justice in a digital age [21].

2.3. Co-Creation with Marginalised Communities

As previously noted, the typically low-intensity and varied activities associated with citizen participation pose challenges for engaging marginalised communities in smart city initiatives [24]. The ability of marginalised communities to take part in the smart cities processes is additionally hindered by what goes under the umbrella term "digital divide" [30], as well as other relevant dimensions such as linguistic divide, socio-economic divide, representation imbalance, etc. To properly deal with these phenomena, practitioners of co-creation are obliged to step forward beyond the traditional "process expertise" [31], aiming for co-creation practices based on "transformation expertise", and, for doing so, they need a critical understanding of social structures that underlie the need for inclusion of marginalised groups [9]. Paulo Freire, famously observed that critical thought is inseparable from action "upon the world in order to transform it" [32]. The critical pedagogy perspective proposed by Freire invites us to understand everyday life from the perspective of those who are the most powerless so that society can be transformed in the interests of a more humane and just existence for all [32].

The literature frequently talks about marginalisation in connection with inclusion and social exclusion without providing explicit definitions [33]. Despite ambiguity, 'marginalisation' often transforms into related concepts like disadvantage, discrimination, disempowerment, exclusion, inequality, silencing, stigmatisation, victimisation, and more [34]. Razer et al. define social exclusion as a state in which individuals or groups lack effective participation in key activities or benefits of the society in which they live [35]. Social exclusion involves being marginalised from society, encompassing feelings of alienation, undervaluation, and incapacity to contribute meaningfully to the community [36]. The critical smart city scholars therefore argue for developing power-balanced relationships in participatory design, by exploring new ways of engaging with marginalised communities, focusing on horizontal processes and the changing role of designers [37].

3. Design Justice

Initiatives aimed at involving marginalised segments of society in digital innovation, along with the complexities that these processes entail, present a significant opportunity to reframe the meaning and practice of co-creation. This paper introduces the Design Justice framework that aims to challenge rather than reproduce structural inequalities. It has emerged from a growing community of designers in various fields who work closely with social movements and community-based organisations around the world. Design justice connects design to larger struggles for collective liberation and ecological survival, and provides for this reason a better fit to take a stance for marginalised communities.

3.1. Conceptual Foundations: Intersectionality and Matrix of Domination

Before introducing the full design justice framework, Costanza-Chock defines two concepts borrowed from Black Feminist and Critical Race Theory scholars, namely *intersectionality* and *matrix of domination* [38]. The idea of intersectionality laid the foundation for a gradual and ongoing paradigm shift in the social sciences, legal scholarship, and other research and practice areas. This shift is now making its impact on different design domains, including computational-oriented literature. Closely linked to intersectionality, the matrix of domination is a term developed by Black feminist scholar Patricia Hill Collins to refer to race, class, and gender as interlocking systems of oppression, rather than each operating 'on its own.' Collins explains that "people experience and resist oppression on three levels: the level of personal biography; the group or community level of the cultural context created by race, class, and gender; and the systemic level of social institutions" [39].

Although prior design paradigms have sought to centre on users and communities, none have the explicit attention towards intersectional equity in the way that design justice does [40]. Authors as Broto et al. [41] outline the significance of adopting intersectionality lens to ensure that innovation initiatives within marginalised communities do not transform into exploitative endeavours, potentially overlooking crucial urban, civic, and political matters [13].

Design justice principles[1] unfolds as follows in Table 1:

Table 1
Design justice principles, adapted from [42].

Design Justice Principles	
Principle 1	We use design to sustain, heal, and empower our communities, as well as to seek liberation from exploitative and oppressive systems.
Principle 2	We center the voices of those who are directly impacted by the outcomes of the design process.
Principle 3	We prioritise design's impact on the community over the intentions of the designer.
Principle 4	We view change as emergent from an accountable, accessible, and collaborative process, rather than as a point at the end of a process.
Principle 5	We see the role of the designer as a facilitator rather than an expert.
Principle 6	We believe that everyone is an expert based on their own lived experience, and that we all have unique and brilliant contributions to bring to a design process.
Principle 7	We share design knowledge and tools with our communities.
Principle 8	We work towards sustainable, community-led and controlled outcomes.
Principle 9	We work towards non-exploitative solutions that reconnect us to the earth and to each other.
Principle 10	Before seeking new design solutions, we look for what is already working at the community level. We honor and uplift traditional, indigenous, and local knowledge and practices.

[1] See e.g. Design Justice Network Principles: https://designjustice.org/read-the-principles

3.2. Reconsidering Co-Creation from a Design Justice Perspective

In order to genuinely collaborate with marginalised communities in smart city and digital innovation contexts, we suggest applying the Design Justice framework. At a higher abstraction level, we can reframe any design effort through a general three-level stratification of action: behaviour (*how*), outcome (*what*), and motivation (*why*). Outcome and motivation can be distinguished as being concerned either by direct objectives (*what*), or by preferences, constraints and values (*why*) which define against what objectives take shape and are realised through the how. Yet, there is a preliminary dimension to take into account: *who* plays a role in the design process, particularly relevant in the case of co-creation. In technology-oriented approaches as the ones used within contemporary smart city design practices, the outcome (*what*) gets most of the attention, as development is centered around (envisioned) solutions. To guarantee a more holistic approach, it is therefore important to recover the neglected dimensions.

To operationalise the design justice framework in this conceptualisation, we integrate the previously mentioned ten principles of Design Justice with inquiries regarding who is engaged in the design process (*who*), the rationale behind the design (*why*), and the methodologies (*how*) through which design justice can be implemented in collaboration with marginalised communities. The perspectives of marginalised communities must be represented in all three facets of design justice, as illustrated in Table 2.

4. Community-based Arts Organisations

To highlight the importance of civil society initiatives in co-creation efforts within smart cities, we will elaborate on a specific subgroup: community-based arts organisations. Here, the importance of arts and culture for the communities as well as the features of community-based arts organisations are outlined using a semi-structured literature review to assess their capacities in relation to the Design Justice framework shown in Table 2.

4.1. On the Role of Community Arts and Culture

Being historically a foundational element in movements for protest and equity globally, encompassing diverse forms of creative expression such as music, theatre, poetry, and visual arts, art is playing a vital role in conveying emotions, communicating complex ideas, but also in motivating action to challenge perceived impossibilities, for instance in addressing issues of racism and the experiences of privilege and oppression [44].

Arts management scholars engaged in the discussion about the societal character of arts, elaborating it with the following arguments: (1) *arts generate meanings*, (2) *arts constitute individual and collective identities* and (3) *arts is inseparable from other social activities* (see e.g. [45]).

Community based arts provide opportunities to revitalise and rethink the social sphere by reflecting on and embracing inclusive approaches [46]. Furthermore, "community-based art is as much about the process of involving people in the making of the work as the finished object itself" [47]. Relational focus on people and processes in working practices enables the community arts sector to act as an inclusive space for all [46].

According Romig [48], art-based community building has the capacity to establish sustainable bonds, friendships, and trust within communities, enhancing their ability to imagine and implement solutions that address the diverse community needs. In his influential work *Use or Ornament? The Social Impact of Participation in the Arts*, François Matarasso claims that arts-based projects have credentials as tools for social renewal [49].

Despite wide recognition of the social character of the community-based arts, one should not forget that increased emphasis of the social impact of community arts frames public funding as an "investment" with the expectation of reducing social exclusion in underprivileged regions [50]. This is not guaranteed. Furthermore, it is important to recognize the critique of so-called "culture-led urbanisation" since its policies often fail to meet initial expectations and result in negative impacts like gentrification, labour market disparities and the commercialization of creativity and heritage assets. Considering

Table 2
A preliminary set of critical questions to evaluate the inclusivity of co-creation engaging with marginalised communities, based on the Design Justice framework [42, 43].

WHY (purpose, vision and values embedded in the design effort)
Does the design have a social and equitable mission?
Is it intended to improve social outcomes and correct systemic inequities?
Does the design include a commitment to accountability to the communities?
Is it designed by community members and does it include a sustainability component?
Does the design have an environmental component to not only mitigate adverse impacts but nurture positive outcomes?
Does the design include a social, human rights, gender, or environmental impact assessment?
Does the design include recognition of past work on the topic with an emphasis on locally generated, indigenous knowledge, and practice?
Does the design include a literature review, systematic review, interviews with local knowledge bearers, etc.?
WHO (actors, allies, and advocates embedded in the design effort)
Who is conducting the design and how do they impact the work?
What are the roles and responsibilities of the designer or other team members?
Is the design process co-designed or co-implemented with the community in question?
Are we adequately listening to and capturing all perspectives from the project team and the studied community?
Does the designer approach the design process, not as an expert, but as a facilitator who does not have the full knowledge of the community in question?
Does the design recognize the blind spots of the designer?
Does the design place value on the contributions of the team participants or communities as experts of their own experiences?
Does the design allow for co-design, adaptation, or any way for participants to contribute to the research process?
HOW (practices, processes conducting the design effort)
Is there acknowledgment that the design both in its process and findings can have long-term effects on participants?
Is the design centering their voices?
Is the design's impact on the community prioritised over the design's intentions?
Could there be unintended outcomes?
What is the meaning of free, prior, and informed consent in this context?
Is there a commitment and series of actions that ensure that a design process is transparent, collaborative, and social change-oriented?
Is the design process evaluated continuously and iterated for increased accessibility, accountability, and collaboration?
Is there a mechanism for training and knowledge sharing with the communities that are being studied?
Does the design process include a component in which we report back to the communities and ensure that it is a productive and constructive process for everyone involved?

these challenges, it is important to understand if culture and creativity can sustainably drive smart city initiatives without long-term adverse effects [51].

4.2. Community-based Arts Organisations in the Design Justice Framework: the Why/Who/How Dimensions

In principle, community-based arts organisations have the potential to engage significantly in the realm of *why*, by fostering discussions around the purpose, vision, and values embedded in design projects. They could ensure that designs embody a social and equitable mission, aiming to enhance social outcomes and to address systemic inequalities. These organisations can convey the needs of marginalised communities through more effective messages, and uphold the responsibility of design to the community. Drawing on their experiences and locally generated knowledge, community-based arts

organisations can bring valuable insights to the table. Because the proposed critical questions cover all these aspects, they can guide these organisations to explicitly embrace their social intermediary role.

With respect to the *who* aspect, these organisations can become crucial partners in design initiatives, ensuring that designers actively listen to and include all perspectives from the community. Being socially engaged, community arts practices also include affirmation, support, kindness, respect, friendship, and fun, caring for others and intentionally fostering inclusive spaces. When a dominant framework suggests attitudes as self-management and competition, these practices offer an alternative register of contestation [46]. Community arts practices address power imbalances inherent in design processes, emphasising that designers should act as facilitators rather than experts, contributing to a more inclusive design.

Lastly, in the *how* segment of the Design Justice framework, community-based arts organisations can facilitate design processes with marginalised communities using various artistic tools and methods (e.g. Theatre of the Oppressed method, see next section). They could create spaces for reflection and evaluation throughout the design journey, informing the community and broader audience about the design process and outcomes. Borwick claims that the successes of today's non-profit arts and cultural organisations depend on their capacity to represent the interests of and actively involve a wider portion of the community [52]. Acting as advocates for design justice practices in the technological domain, these organisations could play a vital role in promoting more ethical design.

4.3. How Art and Culture Can Transform Technology Design

By fostering critical reflection, enhancing awareness of datafication and promoting inclusive practices, art cultivates trust and accountability, positioning communities as sources of knowledge that are able to radically re-imagine society instead of merely assisting in particular kind of democracy in the service of innovation [7]. Art has the capacity to resonate deeply with individuals, leaving lasting impressions. In the following section, we will review a number of illustrative examples.

JUST-AI[2] fosters a range of creative projects, including science fiction writing that explores themes related to AI ethics. Writing fiction enables de-centring expected hierarchies in technology development, and enhances capacities for empathy. Viola van Alphen[3], an activist and a writer from Eindhoven, highlights that artists play a crucial role in simplifying complex issues related to datafication and making them more comprehensible.

Art can increase awareness of algorithmic surveillance by promoting public reflection on the impact of data-driven technologies, thereby fostering critical literacies in urban communities, as exemplified by artists like Pip Thornton [53]. Additionally, many artistic collectives and artists have created politically aware and aesthetically innovative works under the umbrella of "surveillance art" [54].

Arts initiatives could become important advocates for community collaboration in design justice. Furtherfield[4], an arts-based collective from London, advocates for inclusivity and equity in art and technology to promote social change, while opening access to these fields for collective action and creative collaborations between artists and communities. Digital Civil Society[5] in Germany, initiated by SUPERRR Lab[6], a Berlin-based feminist community and advocacy organisation, gathered over 80 organisations to advocate for the more active role of civil society in digitisation policies in Germany claiming that digital transformation is not a purely technical concern, but first and foremost a social issue[7].

Furthermore, highlighting the experiences of digital oppression, new forms of activism are developed that actively resist data-driven systems and reject commercial digital infrastructures. Notable examples are projects such as the *Algorithmic Justice League*[8] which explores the harms and biases of artificial

[2] https://www.just-ai.net
[3] https://spui25.nl/bio/viola-van-alphen
[4] https://www.furtherfield.org
[5] https://digitalezivilgesellschaft.org
[6] https://superrr.net
[7] https://superrr.net/project/digitalcivilsociety
[8] https://www.ajl.org

intelligence, and *Our Data Bodies*[9], a grassroots research project that works with local communities aiming to develop critical public literacies around algorithmic systems [55].

Community-based arts organisations could act as intermediaries between tech companies, governments, and grassroots initiatives in the city. WORM[10] is an independent and innovative arts venue in Rotterdam that fosters a network of global partnerships and acts as a primary contact for grassroots organisations. Many other art spaces from the Netherlands such as OT301[11], W139[12] or Framer Framed[13] that cultivate strong links with diverse marginalised communities could be relevant in the same context.

One of the powers of the arts is in the ability to recreate and shift negative narratives of marginalisation and initiate action. Take Back The Tech![14] is a mobilisation initiative aimed at encouraging everyone to assert control over technology to combat digital violence against women.

Art could challenge the present and reimagine new collective technological infrastructures. Varia[15], an artistic initiative in Rotterdam, fosters collective critical approaches to everyday technology, while facilitating a collective infrastructure for questions, opinions, support, and action. In Chile, Radical Data[16], a collective of mathematicians, technologists, dancers and designers aims to redefine technology as a tool for communities, emphasising collaborative resistance and reclaiming of agency in the digital era.

Two examples based on the Theatre of the Oppressed (TO) methodology additionally illustrate how community arts practices could address power imbalances in design processes and function as tools for critical digital pedagogy and co-creation.

Developed by Brazilian theatre director and political activist Augusto Boal in the 1960s, TO is a humanist theatrical methodology rooted in the philosophy of Paulo Freire's "pedagogy of the oppressed" [56]. TO serves as a powerful tool for raising awareness about systemic inequalities and injustices, breaking down the barriers between audience and performers by inviting participants to engage as "spect-actors" rather than mere spectators. This participatory approach encourages individuals to move from passive acceptance of oppression to active resistance against various forms of injustice, including those related to class, race, and gender. TO employs aesthetic elements [57] such as words, sounds, and images to stimulate self-representation, raise self-esteem, and facilitate meaningful dialogue for social transformation.

"Data theatre", rooted in the tradition of Freire and Boal, is developed as an educational tool that offers an alternate entryway to building critical data literacy, particularly for learners with limited access to technology [58]. Likewise, a theatre group collaborating with Creativity and Change at Munster Technological University (MTU) investigates local and global implications of social media engagement-based algorithms under the mentorship of Brazilian theatre practitioner Julian Boal (son of Augusto). This collaboration emphasises the need for algorithmic awareness and demonstrates how TO can facilitate engagement with complex issues, revealing and challenging invisible power structures in technology development [59].

5. Conclusions

After reviewing relevant knowledge and engaging with critical analysis and evaluation (drawing from scholarly literature) of the concept of co-creation across all relevant dimensions in smart cities (section 2), the paper introduces an initial version of an evaluative framework for more inclusive co-creation shaped from a Design Justice perspective (section 3). This has been chosen as an instance of operationalisation attuned to the characteristics of marginalised communities, as specifically captured by Design Justice

[9] https://www.odbproject.org
[10] https://worm.org/about/worm-pirate-bay
[11] https://www.ot301.nl
[12] https://w139.nl/
[13] https://framerframed.nl/
[14] https://www.takebackthetech.net
[15] https://varia.zone/en
[16] https://radicaldata.org

concepts as intersectionality and the matrix of domination. While smart city initiatives highlight co-creation in their projects, they employed specific top-down approaches led mostly by tech parties in the context of a market-driven rationale [20]. In contrast, a design justice approach emphasises community-led practices that empower marginalised communities. However, to take its full implementation, the design justice approach needs allies among both technology design practitioners and those engaged in social and political advocacy. The paper therefore analyses (section 4) facets of community-based non-profit arts organisations to become partners in the implementation of the design justice movement. Finally, the paper suggests that community-based non-profit arts organisations can play a vital role in these initiatives due to their intrinsic strengths, including sustained community involvement, inclusivity, advocacy for marginalised groups, and the meaningful articulation of community needs and positions through arts methods. The paper presents illustrative examples demonstrating how community-based art could transform and re-imagine technology by fostering critical reflection, facilitating empathy, altering narratives for marginalised communities, enhancing visibility and awareness of datafication, creating alternative pathways for critical digital literacy and addressing invisible power structures. Art tools and methods used by various initiatives could be employed in meaningful co-creation processes with communities. Reflecting on the knowledge from community-based arts organisations about empathy, empowerment and accountability could be of great importance in framing more just societies in the digital era. Through their public activities, art and culture could facilitate extensive debates, thereby enhancing transparency in the processes of societal technological transformation. Cities bear a significant responsibility to ensure the active participation of informed civil society stakeholders in technological innovation initiatives, thereby guaranteeing adherence to legislative requirements. This requires proactively identifying civil society actors and investing in their capacities to maintain long-term transparency and accountability in the digital transformation process. To encourage systemic involvement of arts and culture organisations closely connected to marginalised communities in the areas of digital transformation and smart cities, further research is needed on possible new policy initiatives and funding frameworks.

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Declaration on Generative AI

During the preparation of this work, the authors used generative AI tools in order to perform Grammar and spelling check in some portions of the text. After using these tools, the authors reviewed and edited the content as needed and take full responsibility for the publication's content.

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