POLITECNICO DI TORINO
Repository ISTITUZIONALE

Transformative Hope. Blockchains and Civic Digital Platforms for Circular Urban Economies

Original
Transformative Hope. Blockchains and Civic Digital Platforms for Circular Urban Economies / Martin Sanchez, L.A., Viano, C., Cenere, S.. - ELETTRONICO. - (2024), pp. 300-311. (16th Conference of the International Forum on Urbanism – IFoU "Urbanism of Hope" Online 12-14 dicembre 2024) [10.17608/k6.auckland.30783074].

Availability:
This version is available at: 11583/3008847 since: 2026-03-16T17:45:52Z

Publisher:
The University of Auckland - Waipapa Taumata Rau

Published
DOI:10.17608/k6.auckland.30783074

Terms of use:

This article is made available under terms and conditions as specified in the corresponding bibliographic description in the repository

Publisher copyright

(Article begins on next page)

27 November 2026

URBANISM OF HOPE

Multi-city Online Conference:

Global Relay, 48 Hours, 6 Cities



The 16th Conference of the International Forum on Urbanism (IFoU)

12-14 December 2024

INTERNATIONAL FORUM ON URBANISM

THE UNIVERSITY OF AUCKLAND NEW ZEALAND

EPFL

TU Delft Delft University of Technology

The proceedings of the Proceedings of the 16th Conference of the International Forum on Urbanism (IFoU) have been prepared by:

Dr Manfredo Manfredini, m.manfredini@auckland.ac.nz
Dr Jing Jiang, jjia417@aucklanduni.ac.nz

Proceedings of the 16th Conference of the International Forum on Urbanism (IFoU)

12-14 December 2024

IFoU 16 Conference Hosts:

NTU Taipei

EPFL Lausanne

University of Buenos Aires

Chinese University of Hong Kong

University of Auckland - Waipapa Taumata Rau

Delft University of Technology

Editors and Conference Co-Chairs: Manfredo MANFREDINI, Jürgen ROSEMANN, WANG Chiu-Yuan, Vivienne, ZHANG Ye, Hendrik TIEBEN, KANG Min-Jay, Paola VIGANÒ, Machiel VAN DORST, and Flavio JANCHES

Publisher: Future Cities Research Centre, Te Pare School of Architecture and Planning, The University of Auckland - Waipapa Taumata Rau

First published: 2024

To cite this document: Manfredini, M., Rosemann, J., Wang, C.-Y. V., Zhang, Y., Tieben, H., Kang, M.-J., Viganò, P., Van Dorst, M., & Janches, F. (2024). *Proceedings of the 16th Conference of the International Forum on Urbanism*. The University of Auckland - Waipapa Taumata Rau.

DOI: 10.17608/k6.auckland.30783074
ISBN: 978-0-473-77144-7



The 16th conference of the International Forum on Urbanism (IFoU) took place from 12 to 14 December 2024.

This publication includes the papers accepted for the 16th IFoU Conference, which was organized as a collective event by six member institutions of IFoU: National Taiwan University, EPFL Lausanne, University of Buenos Aires, Chinese University of Hong Kong, The University of Auckland – Waipapa Taumata Rau, and Delft University of Technology. Under the general theme, Urbanism of Hope, each participating institution became the host for one sub-theme presented online during the conference. In this way, following the presentations of the different sub-themes from host to host, it became a virtual tour around the world.



Table of Contents

Table of Contents I

Preface III

Committees IV

IFoU Conference Scientific Committee V

Keynote Speakers VI

1. Governmentality and Local Participation

Developing Participation Strategies for Canal Heritage Conservation Through Sustainable Urban Drainage Systems: Focusing on the Suzhou Section of the Beijing-Hangzhou Grand Canal 2

From Provincial Government Relocation to Cultural Hub: The Evolution of Wufeng's Urban Landscape 13

Governance of Ecological Space in the Greater Bay Area: A Critical Review 26

Visualising Future Sustainable Cities for India: Adapting Participatory Design Frameworks for Children in the Majority World 34

Catalysing Circular Urban Economy Through Community-Led Public Space Transformation: The CORPUS Project's Approach to Participation 41

2. Local Resiliency

Shaping Resilience: Environmental Transformation and Settlement Adaptation Along the Ming-Qing Old Course of the Yellow River 52

Assessment of Urban Resilience to Floods: An Interplay of Socio-Ecological System Interactions in Cities 66

The Blue Heart: Transformative Multi-Scalar Design for Cross-Domain Planned Climate Adaptation in the Dutch Delta 75

Landscape Approach Valparaiso: Hydro-Geomorphology and Socio-Ecological Variables as a Basis for Water-Sensitive Planning and Design 90

Recontextualising Energy Demand from Socio-Ecological Practices 98

Ecology as a Meshwork – Exploring the Trans-Material Entanglement of Roots, Routes, and Rhizome at Taoyuan's Guo-Hsi Settlement 107

3. Spaces of Integration – Living Together

New Public Spaces for Urban Life? Understanding the "Publicness" of Urban Metro Stations as Public Spaces 123

An Exploration of Museums as Emotional Ties for Communities: A Fine-Grained Sentiment Analysis Based on Social Media Comment Data 135

Sky Gardens as an Alternative for Public Space in High-Rise Housing: Insights from Singapore's Public Housing Projects 145

Housing Policies Within Urban Development Projects: The “Barrio Parque Donado-Holmberg" in Buenos Aires 156

A Study of Spatial Characteristics Changes of Border Trade Market in Tibet 163

Revitalising Streets Through Pandemic-Induced Street Experiments: A Longitudinal Assessment of Outdoor Dining Programmes’ Impact on Vitality in Toronto 172

Strengthening Local Networks Under the Rain of Post-Pandemic Projects in Italy. The Case of Central Lazio, Between the Tyrrhenian Coast, Rome and the Apennines 181

Investigating the Design Principles for Fluctuation-Supportive Railway Station Areas 190

4. Connectivity and Accessibility in the Age of Mediated Relational Mobility

Unravelling the Impact of Infectious Diseases on Urban Travel Behaviour and Preference in Shanghai: A Spatial-Temporal Analysis from Social Media Footprints..... 201

Mobilising Home Territories: The Abstractive Planetarisations of Domesticity in China’s “Homes Away from Home” 212

AR-Driven Collage Technology in the Regeneration of Suzhou's Historical Water Streets: A Study of Public Attitudes and Applicability 221

Urban Disruptions as Laboratories for Innovation Some Explorations in Rome 231

Utilizing Artificial Intelligence to Promote Spatial Justice in Urban Marginalized Communities: A Case Study of London 241

Tangles of Time. Soil Perturbations as Instruments of Potential Relationality for Transition in the Project 250

5. Spaces for Local Economy

Economic Potential of Urban Parks in China: Historical Evolution and Case Study of Beijing 265

Local Urban Economy of Migrant Communities: Case of Tbilisi, Belgrade, and Berlin 275

Empowering Local Economies in Times of Crisis: The Role of Urban Acupuncture in Reactivating Spaces. 282

Enabling Spaces of Integration and Quality of Life: A Governance Study of Co-Production Processes in Monwabisi Park, Cape Town 291

Transformative Hope. Blockchains and Civic Digital Platforms for Circular Urban Economies 300

5. SPACES FOR LOCAL ECONOMY

Host: Delft University of Technology

In times of global crises, local economy and employment often get heavily influenced by unexpected events, such as trade restrictions, pandemics, flooding, and more, which further lead to socio-economically downgraded areas. In this context, the magnitude and emergency of the issues require innovative solutions to enhance local economic vitality and livability, which are sustainable and flexible to cope with uncertainties ahead. At the same time, we see that local initiatives, informal settlements, free spaces, and eco-villages can be frontrunners, combining social resilience, spaces of making and circularity.

Relevant questions include, but are not limited to: Which spatial interventions can stimulate local initiatives that generate urban vitality under these global crises? What is the role of informal economies, their impact on and demand of urban space? What forms of co-working and combined working-living spaces can improve circular economic and quality of living?

Table of Contents

Economic Potential of Urban Parks in China: Historical Evolution and Case Study of Beijing 265

Local Urban Economy of Migrant Communities: Case of Tbilisi, Belgrade, and Berlin 275

Empowering Local Economies in Times of Crisis: The Role of Urban Acupuncture in Reactivating Spaces. 282

Enabling Spaces of Integration and Quality of Life: A Governance Study of Co-Production Processes in Monwabisi Park, Cape Town 291

Transformative Hope. Blockchains and Civic Digital Platforms for Circular Urban Economies 300

Spaces for Local Economy

Transformative Hope. Blockchains and Civic Digital Platforms for Circular Urban Economies

Cristina Viano[1]*, Luis Martin Sanchez[2], Samantha Cenere[3], Nicolò Fenu[3], Paolo Giaccaria[3], Francesco Confalone[1]

[1] University of Turin, Computer Science Department; cristina.viano@unito.it; https://orcid.org/0000-00025823-6257
[2] Politechnic of Turin, Interuniversity Department of Regional and Urban Studies and Planning.
[3] University of Turin, Department of Economics, Social Studies, Applied Mathematics and Statistics.
* Corresponding author.

Abstract: In a context where envisioning a future is increasingly difficult, digital innovation has emerged as a genuine beacon of hope for improving our territories, particularly in terms of social and environmental justice. However, this optimism is tempered by complexities and ambiguities, which underscore the limitations of a strictly technocratic vision of digital innovation. The use of digital technologies in civic and non-profit contexts in urban projects represents compelling examples that diverge from a technocratic view of digital innovation. The research presented in this paper is part of the European project CORPUS, which aims to explore viable models of circular urban economies (CUE) for retrofitting public urban spaces through participatory processes and digital technologies. This paper offers an exploratory review of CUE and investigates how digital tools are used within them. It then discusses the cases under consideration through the lens of prefigurative planning (Davoudi, 2023), which serves as a critical lens for assessing both their potential to challenge the status quo of unsustainable production and consumption models in urban contexts, and their inner complexities.

Keywords: circular urban economies; prefigurative urbanism; prefigurative planning; digital technologies, blockchain.

1. Introduction

> It is a question of learning hope. Its work does not renounce, it is in love with success rather than failure. Hope, superior to fear, is neither passive like the latter, nor locked into nothingness. The emotion of hope goes out of itself, makes people broad instead of confining them, cannot know nearly enough of what it is that makes them inwardly aimed, of what may be allied to them outwardly.
>
> Ernst Bloch (The Principle of Hope, Introduction)

In recent years, digital technologies have gained significant prominence in the field of urban and territorial studies and design, as well as in almost every aspect of our lives. Concepts such as smart city (Angelidou, 2014), platform urbanism (Caprotti et al., 2022), and the twin transition (digital and ecological) have become ubiquitous, even if diverse in nature.[1]

Amid a context of polycrisis (Zeitlin et al., 2019), digital technologies appear to have assumed the role of a secularized new faith, or the last hope in times when imagining the future of cities and territories has become increasingly difficult (Davoudi, 2023). Within this framework, digital technologies are often portrayed as neutral, apolitical tools,

[1] Smart City refers to a meta-project of urban development; platform urbanism offers an interpretive lens viewing our territories as digitally enabled socio-technological assemblages rooted in urban environments; and twin transition highlights the dual process of digital and ecological transformation in territorial policies.

overlooking their inherent ambiguities and complexities (Certomà et al., 2024).
On the contrary, recognizing their inherently political nature allows us to avoid simplistic criticisms, even when these technologies intersect with urban governance and design. In fact, within the digital realm, lesser known radical and reformist approaches to urban innovations coexist alongside mainstream ones (Certomà, 2021), striving to position themselves outside the logic of advanced techno-capitalism. Some of these platforms facilitate interventions in urban environments through collective micro-practices of care for communities and territories, aiming at tackling urban environmental and social problems. These practices are embodied in the urban context and could be framed within what scholars (Davoudi, 2023; Minuchin, 2021; Miraftab, 2017) define as prefigurative planning or prefigurative urbanism: niche projects capable of challenging the mainstream, creating new pathways, new trajectories, and embodying that proactive and inherently optimistic process to which Ernst Bloch refers in his philosophy of hope.

Within this variety of practices that tackle socio-environmental problems, this paper focuses on circular urban economies (CUE) activated at the local community level and investigates the role of digital platforms within them. The paper analyses some projects at the (sub)urban community level through the lens of prefigurative urbanism. The research questions are:

- How do digital platforms support and enable CUE?
- What is the relationship between digitally enabled CUE and urban spaces?
- What are the prefigurative elements, ambiguities and challenges of digitally enabled CUE?

We answer these questions through an exploratory analysis of a selected example of CUE, conducted as part of the EU-funded research project CORPUS—Phygital Cooperation in the Retrofitting of Public Space.[2] The project studies CUE aiming at regenerating public urban spaces, based on community engagement and on civic digital technologies.

While another paper resulting from the same research project, and presented at this conference,[3] focuses on how co-design approaches can enable active contributions from citizens, the present contribution focuses on the role of digital platforms.

Section 2 provides the interpretative framework for this work. Section 3 describes the methodological and analytical framework. Sections 4 and 5 analyse and discuss the selected cases for unveiling their complexities

2. Background

2.1 Digitally-enabled CUE

Among a great variety of urban experiments aimed at reducing the impact of urban activities on natural resources, this research considers circular economies (EU Commission, 2020; Tapia et al., 2021) at the community level. The research has two focuses. On one hand, we refer to circular economy processes such as reuse, repair, upcycling and recycling that involve local actors and final user first hand (Lekan & Rogers, 2020; Seyfang & Smith, 2007; Tornhill et al., 2024), rather than complex industrial production and supply chain.

On the other hand, we focus on experiments defined as alternative urban digitalization, or alternative digital urbanism (Di Bella, 2015; Vadiati, 2022), referring to actions that question mainstream smart city and platform urbanism models and advance more participatory digital tools (Vadiati, 2022). They are initiated in different sectors and with different enabling digital tools. Blockchains have recently emerged in this field due to their potential for ensuring disintermediated, safe and automatized value transactions and decentralized governance models, even if the socio-political implications of blockchains in civic domains are highly debated (Viano, 2024). Digitally enabled collaborative sharing economies (e.g., Lampinen et al., 2020; Lekan & Rogers, 2020; Leontidou, 2020; Santala & McGuirk, 2022) that differ from the market-oriented sharing economies relying on global commercial platforms are also of specific interest for the present research.

These experiments can take the form of municipal programmes, multi-stakeholder research and innovation projects such as urban living labs (ULL), civic or grassroot initiatives.

2.2 Prefigurative urbanism

[2] https://corpusproject.eu/.

[3] "Catalysing Circular Urban Economy Through Community-Led Public Space Transformation: The Role of Digital Tools and Participatory Design in the CORPUS Project."

Some of the practices discussed in Section 2.1—particularly those classified as grassroots—have been described as "prefigurative of urban structures" (Santala & McGuirk). *Prefigurative politics* refers to a series of social experiments that critique the status quo while simultaneously seeking to establish "alternative or utopian social relations in the present" (Cornish et al., 2016; Jeffrey & Dyson, 2021; Yates, 2015). This type of action directly counters the pervasive logic of "there's no alternative" which risks fostering a sense of powerlessness and paralyzing action (Holloway, 2010). The resistance to resignation—which closely aligns with Bloch's "principle of hope"—is foundational to *prefigurative planning*, grounded in post-foundational political theories (Marchart, 2007). Thus, prefigurative planning aims to envision "transgressive, counter-hegemonic, and imaginative" practices (Miraftab, 2017, p. 276) within cities, in active opposition to the neoliberal city model (Davoudi, 2023). Prefigurative planning does not simply reject the status quo; it also seeks to conceptualize alternatives (Santos, 2004, p. 241). This approach frames cities and territories not as static entities but as spaces in constant transformation, using hope as an active category capable of constructing alternative futures within the present, and requiring the navigation of power relations and the confrontation and negotiation with rigid institutional structures.

In this paper, the concept of *prefigurative planning and urbanism* serves as a critical lens for analysing the case studies under consideration (not limited to grassroots practices but including civic initiatives and public-led living labs), to investigate their potential to challenge the status quo of unsustainable models of production and consumption within urban contexts.

2.3 Reading for difference

Another feature of the digitally enabled urban experiments under consideration is to be inspired by different socio-political visions and imaginaries, including radical alternatives to neoliberal paradigms, reformist approaches to smart citizenship, but also digitization processes that do not significantly depart from mainstream paradigms of technological innovation (Certomà, 2021).

To understand this kind of experiment, a stream of research inspired by the work of Gibson-Graham (2008) on diverse economies provides useful inspiration. Gibson-Graham (2006) advocates reading diverse economies "for difference" rather than for the dominance of capitalism, thus escaping dichotomies and giving room to the diversity of emancipatory agencies. This approach is adopted for studying transformative socio-economic practices (Certomà & Giaccaria, 2023; Davies et al., 2017; Thompson, 2019) and digital social innovations, also with blockchains (Balaguer Rasillo, 2023; Certomà, 2023; Lynch & Muñoz-Viso, 2023; Santala & McGuirk, 2022). The authors cited above remark the compresence of social justice goals and neoliberal approaches to urban digitalization, and of communitarian and libertarian instances. We build on this approach for studying digitally enabled CUE, and specifically blockchain-base tokenized systems.

3. Methodology

3.1 The CORPUS project

The EU-funded research project CORPUS explores how to develop CUE, aiming at regenerating public urban spaces together with local communities (e.g., through the collective design and construction of urban equipment). The project is based on two assumptions. First, that circularity and upcycling of materials, community engagement and participatory design, and civic digital platforms can, together, form a phygital model of cooperation for the revival of public space. Hence the three core research dimensions of the project: spatial/material, social/participatory, and digital. Second, that the ULL approach has the potential to foster urban transitions and change in terms of CUE. Hence, the interdisciplinary (urban planning, participatory design, computer science) and transdisciplinary (participatory action research done together with local private and public actors) character of the research.

As regards the digital dimension, the project studies how blockchain-based platforms can enable a decentralized value exchange system that encourages circular behaviours through tokenization,[4] and how such platforms can be developed as civic technologies. In order to test and model participatory and blockchain-enabled CUEs, the CORPUS project activates ULL (Marvin et al., 2018) in the cities of Egaleo (Greece) and Turin (Italy).

[4] The digital representation of values in the form of cryptographic token.

The CUE mapping and analysis presented in this paper is part of the first research phase of the CORPUS project, and was aimed at deepening the knowledge of existing examples of digitally-enabled CUE.

3.2 Mapping CUE

The main sources for our work are databases and reports on EU projects related to (urban) circular economies[5] and on blockchain-based projects addressing sustainability related issues[6] (Galen et al., 2018, 2019; Polvora et al., 2020; Voshmgir et al., 2019), and scholarly literature on circular, collaborative and sharing economies (Ertz & Boily, 2019; Lampinen et al., 2022; Santala & McGuirk, 2022; Tornhill, 2024). We selected 30 projects[7] that address the three core pillars of the CORPUS project (circularity, digital, and participation) and then refined the selection to 9. These projects are listed in Table 1.

Each project was studied through the following analytical dimensions:

1. Socio-economic models:
   - *Objectives:* project's specific challenge within the broader topic of socio-environmental sustainability.
   - *Circularity*: type of circular fluxes and processes activated.
2. Digital tools:
   - *Type of mediation:* the way in which the platform is expected to facilitate CUE interactions.
   - *Functionalities*: the specific means of interactions provided by the platforms.
   - *Transactions* enabled, which is strictly related to the desired circular processes.
3. Urban spaces:
   - *Geographical location* and *level.*
   - Relation between *digital mediation, circularity and urban spaces.*

As regards mediation types and functionalities, we build on the analysis of digital platforms for sharing economy communities by Lewkowicz et al. (2019).[8] We adapted their typology of mediations (based on Sutherland & Jarrahi, 2018) and functionalities, by widening the categories to include more general ones that are relevant for participatory actions (e.g., geo-referred mapping) or for circular economies (e.g., monitoring and tracking), and by adding functions which are peculiar to circular fluxes and tokenized transactions (e.g., providing incentives). In Table 2, functionalities are put in relation to the type of mediation to which they are more typically associated, but the same functionalities can support more than one type of mediation. Moreover, we list a set of possible transactions (of material/economic and immaterial values) through which sharing and circular economies take place.

[5] EU database on NEB projects: https://new-european-bauhaus.europa.eu/get-inspired/inspiring-projects-and-ideas_en; EU CORDIS database https://cordis.europa.eu/

[6] PositiveBlockchain database available at https://positiveblockchain.io/

[7] Most of the projects are active at the date of writing, as resulting from their media channels. Others have been recently terminated, but they have been included when their circular urban economy models appeared as particularly relevant. It's worth noting that innovative projects in the digital and social innovation fields are usually marked by a high turnover rate. This means that reviews and lists as the one presented here require continuous updates and ongoing research.

[8] https://sharingandcaring.eu/working-group/platforms-collaborative-economy The S&C project is relevant to our aims, since, within the "ongoing critique of the sharing economy narrative, questioning the commodification of collaboration" (Lewkowicz et al., 2019, p.2) it aims at contributing to build platforms for a caring economy that values cooperation. This resonates with the overall goal of the Corpus project in relation to CUE and to the use of blockchains, which we aim at re-orienting from speculative or logistic-only applications to participatory practices in urban communities.

Table 1 – Analysis of selected CUE.

	SOCIO-ECONOMIC MODELS		DIGITAL TOOLS				URBAN SPACES		
Project	Objectives	Circularity	Mediation	Functionalities	Transactions	Block-chain	Geograph. Location	Level	Digital Mediation & Urban Circularity
Celo Celo	To provide goods and services to disadvantaged people. To avoid waste of objects and foods. To encourage reuse.	Sharing economy: individual users and associations can both offer and ask for unused objects (e.g. clothes, furniture) and services (e.g. volunteering)	Matchmaking	Wall (website) for matching demand and offer	P2P donations		Italy (Turin and Milan city and metropolitan areas)	Local (City)	Increase of reuse. Contribution to local social and environmental strategies.
Junker App and "Reuse wall"	To facilitate waste sorting by citizens. To encourage the reuse of objects:	Circular economy: separate waste collection on a municipal basis. Sharing economy: individuals and organization reuse objects donated by local institutions.	Information sharing. Matchmaking. Extending reach.	*Junker App:* app for customized information and learning (recognition of materials, information on collection centres...). Mapping. *Reuse Wall*[1]: publishing objects available for donations.	Collection for recycling. Donations.		Italy (various municipalities)	Local (City).	Improvement of municipal waste collection services and behaviours. Increase of reuse.
The Inner West Tool Library	To avoid waste of objects. To encourage reuse. To connect actors.	Sharing economy: "library of things" at the neighbourhood/city level	Matchmaking; Extending reach.	Wall (website) for matching demand and offer. Geolocation.	P2P lending		Australia (Sydney)	Local (Neigh-bourhood - City)	Increase of reuse. Strengthening community relationships.
Peerby	To avoid waste of objects. To encourage reuse. To connect actors.	Sharing economy: "library of things" at the neighbourhood/city level	Matchmaking; Extending reach.	Wall (website) for matching demand and offer. Geolocation.	P2P lending and renting.		The Netherlands (various municipalities)	Local (Neigh-bourhood - City)	Increase of reuse. Strengthening community relationships.

[1] Additional functionalities for local authorities.

	SOCIO-ECONOMIC MODELS		DIGITAL TOOLS				URBAN SPACES		
Project	Objectives	Circularity	Mediation	Functionalities	Transactions	Block-chain	Geograph. Location	Level	Digital Mediation & Urban Circularity
InvolveMint	To encourage environmental and social works. To increase personal liquidity for daily purchases. To keep wealth local.	Circular (+social) economy: Environmental and social care actions in community projects are documented (POI, proof of impact) and rewarded with tokens to be used as local currency for shops and goods.	Encouraging behaviours. Monitoring (Economic transactions).	Mobile and web app to 1) report and certificate actions 2) generate tokens > to be used as material and moral incentives (local currency)	Certification. Rewards / Incentives.		USA (Pittsburg)	Local (Neigh bourhood - City)	Contribution to local social and environmental strategies. Enhancement of local retail and productions (e.g. increase of liquidity).
Empower	To reduce plastic waste produced by individuals and organizations.	Circular economy: plastic waste collection and recycling are tracked and rewarded with "plastic credits" and customizable deposit schemes, to be used as monetary or gamified incentives	Encouraging behaviours. Monitoring. Economic transactions.	Blockchain-based platform (website) to 1) track actions 2) issue and exchange tokens/incentives	Certification. Rewards / Incentives (monetary or gamified). Credits.	X	n.d.	Global or Local (City and beyond)	Increase of fluxes of materials to be recycled. Contribution to public or private environmental strategies.
Plastik Bank	To reduce plastic waste. To create jobs and income.	Circular (+social) economy: collection of plastic waste by vulnerable communities is tracked and generate financial and social benefits, supported by credits purchased by companies	Monitoring. Economic transactions.	Blockchain-based platform (website) to 1) track actions 2) issue and exchange tokens as incentives and payments	Certification. Rewards / Incentives. Payments Credits.	X	Various countries	Global and Local	Increase of fluxes of materials to be recycled. Contribution to public or private environmental and employment strategies.

	SOCIO-ECONOMIC MODELS		DIGITAL TOOLS				URBAN SPACES		
Project	Objectives	Circularity	Mediation	Functionalities	Transactions	Block-chain	Geograph. Location	Level	Digital Mediation & Urban Circularity
Plastic App	To reduce plastic waste. To encourage individual plastic waste sorting	Circular economy: waste sorting actions by individuals.	Encouraging behaviours. (Information sharing).	Blockchain-based app leveraging gamification: –geolocation –quiz/challenges and learning, –tokenized rewards	Rewards	X	France	Local (use on an individual basis)	Specific target on individual behaviours as a leverage for environmental impact.
Pop-Machina	To enable production of circular products and services. To certify circular productions. To support makerspaces and makers communities.	Circular economy: Production and purchase of (certified) circular goods and services through P2P network in makers communities.	Matching. Economic transactions. Monitoring and certification. Trust building.	Blockchain-based platform (website) for 1 marketplace of circular material and services 2) community currency 3) tracking and community-based certification of the circularity	Rent. Sale and purchase. Certification.	X	Belgium, Greece, Lithuania; The Netherlands; Turkey, Spain.	Local (Neigh-bourhood - City)	Multifaceted activation of transactions aimed at circular fluxes within communities referred to urban makerspaces.

Table 2. Type of mediations, functionalities and transactions in digital platforms for CUE.

Type of Mediation	Functionalities	Transactions
Communication and information sharing	News, blogs, messaging	Wall, post, chat (social network)
	Mapping / geo-referred mapping	
	Learning	Donations
Matching	Wall, inventory, catalogue, mapping	Barter
	Payments, marketplace, e-commerce	Lending
Economic transactions	Economic incentives and other benefits	Rental
	Community currencies	Sale / Purchase
Encouraging behaviours	Material and moral incentives (incl. rewards and gamification)	Incentive
Monitoring	Records, reports, indicators, data analysis, mapping	Certification
Certification of information / notarization	Tracking systems, certificates	[combination of communication, matching, extending reach, encouraging functionalities]

4. Analysis

4.1 Socio-economic models

The need or problem addressed by the projects under consideration is mainly related to environmental aspects, i.e., avoiding or reducing waste, encouraging practices such as reuse and recycling (CeloCelo, Bacheca del Riuso, the Inner West Tool Library, Peerby, Empower, Plastic Bank, PlasticApp) or producing of circular products and services (Popmachina). In some cases, sustainability and circularity are functional to, or interrelated with, broader goals concerning socio-economic inclusion (CeloCelo and Plastic Bank), social cohesion and care (InvolveMint), or supporting self-organized communities (such as makers, in Pop-machina).

We label *sharing economies* those collaborative processes around the reuse (sharing, donation, loan, etc.) of objects. The "library of things" through which objects are lent and borrowed at the neighbourhood or town level is a typical example (The Inner-West Tool Library, Peerby). In other cases, the transfer of objects occurs not among peers, but as a gift from donors to receivers (e.g., Reuse wall, Celo Celo).

We label *circular economies* those processes in which circular fluxes are activated for repairing, up-cycling, recycling purposes, i.e., materials are repaired, recombined and recovered to generate new objects. We are analysing small-scale actions that encourage specific individual or organizational behaviours as part of wider circular fluxes: for instance, reducing waste and waste sorting (InvolveMint, Empower, Plastik Bank, Plastic App). The Pop Machina project is an interesting example of a different case, aiming at directly enabling the production of circular goods and services within makerspaces.

4.2 Digital tools

The local *sharing economies* under consideration mostly rely on websites or apps whose mediation (see Table 2) consists in *matching* the demand and supply of objects or unmet needs. Together with *communication and information sharing* on available resources, this triggers direct contacts among the actors, aimed at donating or at lending and borrowing. The related core functionalities are bulletin boards, inventories and catalogues. Basic messaging or news functionalities are sometimes included, but not more complex booking or payment systems which are typical of marketplaces and e-commerce portals. Other functionalities can be present, such as customized learning or interactive maps.

While digital tools for wider circular supply chains are focused on *monitoring* and *certifying* information through functionalities for mapping, tracking, recording fluxes of

resources, the circular economies under considerations are focused on the mediation of *encouraging specific behaviours*. Based on different forms of quantification and monitoring of the value(s) of such actions, they provide functionalities such as incentives, rewards and gamification, so that the same circular actions are repeated.

This explains the experimentation with blockchain technologies. Namely, they leverage the blockchain property of *tokenization*, i.e., the digital representation of values in the form of cryptographic tokens; the possibility of transferring tokens between *wallets* in a secure manner even without intermediaries[1]; the possibility to program automated transactions through *smart contracts*. The core mechanism is the following. Circular actions are quantified according to different criteria (e.g., kilos of plastic collected or recycled), and this value is represented through reward tokens. They can provide economic benefits (e.g., being redeemed as discounts for local shops or services) (Empower) or keep circulating in the form of complementary currencies (Plastic Bank), or take the form of gamified and moral incentives (PlasticApp). Tokens can also be designed as credits, purchased by other actors who do not contribute directly to the circular actions, thus entering further economic value in the system (Empower, Plastic Bank).

4.3 Urban spaces

Sharing economies are designed for local coverage at the neighbourhood or city level, due to the necessity of participants physically meeting to hand over the materials and objects. Circular economy models show a greater variety in terms of geographical scope. On one side, circular actions and the related incentives are expected to be mutually reinforced at the city level, especially when social cohesion, care and community-oriented goals are present (Involvemint) or when short supply chains are activated (Pop Machina). On the other hand, more complex incentives and credit schemes imply the interplay of the local and regional or global level. For instance, circular actions take place in a local community and are supported by actors who operate elsewhere (Plastic Bank); or they can be undertaken indifferently by community actors or regional players (e.g., companies within a supply chain) when the model is flexible across levels (Empower).

Our last insight concerns how the digital mediation is expected to have an effect on the way in which circular fluxes take place in urban spaces and affect urban spatialities and policies at different scales. Most of the models considered aim at increasing or improving circular fluxes of objects and materials at the local level. Hence, the possible contribution to municipal plans and policies on environmental issues such as waste reduction and sorting, but also to other city strategies: for instance, encouraging access to other economic, social or cultural services in the same city. Also, community-based models of sharing economies go beyond environmental goals, coupling them with community-building purposes as opposed to commercial sharing platforms. Generally speaking, digital mediation is designed to encourage a wide set of materials fluxes and socio-economic interactions in the urban space: circularity not only attains materials, but also immaterial resources.

5. Discussion

In this section we discuss the cases analysed above in light of the concepts of prefigurative planning and prefigurative urbanism. We identify some elements that indicate attempts to go beyond the status quo of unsustainable urban production and consumption models, while also fostering practices of care and empowerment for territories and communities. We also identify criticalities that could reproduce existing unsustainable business and governance models.

First, the observed projects generally advance an integrated approach to the environmental and social dimensions of sustainability. A typical mechanism is considering actions for the circularity of materials as a trigger for community building and care (e.g., people meet for borrowing objects), or for social programmes (e.g., waste collection as an opportunity for job creation). Conversely, the intertwining with the economic aspects of sustainability is more prone to contradictions. Particularly in the circular economies considered, incentivization opens the possibility for wider participation, thus tackling one of the constraints of prefigurative actions—remaining limited to a small number of committed actors (Jeffrey, 2021). However, typically, market-related elements such as the search for individual utility are introduced. In some cases, this is considered detrimental to genuine commitment and to intrinsic motivations to contribute to social goals, while others see an opportunity for a positive contamination between economic and social logic: for instance, helping the self-sustainability of social projects.

[1] The novelty of the first widely known blockchain, Bitcoin, relied in the possibility of implementing a natively digital and peer-to-peer currency even in the absence of traditional middlemen like banks and financial institutions

Second, when blockchain-enabled tokenized economies are leveraged, tokenization poses the risk of taking commodification of social values and public assets to extremes (Viano et al. 2023), but it also provides the opportunity of making hidden resources emerge: for instance, making environmental-care actions visible and attributing a value to them. Similarly, when credit schemes are adopted, they can help channel resources towards actions that are deemed positive for a community, but their design should avoid the pitfalls for which instruments such as carbon credits are often criticized, due to the reproduction of "business as usual" extractive and pollutant productive models.

Third, sharing economies in the form of communal sharing practices (Santala & McGuirk, 2022) fosters shared use and temporary ownership and repair/reuse of goods rather than exclusive property, accumulation and consumerism.

Fourth, in the same field, some projects with a more radical post-capitalist orientation also try to develop their own digital platforms based on open access, open source and data-privacy paradigms that challenge data-extractive digital monopolies. However, alternative solutions often strive to reach a sufficient network effect, or can result in not being user-friendly for non-tech-savvy people. Conversely, when mainstream, free of charge, user-friendly digital services are adopted, the offset contributes to consolidating (digital) corporate monopolies.

Fifth, the adoption of digital systems, particularly based on the blockchain, for enabling commons-based and peer-to-peer production is often related to political visions where traditional institutions and intermediaries are overcome in favour of horizontal decision making (Minuchin, 2021). Conversely, in most cases considered here, urban authorities and other local institutions are involved. This can help to reach a wider impact, affirmation and sustainability of the novel practices, if included in wider urban renewal policies and plans.

Lastly, a distinctive feature of prefigurative experiments is being limited in time and scale. However, they represent relevant awareness-raising and capacity-building opportunities (Jeffrey & Dyson, 2021). Scholars have also observed that scaling-up is not necessarily an objective for community-based economies, for which the goal of proliferation could be more meaningful (Lampinen et al., 2020): this is a relevant stimulus for urban planning, i.e., thinking the identification of the appropriate scale for a circular urban economy is viable.

The observed projects cannot be defined as examples of prefigurative urbanism or prefigurative politics in a strictly post-capitalist, radical or oppositional meaning (Davoudi et al., 2023: Minuchin, 2021). For instance, they generally do not advance radically alternative power relations or counter-hegemonic practices. Returning to the notion of prefigurative is rather a heuristic device aimed at challenging existing practices while acknowledging their fragile and contested character (Santala & McGuirk, 2022), their being enacted within existing socio-political and economic systems, and their consequent inner paradoxes. In line with other studies (see Section 2.3), we claim that being aware of the coexistence of different and conflicting paradigms, such as care for the community and individual incentives, is necessary for exploring novel forms of circular and sharing economies and of digital platforms that can re-organize economic relations in urban contexts.

6. Conclusion

This paper has analysed selected examples of CUE, identifying recurring patterns through which digital platforms support them. The review is not meant to be systematic or exhaustive. It provides an exploratory overview to point out potential and challenges to be aware of when studying or initiating experimentations in this field.

Specific implications for the CORPUS project are as follows. Experimenting with the blockchain as a civic technology implies dealing with complexities and contradictions, mostly related to the adaptation of quantification and automatization mechanisms (that are typical of tokenized economies) to social and civic purposes. It is therefore necessary to understand how tokenized incentives can help in making social values visible, in attracting newcomers, or in scaling-up or proliferating CUE. The ambition of the CORPUS project is to engage community members and local authorities in creatively discussing and co-designing the goals and logics of the enabling digital platforms, as part of plans for the renewal of urban spaces.

Reorienting cryptographic tokens and smart contracts towards CUE is a possible example of prefigurative digital urbanism, that challenges the mainstream application of the blockchain, such as speculative cryptocurrencies and acritical hypes on disintermediated governance models, and proactively opens new pathways around tokenized economies with social and civic purposes.

Acknowledgments

This project has been funded by the Italian Ministry of University and Research (MUR), the Dutch Research Council (NWO), and the Greek General Secretariat for Research and Innovation (GSRI) under the Driving Urban Transitions Partnership (Grant N° 101069506), which has been co-funded by the European Union.

References

1. Angelidou, M. (2014), Smart city policies: A spatial approach, *Cities,* 41(1), 2014, S3-S11,
2. Balaguer Rasillo, X. B. (2023). Digital commoning and post-capitalist crypto-economies: The case of FairCoop. *Geoforum,* 144, 103811
3. Caprotti, F., Chang, IC.C. & Joss, S. Beyond the smart city: a typology of platform urbanism. *Urban Transform* 4, 4 (2022).
4. Certomà, C., (2021). *Digital Social Innovation: Spatial Imaginaries and Technological Resistances in Urban Governance*. Springer International Publishing, Cham.
5. Certomà, C. (2023). Narratives of digital social innovation. "Reading for difference" space and spatialities of socio-technological networks in the augmented city. In Albanese, V., Muti G. (eds), *Oltre la Globalizzazione – Narrazioni*, Società di Studi Geografici. Memorie geografiche NS 23, 2023, pp. 689-693.
6. Certomà, C., & Giaccaria, P. (s.d.). *Dialogic practices of urban gardening in Rome: "Reading for difference" in social innovation*.
7. Certomà C., Iapaolo F., Martellozzo F. (eds.) (2024). *Digital Technologies for Sustainable Futures: Promises and Pitfalls2* (1st ed.). Routledge.
8. Cornish, F., J. Haaken, L. Moskovitz, and S. Jackson. 2016. "Rethinking Prefigurative Politics: Introduction to the Special Thematic Section." *Journal of Social and Political Psychology* : 114–127.
9. Davies, A. R., Donald, B., Gray, M., & Knox-Hayes, J. (2017). Sharing economies: Moving beyond binaries in a digital age. *Cambridge Journal of Regions, Economy and Society*, *10*(2), 209–230.
10. Davoudi, S. (2023). Prefigurative planning: Performing concrete utopias in the here and now. *European Planning Studies*, *31*(11), 2277–2290.
11. Di Bella, A., & Di Bella, A. (2015). *Smart Urbanism and Digital Activism in Southern Italy* (smart-urbanism-and-digital-activism-in-Southern-Italy) [Chapter]. https://Services.Igi-Global.Com/Resolvedoi/Resolve.Aspx?Doi=10.4018/978-1-4666-81507.Ch006
12. Ertz, M., & Boily, É. (2019). The rise of the digital economy: Thoughts on blockchain technology and cryptocurrencies for the collaborative economy. *International Journal of Innovation Studies*, *3*(4), 84–93.
13. European Commission (2020). A new Circular Economy Action Plan: For a cleaner and more competitive Europe.
14. Galen, R. (2018). *Blockchain for Social Impact moving beyond the hype*. 82.
15. Gibson-Graham, J. K. (2008). Diverse economies: Performative practices for `other worlds'. *Progress in Human Geography*, *32*(5), 613–632.
16. Giddens, A. (1990). The Consequences of Modernity. Polity Press, Cambridge.
17. Holloway, J. 2010. *Crack Capitalism*. London: Pluto Press
18. Jeffrey, C., & Dyson, J. (2021). Geographies of the future: Prefigurative politics. *Progress in Human Geography*, *45*(4), 641– 658.
19. Lampinen, A., Light, A., Rossitto, C., Fedosov, A., Bassetti, C., Bernat, A., Travlou, P., & Avram, G. (2022). Processes of Proliferation: Impact Beyond Scaling in Sharing and Collaborative Economies. *Proceedings of the ACM on Human-Computer Interaction*, *6*(GROUP), 1–22.
20. Leontidou, L. (2020). Mediterranean cities of hope: Grassroots creativity and hybrid urbanism resisting the crisis. *City*, *24*(1– 2), 263–275.
21. Lekan, M., & Rogers, H. A. (2020). Digitally enabled diverse economies: Exploring socially inclusive access to the circular economy in the city. Urban Geography, 41(6), 898–901.
22. Lewkowicz, M., et al., (2019), *Technical Design and Development of Future Platforms*, White Paper. Available at https://sharingandcaring.eu/sites/default/files/files/D22%20final.pdf
23. Linders, D. (2012). From e-government to we-government: Defining a typology for citizen coproduction in the age of social media. *Government Information Quarterly*, *29*(4), 446–454.
24. Luque-Ayala, A., Firmino, R. J., Fariniuk, T. M. D., Vieira, G., & Marques, J. (2020). Platforms in the making: Hacking the urban environment in Brazilian cities. In *Urban Platforms and the Future City*. Routledge.
25. Lynch, C. R., Muñoz-Viso, À. (2023). Blockchain urbanism: Evolving geographies of libertarian exit and technopolitical failure. *Progress in Human Geography*, 03091325231219699.
26. Marvin, S, Bulkeley, H, Mai, L, McCormick, K, and Voytenko Palgan, Y. (2018). *Urban Living Labs Experimenting With City Futures*. New York: Routledge
27. Marchart, O. 2007. Post-foundational Political Thought: Political Difference in Nancy, Lefort, Badiou and Laclau. Edinburgh: Edinburgh University Press.
28. McFarlane, C., & Söderström, O. (2017). On alternative smart cities: From a technology-intensive to a knowledge-intensive smart urbanism. *City*, *21*(3–4), 312–328
29. Minuchin, L. (2021). Prefigurative urbanization: Politics through infrastructural repertoires in Guayaquil. *Political Geography*, *85*, 102316.
30. Miraftab, F. 2017. "Insurgent Practices and Decolonization of Future(s)." In *The Routledge Handbook of Planning Theory*, edited by M. Gunder, A. Madanipour, and V. Watson, 276–288. London: Routledge.
31. Olivier, P., & Wright, P. (2015). Digital civics. *Interactions*, 22, 61–63.
32. Pólvora A (ed), Hakami A (ed), Bol E (ed), Hassan S, Brekke JK, Atzori M, Bodó B, Mieklejohn, S, De Filippi P, Beecroft K, Rozas D, Orgaz Alonso C, Martínez Vicente E, Lopéz Morales G, Figueras Aguilar A. (2020), *Scanning, the European Ecosystem of Distributed Ledger Technologies for Social and Public Good: What, Why, Where, How, and Ways to Move Forwar*d. EUR 30364 EN, Publications Office of the European Union, Luxembourg.

27. Santala, I., & McGuirk, P. (2022). Communal sharing within and beyond digital platforms: Prefiguring interdependent sharing cities. *Digital Geography and Society*, *3*, 100026.

28. Seyfang, G., & Smith, A. (2007). Grassroots innovations for sustainable development: Towards a new research and policy agenda. Environmental Politics, 16(4), 584–603.

29. Shelton, T., & Lodato, T. (2019). Actually existing smart citizens. *City*, *23*(1), 35–52.
30. Sutherland, W., Jarrahi, M.H., (2018.) The sharing economy and digital platforms: A review and research agenda. *International Journal of Information Management* 43 (2018), 328 - 341.
31.Thompson, M. (2019). Playing with the Rules of the Game: Social Innovation for Urban Transformation. *International Journal of Urban and Regional Research*, *43*(6), 1168–1192.
32. Tapia, C., Bianchi, M., Pallaske, G., & Bassi, A. M. (2021). Towards a territorial definition of a circular economy: exploring the role of territorial factors in closed-loop systems. *European Planning Studies*, *29*(8), 1438–1457.
33. Tornhill, S., Emanuel, M., & Bradley, K. (s.d.). No space to share. Challenges of accommodating grassroots initiatives in sustainable urban districts. *City*, *0*(0), 1–24.
34. Vadiati, N. (2022). Alternatives to smart cities: A call for consideration of grassroots digital urbanism. *Digital Geography and Society*, *3*, 100030.
35. Viano, C., Avanzo, S., Boella, G., & Schifanella, C. (2023). Civic Blockchain: Making blockchains accessible for social collaborative economies. Journal of Responsible Technology, 15(2023), 100066.
36. Viano, C., (2024) Context-based Civic Blockchain: localising blockchain for local civic participation. Digital Geography and Society, 6, 100090
37. Voshmgir, S. (2019). *SustainableDevelopment+Report_BlockchainWeb3_SDGs.pdf*.
38. Yates, L. 2015. "Rethinking Prefiguration: Alternatives, Micropolitics and Goals in Social Movements." *Social Movement Studies* 1–21. doi:10.1080/14742837.2013.870883
39. Zeitlin, J., Nicoli, F., & Laffan, B. (2019). Introduction: The European Union beyond the polycrisis? Integration and politicization in an age of shifting cleavages. *Journal of European Public Policy*, *26*(7), 963–976.

The 16th Conference of the International Forum on Urbanism (IFoU)



Multi-city Online Conference:

Global Relay, 48 Hours, 6 Cities

ifou2024@cuhk.edu.hk

IFoU 16 Conference Hosts:

NTU Taipei

EPFL Lausanne

University of Buenos Aires

Chinese University of Hong Kong

The University of Auckland–Waipapa Taumata Rau

Delft University of Technology

INTERNATIONAL FORUM ON URBANISM

THE UNIVERSITY OF AUCKLAND NEW ZEALAND

EPFL

TU Delft Delft University of Technology