

Soft Situationism and Digital Social Innovation from Lisbon's Urban Periphery



António Gorgel

antonio.gorgel@universidadeeuropeia.pt
IADE, Faculdade de Design, Tecnologia e
Comunicação da Universidade Europeia,
Moscaide, Portugal

The increasing massification of tourism in historic cities has generated significant impacts on peripheral territories, which are often excluded from circuits of cultural and economic valorisation. This paper proposes a situated approach to digital social innovation, intersecting participatory design, community-centred design (CCD), soft situationism, and practices of computational interaction and generative aesthetics as a critical response to these dynamics. Drawing on an analysis of Human–Computer Interaction (HCI) modalities applied to territory, the paper discusses the potential of HCI as a community-oriented relational infrastructure. The case study, XAPAX-APA Colab, developed in the periphery of Lisbon, materialises this approach through co-creation processes with the Café Costura community, integrating textile printing, a generative system grounded in tangible and embodied interaction, a participatory digital archive, and a collaborative territorial map. The results demonstrate how the articulation of in-person practices and digital devices can strengthen community agency, make marginalised forms of knowledge and narratives visible, and promote alternative forms of territorial mediation. The paper contributes to an expanded understanding of digital social innovation as a process that is simultaneously social in its means and ends, reaffirming the role of design and critical HCI in the construction of more just, participatory, and culturally sustainable urban models.

1 Situated Design and Digital Social Innovation

As in other historic cities, quality of life in Lisbon is increasingly threatened by the massification of tourism. Both the country and the city have progressively positioned themselves as privileged tourist destinations, benefiting from a favourable climate, a significant natural and built heritage, and a wide diversity of material and immaterial culture. Although the exponential growth of tourism represents an important contribution to the national economy, the absence of regulatory mechanisms and alternative strategies on the part of responsible entities has produced negative impacts on the sustainable development of this activity, affecting other sectors directly and indirectly. This growing pressure of mass tourism on historic and peripheral territories, as in the case of the Portuguese capital, calls for a reconfiguration of traditional approaches to urban planning, tourism development and cultural intervention.

The work developed within the scope of this research, intersecting participatory design with the framework of community-centred design (CCD) and soft situationism — understood as a situated approach that privileges the creation of collaborative situations, territorial drifting

Keywords: Digital Social Innovation, Soft Situationism, Generative Aesthetics, Computational Design, Tangible User Interfaces, Participatory Design, Territorial Mediation, Urban Periphery.

and attention to everyday uses and practices — is further articulated with practices of computational interaction and generative aesthetics, in which interactive systems operate as cultural and territorial mediators. These intersections demonstrate that the valorisation of local identities and the symbolic and economic redistribution of opportunities depend on processes rooted in the territory and oriented towards genuine community participation (Meroni 2007, 2008; DiSalvo et al. 2013). Within this framework, CCD provides a strategic, community-oriented perspective focused on local change, while participatory design operates as a relational methodology for its materialisation through interactive and computational artefacts.

This is a systemic approach developed in the periphery of Lisbon, involving communities that are particularly vulnerable to the direct and indirect impacts of mass tourism, and framed by CCD as a perspective that extends the methods and tools of user-centred design to the scale of the community (Meroni 2008). In this context, the design process begins with an understanding of local values, behaviours and dynamics, creating conditions for the development of solutions co-created with the communities themselves. CCD thus functions as a catalyst for local change, recognising the community simultaneously as a resource to be valued, an agent of transformation and a source of situated knowledge (Meroni 2007).

The design team involved in this process seeks to understand the community through practices of field immersion and the establishment of empathetic and sustained relationships with people, while simultaneously mobilising non-specialised forms of design knowledge to design with and for the community (Manzini 2015). Within this framework, the development of tools and artefacts that enable the co-design of contextually coherent solutions assumes particular relevance, insofar as it allows non-designer participants to apply their knowledge, experiences and professional skills to the issues under discussion, reinforcing the collaborative and distributed dimension of the design process (Cantu et al. 2012). The territory, as a common denominator between community and designers, thus becomes an object of design, approached from a holistic, strategic and systemic perspective, in which complexity is understood as an integral part of the context of intervention (Valtonen 2010).

This practical, situated approach, mediating between culture, technology and economy, integrates digital infrastructures, participatory platforms and interactive interfaces as extensions of the territory, capable of amplifying local voices, making peripheral narratives visible and creating new forms of mediation between residents, visitors and policy-makers. By articulating in-person practices and digital systems, design ceases to operate exclusively on isolated objects or interfaces and instead intervenes in territorial ecologies of relationships, reinforcing the role of design and Human–Computer Interaction (HCI) as strategic fields for social innovation applied to territory.

2 Interaction Modalities for Community-Based Digital Innovation

Traditionally associated with the design of interfaces and interactive systems, Human–Computer Interaction (HCI) has increasingly asserted itself as a critical and political field when applied to community and urban contexts. Research in HCI oriented towards social innovation recognises that technologies are not neutral, contributing to the inscription of values, to sociocultural equity, and to the reorientation of behaviours (NESTA 2015; Certomà 2021). In this sense, the articulation between HCI and participatory design with communities enables the conception of situated technologies that are sensitive to cultural and social contexts and co-created with the communities that use them (Dourish 2001; Buyannemekh 2024).

Within a territorial context, HCI can operate as a relational infrastructure, supporting processes of digital social innovation (DSI) through collaborative platforms, participatory digital archives, local data visualisation systems or interactive experiences that promote the discovery of peripheral territories. These practices are enabled by a diversity of open technological infrastructures that increasingly underpin DSI in urban contexts, including open data, open hardware, open networks and open knowledge (NESTA 2015; Buyannemekh 2024).

Crowdmapping platforms aimed at reporting urban problems or cultural opportunities, as well as participatory local planning systems in which residents comment on, vote for or co-create proposals for the territory, constitute examples of territorial collaborative platforms (Angelidou & Psaltoglou 2018). In these cases, HCI focuses less on the technical efficiency of the interface and more on the structuring of relationships between people. OpenStreetMap¹ is one of the most well-known urban mapping platforms, maintained by volunteers who provide geographical data on streets, buildings and points of interest in cities worldwide (Haklay & Weber 2008).

Participatory digital archives function as community repositories of oral memory in peripheral neighbourhoods and as visual platforms where inhabitants document cultural practices, markets, crafts or local rituals. Interaction within these platforms can be understood as an act of cultural and political inscription, rather than merely informational navigation (Certomà 2020). Many municipalities have developed digital archives that, although institutionally created, open space for active citizenship contributions, as in the case of the Amsterdam City Archives (Open Amsterdam),² which integrates resident-produced content into the digital urban collection.

In local data visualisation systems, environmental data collected through low-cost sensors are made available, alongside interactive maps that combine statistical data with local testimonies, supporting processes of interpretation and collective deliberation (Buyannemekh

1. <https://www.openstreetmap.org/>

2. <https://archieff.amsterdam/>

2024). The Urban Observatory (Newcastle, UK)³ constitutes an example of a real-time urban sensor network, whose visual interface presents data on traffic, noise, urban climate and pedestrian flows, enabling neighbourhood comparison and the identification of spatial patterns (Newcastle Urban Observatory – EPSRC National Edge Artificial Intelligence Hub n.d.).

Within the domain of interactive experiences for the discovery of peripheral territories, research and practice in HCI have repeatedly proposed location-based narratives accessible through mobile devices, as well as interactive installations in public space that respond to presence, movement or collective participation (Farman 2012). These approaches typically combine pedestrian exploration, geolocation and narrative media to foreground embodied, temporal and locally situated forms of knowledge. The Hidden Florence⁴ application exemplifies this paradigm by articulating GPS-based navigation with audio narratives, reframing secondary urban areas as spaces of experiential and cultural discovery rather than as residual or transitional zones.

A parallel line of work has explored hybrid interfaces that combine digital and physical components, such as Tangible User Interfaces (TUIs) that translate physical actions into visualisations of territorial data (Ishii & Ullmer 1997; Hornecker & Buur 2006; Ishii et al. 2012). CityScope,⁵ developed by the MIT Media Lab, is an example of a hybrid interface applied to urban planning, combining manipulable physical objects with real-time digital simulations. This approach enables the collaborative exploration of complex urban scenarios, mediating processes of participation, deliberation and territory-oriented DSI.

The table presents a comparative assessment, synthetically highlighting how the different typologies of DSI systems activate quality principles in differentiated ways. While collaborative platforms and hybrid interfaces show greater intensity in principles associated with participation, social mediation and collective learning, local data visualisation systems tend to focus on the production and interpretation of information, exhibiting lower levels of community engagement. Territorial interactive experiences, in turn, stand out for their contextual sensitivity and narrative potential, although they display lower intensity in terms of infrastructural openness and long-term participatory processes.

3. <https://urbanobservatory.ac.uk/>

4. <https://hiddenflorence.org/>

5. <https://cityscope.media.mit.edu/>

Table 1. Synthetic Evaluation of Digital Social Innovation Systems in Territory
Scale: High (H) | Medium (M) | Low (L).

Quality Principles DSI + HCI	Collaborative platforms OpenStreetMap	Participatory digital archives Amsterdam City Archives	Local data visualisation systems Urban Observatory	Territorial interactive experiences Hidden Florence
Community orientation	H	H	M	M
Meaningful participation	H	M	L	L
Territorial sensitivity	M	H	M	H
Open / appropriable infrastructures	H	M	M	L
Digital-in-person integration	M	M	L	M
Mediation of social relations	H	M	L	M
Processuality / collective learning	H	M	M	L
Collective social value	H	H	M	M

The DSI evidenced in these examples asserts itself as an emerging field at the intersection of social innovation, digital technologies and urban governance, characterised by collaborative processes in which citizens, communities, organisations and public institutions use technology to co-create knowledge and solutions oriented towards concrete social needs (NESTA 2015; Buyannemekh 2024). In urban contexts, DSI assumes particular relevance due to the concentration of social capital, diversity of resources and technological infrastructures offered by cities, creating favourable conditions for experimentation and collective innovation (Angelidou & Psaltoglou 2017, 2018; Buyannemekh 2024).

In contrast to technocratic or centralised approaches, DSI is distinguished by its participatory, inclusive and decentralised character, positioning citizens not merely as end users but as active agents in the definition of problems and the development of responses (Cerotomà 2020). This orientation aligns DSI with fundamental principles of HCI, particularly in its critical, participatory and community-centred strands, in which technology is understood as a mediator of social relations, collaborative practices and processes of empowerment (Vlachokyriakos et al. 2016).

Research further emphasises that DSI should not be confused with the mere digitalisation of social innovation, but rather understood as a process of digital transformation of social innovation, in which new relationships, new forms of collaboration and new collective capacities emerge (NESTA 2015; Buyannemekh 2024). Within this framework, in-person practices – such as workshops, living labs, fab labs or urban laboratories – retain a fundamental role, complementing digital platforms and reinforcing the relational dimension of innovation.

Finally, it is important to note the risk of DSI being co-opted by technocratic agendas, particularly within the context of smart cities (Certomà 2020). From a critical perspective, DSI should remain community-oriented, avoiding becoming an extension of governance models centred on efficiency, surveillance or neoliberal logic. In this sense, critical HCI and participatory design play a fundamental role in ensuring that DSI technologies reinforce civic agency, promote inclusion and contribute to more just and democratic forms of urban development (Buyannemekh 2024).

3 Participatory Design, Territory, and Soft Situationism

The practice developed within the scope of this research, which combines participatory design with the community-centred design (CCD) framework and soft situationism, articulated with explorations of computational interaction and generative aesthetics as cultural and territorial mediators, materialises in the XAPAXAPA Colab project. This approach draws critically on the legacy of Situationism, particularly the notions of *dérive* and psychogeography developed by the Situationist International (Debord 1958; Debord 1967), here reinterpreted in a non-confrontational manner as practices of attention, listening, and sensitive immersion in the territory.

XAPAXAPA Colab, developed in Santa Clara, a peripheral parish located in the northeastern area of the city of Lisbon, over an extended period since 2024, has unfolded through a series of iterative phases, including initial field immersion, the establishment of relationships with the Café Costura community, exploratory co-creation workshops, and the progressive integration of digital tools. Rather than following a linear process, the project evolved through cycles of experimentation, reflection, and adaptation, allowing different components, such as textile practices, generative systems, and digital platforms, to emerge and stabilise over time.

Santa Clara is characterised by a strong presence of social housing, high cultural diversity, and trajectories marked by processes of urban marginalisation. Although geographically integrated within the municipality of Lisbon, Santa Clara remains largely disconnected from the central circuits of cultural, economic, and touristic valorisation, often being represented through deficit-based or stigmatising narratives. At the same time, the parish has been indirectly affected by the dynamics of mass tourism in the historic centre, particularly through the uneven redistribution of urban resources. In this context, XAPAXAPA Colab positions itself as a situated intervention that seeks to counter these centre-periphery asymmetries by promoting the valorisation of local cultural practices, strengthening social capital, and creating new forms of territorial visibility and mediation emerging from within the community itself.

The core of XAPAXAPA Colab is the Café Costura (Sewing Café), an informal community space located in the PER 11 social housing complex, in Santa Clara (Fig. 1). This housing estate, resulting from the Special Rehousing Programme, hosts populations whose trajectories are marked by urban displacement, housing precarity, and significant cultural diversity. Within this context, Café Costura emerges as a space of regular gathering, mutual learning, and collective production, driven primarily by women residents of PER 11. It functions simultaneously as a place for socialisation, the sharing of life experiences, and the transmission of practical knowledge related to sewing, textile work, and the reuse of materials. As a social infrastructure deeply embedded in the territory, Café Costura sustains relationships of trust and continuity that are fundamental to the development of the project, in line with the principles of CCD (Meroni 2007, 2008).

Fig. 1. Sewing Café, XAPAXAPA Colab.
Patchwork and collective discussion.



The central objective of XAPAXAPA Colab is to explore CCD as a strategic perspective oriented towards territorial social innovation, while participatory design operates as the relational methodology through which this perspective is realised. This is achieved through analogue and digital processes that articulate creative practices, cultural mediation, and the economic valorisation of local knowledge. Its specific objectives include: (i) strengthening the agency and visibility of peripheral communities through situated cultural production; (ii) creating collective memory devices that document local narratives, practices, and identities; (iii) promoting alternative forms of relationships between residents, visitors, and territory, aligned with principles of creative, small-scale, and post-growth tourism; and (iv) experimenting with digital social innovation models that integrate in-person practices and digital platforms, avoiding extractive or purely instrumental approaches.

Originally named Estampa Colab, the project was renamed XAPAXAPA Colab following a co-creation process with the participants of Café Costura. During the workshops, the women collectively created a song centred around the word *xapaxapa*, a term from Cape Verdean Creole meaning patchwork. This expression came to symbolically synthesise the project's logic as a composition of differences, memories, gestures, and diverse forms of knowledge into a collective whole, functioning as

both a cultural and aesthetic metaphor of the territory and of the collaborative practices developed within it.

The soft situationism that informs XAPAXAPA Colab materialises through the creation of collaborative situations rooted in everyday life, approximating a reinterpreted logic of *dérive* (Debord 1958; Careri 2002), in which walking through the territory, attention to informal uses of space, and direct contact with local people, rhythms, and practices play a central role. Beyond the activities taking place at Café Costura, the project incorporates informal walks through Santa Clara, involving streets, everyday spaces of sociability, and proximity-based facilities (Fig. 2). These practices do not aim at producing objective cartographies, but rather at constructing situated knowledge through lived experience, in line with critical perspectives that understand urban space as a social construct (Lefebvre 1974).

Fig. 2. *Dérive* in Alta de Lisboa (Feira do Relógio); stencil print overlaying fair stalls onto a Lisbon map, with Santa Clara positioned as the city's heart.



By privileging slow, repeated, and attentive movements, soft situationism distances itself from the original logic of rupture and confrontation associated with historical Situationism, instead aligning with an ethical and relational practice of territorial attention. The experiences emerging from these walks directly inform the co-creation processes developed in the project—from the production of patterns and objects to the construction of digital narratives—establishing continuity between bodily experience, social practice, and technological mediation. It is from this relational and experiential foundation that participatory digital design devices emerge, in which technology acts as an extension of territorial lived experience rather than as an external or abstract instance.

4 Digital Participatory Design as Relational Practice

The integration of digital tools into processes of genuine participation depends on the construction of trust-based relationships, temporal continuity, and the recognition of the situated knowledge of the communities involved (DiSalvo et al. 2012). Within this framework, digital participatory design cannot be understood as a mere set of methods or

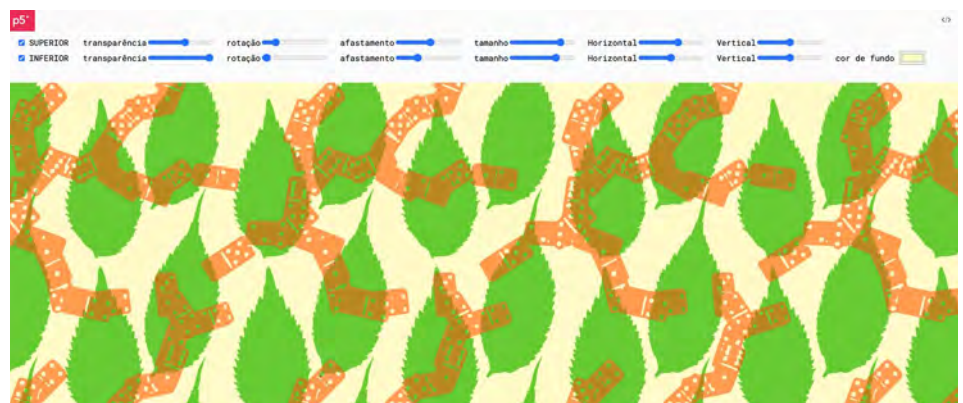
interfaces, but rather as a relational process that unfolds over time and is grounded in pre-existing social practices. It is therefore essential to avoid extractivist or purely instrumental approaches, in which technology is used to collect data or produce outcomes without providing tangible returns to the communities.

In line with the principles of DSI discussed earlier, digital participatory design should function as an extension of in-person practices, reinforcing—rather than replacing—physical spaces of encounter, dialogue, and collective production. In the context of XAPAXAPA Colab, this articulation materialises in the relationship between the local Café Costura, as a community-based space of practice, and the digital devices developed to support the creation, documentation, and circulation of the knowledge produced. As demonstrated by studies in critical and participatory HCI, the effectiveness of technologies in community contexts is closely linked to their ability to integrate into existing social ecologies, respecting local rhythms, values, and forms of organisation (Vlachokyriakos et al. 2016).

The comparative analysis presented in the previous table highlights that different modalities of DSI—collaborative platforms, participatory digital archives, data visualisation systems, territorial interactive experiences, and hybrid interfaces—activate quality principles in distinct ways. XAPAXAPA Colab is positioned precisely at the intersection of these modalities, combining in-person participatory processes, creative digital interfaces, the constitution of a community-based digital repository, and territorial interactive experiences into a cohesive whole oriented towards the valorisation of the territory and its forms of knowledge.

The p5.js-based programme developed for the co-creation of patterns emerges as a device of creative mediation, in which digital interaction does not aim at efficiency or automation, but rather at translating collectively produced gestures, decisions, and aesthetics into shareable visual forms (Fig. 3). This approach aligns with a broad notion of hybrid interfaces, linking embodied and material practices, such as sewing and pattern printing, with computational processes that enable experimentation, combination, and visualisation of formal variations. Technology thus operates as an expressive medium, facilitating creative exploration and aesthetic negotiation among participants, rather than as a closed production system.

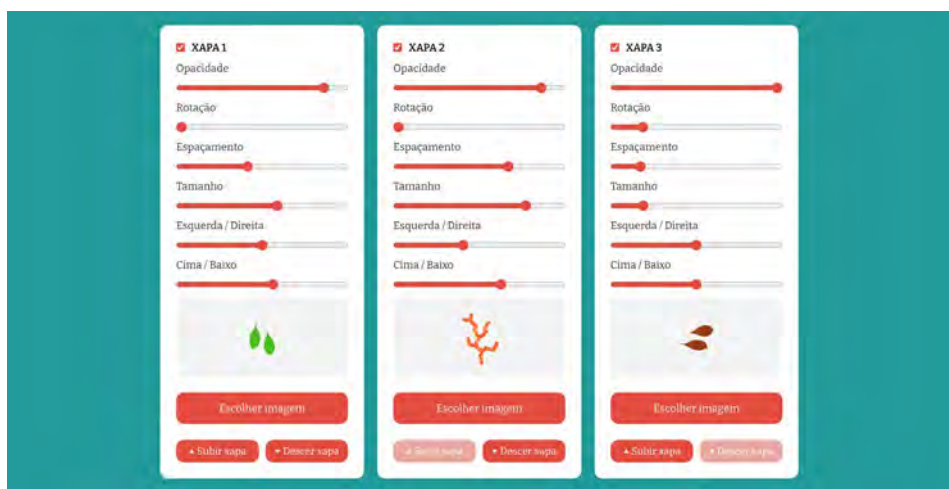
Fig. 3. p5.js-based generative program for pattern creation, allowing the manipulation of layered visual elements through parametric controls informed by situated visual references.⁶



6. Available at <https://editor.p5js.org/gorgelpinto/full/OuM4dPE4o>

Initial workshops with the p5.js-based system exposed a gap between the intended interaction model and participants' immediate understanding of the system, requiring active facilitation to mediate the relationship between physical manipulation and digital output. Rather than being treated as a limitation, this friction became a productive moment within the design process, revealing the need for a more legible and responsive interaction framework. A second iteration of the system (Fig. 4) was subsequently developed and integrated into the project's website, incorporating a simplified interaction logic and clearer feedback mechanisms. This iterative process reflects a core principle of participatory design, in which systems evolve through situated use and continuous adjustment. In this sense, usability emerges not as a predefined condition but as an outcome of collective experimentation.

Fig. 4. p5.js-based interface integrated into the project's website, showing parametric controls for pattern generation and improved UI legibility.



Complementarily, the website under development assumes the role of a participatory digital archive, functioning as a repository of the patterns, objects, and narratives produced within Café Costura. This archive goes beyond documentary preservation, acting instead as a device of collective memory that makes visible cultural practices often marginalised and contributes to the dynamic construction of territorial identity (Parente & Sadini 2017). By enabling the public inscription and circulation of these contents, the digital repository reinforces the social recognition of community-based work and creates conditions for its symbolic and economic valorisation.

The project also foresees the incorporation of territorial interactive experiences into the XAPAXAPA Colab website through a collaborative map dedicated to the mapping of socially, culturally, and productively relevant activities in this peripheral area of Lisbon. This map is not conceived as a purely informational or promotional tool, but as a relational and narrative interface, through which inhabitants themselves propose the inclusion of events, practices, gatherings, and local initiatives, producing a living cartography of the territory. Interaction with the map fosters situated forms of discovery, allowing residents and visitors to explore the territory through local knowledge, informal paths, and temporalities that are often absent from institutional representations. In this way, the interactive experience enhances the visibility of peripheral

cultural ecologies, activates relationships between dispersed practices across the territory, and contributes to collective meaning-making, positioning mapping as an ongoing social process rather than as a static spatial representation.

In this sense, XAPAXAPA Colab aligns with models of DSI that articulate local cultural production with territorial mediation, also functioning as an interface between peripheral communities and external publics. Rather than reinforcing tourism consumption models centred on saturated areas, this approach promotes forms of creative, small-scale, and relational tourism, grounded in encounter, mutual learning, and the valorisation of situated knowledge. The territory thus ceases to be understood as a passive backdrop and is instead constructed as a living process, continuously renegotiated through the social, cultural, and digital practices inscribed within it.

Digital participatory design in XAPAXAPA Colab materialises a community-oriented DSI approach, in which technology reinforces local agency, sustains processes of collective learning, and contributes to more just and inclusive forms of territorial development. By articulating creative interfaces, participatory digital archives, and in-person practices, the project demonstrates how HCI can operate as a relational infrastructure, mediating the production of social, cultural, and territorial value in a situated and sustainable manner.

5 Local Cultural Production and Digital Mediation

The textile prints developed within the scope of XAPAXAPA Colab constitute the main visible materialisation of the co-creation processes carried out with the Café Costura community in the PER 11 housing complex, in Santa Clara. These prints emerge from collective practices of graphic experimentation, grounded in motifs, visual rhythms, and aesthetic decisions shaped by personal memories, cultural references, and everyday experiences shared during the workshops. Rather than being understood as final products, the prints should be regarded as relational artefacts, within which processes of mutual learning, symbolic negotiation, and identity affirmation are inscribed.

The repetitive, modular, and combinatorial nature of the patterns directly evokes the logic of patchwork—symbolically synthesised in the term *xapaxapa*—functioning as a visual metaphor for the composition of differences that characterises both the territory and the community itself. The prints thus operate simultaneously as aesthetic objects, memory devices, and supports for cultural and economic valorisation, reinforcing the visibility of forms of knowledge that have traditionally been devalued and displaced to the urban periphery.

The p5.js-based programme can be understood as a Tangible User Interface (TUI) insofar as interaction is not limited to the manipulation of graphical controls but emerges from a process grounded in situated practices. In this sense, the system articulates the materiality of physical interaction with the generation and transformation of digital content,

establishing a fluid bridge between the world of atoms and the world of bits, as proposed by Ishii and Ullmer (1997). Although the visual output of the system is displayed on a screen, the core of the interactive experience does not lie in the direct manipulation of a conventional graphical interface, but rather in embodied and material engagement that mediates the relationship between physical references and computational transformation.

The system operates by translating spatial and compositional relationships into parametric variations of visual patterns, allowing participants to explore repetition, scale, rotation, and layering through physical arrangement rather than code manipulation. This abstraction layer enables complex generative behaviour while maintaining an accessible and intuitive interaction model.

Within the broader context of XAPAXAPA Colab, however, this interaction should be understood as part of a situated chain of translations that extends beyond the interface itself. The process begins with a form of physical input grounded in soft situationist practices, where graphic references are collected through *dérive*, observation, and engagement with the everyday visual culture of the territory. These references are subsequently translated into digital inputs within the p5.js-based generative system, where patterns are explored, combined, and transformed computationally. The process culminates in a return to the physical domain, with the production of printed patterns through stencil and screen-printing techniques, followed by the fabrication of textile artefacts. Rather than a unidirectional interaction model, this workflow establishes a continuous movement between physical and digital domains, in which computation operates as a mediating layer within a broader material and cultural process (Ullmer et al. 2022). In this sense, tangibility is not confined to the interface but distributed across the entire process, emerging through the transformation and re-materialisation of situated knowledge, in line with perspectives that emphasise embodied, spatial, and materially grounded interaction (Hornecker and Buur 2006; Duranti et al. 2024).

In line with perspectives on ubiquitous computing described by Weiser (1991), the system was designed so that digital processing operates in the background of the user's perception. The focus of interaction shifts away from technology as an explicit object and towards embodied experience, in which the body, gesture, and materiality play a central role. In this context, the p5.js programme functions as a translation layer between physical inputs—resulting from the manipulation of objects, surfaces, or spatial arrangements—and the generation of dynamic visual forms, without requiring digital literacy or formal instructions from participants.

This approach resonates with the concept of embodied interaction developed by Dourish (2001), according to which interaction emerges from the situated relationship between body, space, and artefacts, rather than solely from the interpretation of abstract symbols on a screen. The p5.js programme does not impose a closed semantic structure on interaction; instead, it responds to physical stimuli in an open and ex-

ploratory manner, allowing meaning to be constructed through action and experimentation. The physical affordances associated with the tangible elements guide interaction intuitively, reinforcing the importance of material cues as emphasised by Norman (2013).

As a TUI, the system is further distinguished by its non-instrumental and non-productivist logic, aligning with critical and poetic approaches to interaction. As observed in reference projects within the domain of exploratory tangible interfaces, tangibility is not employed merely to simplify access to technology, but to create conditions for affective, narrative, and symbolic engagement. The p5.js programme thus operates as a device of cultural mediation, capable of transforming simple actions—moving, touching, positioning—into visual representations that evoke memories, territories, or identity-related patterns.

Within the context of XAPAXAPA Colab, this programme can be understood as an exploratory and generative TUI, embedded in a situated participatory design approach. Its interpretative openness allows different users—regardless of age, technological experience, or sociocultural background—to appropriate the system and attribute their own meanings to the interaction, a particularly relevant characteristic in community-based and territorial contexts.

Complementary to the textile prints and the p5.js interactive system, the XAPAXAPA Colab website plays a central role as a participatory digital archive and platform for territorial mediation. The website functions as a repository for the patterns, objects, and narratives produced within Café Costura, digitally extending in-person practices and ensuring their public visibility.

The integration of a collaborative map enables the mapping of socially, culturally, and productively relevant activities in the territory of Santa Clara and nearby areas, reinforcing the relational dimension of the project. This map does not operate as a neutral or institutional representation of space, but rather as a living cartography, constructed through contributions from the community itself, fostering situated interactive experiences of discovery and valorising practices often absent from official circuits.

The outcomes of XAPAXAPA Colab can be understood in relation to the massification of tourism in Lisbon and its asymmetric effects on peripheral territories such as Santa Clara, which are frequently excluded from circuits of cultural and economic valorisation. In contrast to approaches focused on the optimisation of tourist flows, the project proposes a situated form of DSI, in which participatory design and digital technologies are mobilised to reconfigure how the territory is narrated, perceived, and experienced. By centring local cultural production and territorial mediation, XAPAXAPA Colab contributes to shifting the gaze of the city beyond saturated spaces, promoting alternative narratives grounded in community practices and everyday knowledge.

From a social and cultural perspective, the textile prints, the p5.js interactive system, and the participatory digital archive reinforce community agency and the visibility of peripheral identities that are often

marginalised. From a territorial standpoint, the website and collaborative map configure forms of digital place mediation that align with models of creative, small-scale, and relational tourism, based on encounter, mutual learning, and the valorisation of situated knowledge. In this way, the project demonstrates the potential of DSI, articulated with critical HCI, as a response to the impacts of mass tourism, contributing to a symbolic redistribution of value and to more just and sustainable forms of urban development.

6 Implications for Territorial Digital Social Innovation

The research presented demonstrates how the intersection of participatory design, CCD, soft situationism, and computational interaction practices can constitute a situated and critical response to the impacts of mass tourism in peripheral urban contexts. Through XAPAXAPA Colab, the study shows that DSI, when oriented by the community and grounded in concrete territorial practices, enables a shift away from dominant urban valorisation logics centred on consumption and spectacle, instead fostering processes of local cultural production, relational mediation, and symbolic redistribution of value. Within this framework, HCI moves beyond the domain of interface design or technical efficiency and is reconfigured as a relational infrastructure capable of articulating in-person practices, digital artefacts, and computational aesthetic experiences in the collective construction of territory.

By articulating textile prints, a TUI, a participatory digital archive, and collaborative mapping, XAPAXAPA Colab demonstrates the potential of generative aesthetics and computational interaction as cultural and political mediators, capable of making visible forms of knowledge, memory, and practice that are frequently marginalised. The project thus contributes to an expanded understanding of DSI as a transformative process—social both in its means and its ends—and reinforces the role of design and critical HCI in the construction of alternative models of urban development, grounded in genuine participation, collective learning, and small-scale creative tourism. These approaches point towards future research trajectories that further explore the articulation between creative computation, territorial practices, and social justice, reaffirming the territory as a living space for aesthetic, technological, and political experimentation.

Statement on AI Use.. This paper was originally written in Portuguese and subsequently translated into English with the assistance of ChatGPT 5.2. The translated text was reviewed, edited, and validated by the author, who assumes full responsibility for the final manuscript.

References

Andreotti, Libero.

1996. "Introduction: The Urban Politics of the Internationale Situationniste." In *Situationists: Art, Politics, Urbanism*, edited by Libero Andreotti and Xavier Costa, 11–39. Museu d'Art Contemporani de Barcelona.

Angelidou, Margarita, and Artemis Psaltoglou.

2017. "An empirical investigation of social innovation initiatives for sustainable urban development." In *Sustainable Cities and Society* 33, 113–125. <https://doi.org/10.2298/SPAT1839007A>

Angelidou, Margarita, and Artemis Psaltoglou.

2018. "Digital Social Innovation in Support of Spatial Planning: An Investigation through Nine Initiatives in Three Smart City Programmes." In *Spatium* 39, 7–16. <https://doi.org/10.2298/SPAT1839007A>

Buyannemekh, Battulga.

2024. "Digital Social Innovation in Cities: A Systematic Literature Review and a Research Agenda." In *Proceedings of the 25th Annual International Conference on Digital Government Research (DGO 2024)*, 116–132. <https://doi.org/10.1145/3657054.3657073>

Cantu, Daria, Marta Corubolo, and Giulia Simeone.

2012. "A Community-Centered Design Approach to Developing Service Prototypes." In *ServDes 2012: Co-Creating Services*, edited by P. J. Tossavainen, M. Harjula, and S. Holmlid, 65–70. <https://doi.org/10.21606/servdes2012.16>

Careri, Francesco.

2013. *Walkscapes: O Caminhar como Prática Estética* [Walking as an Aesthetic Practice]. Editorial GG.

Certomà, Chiara.

2020. "Digital Social Innovation and Urban Space: A Critical Geography Agenda." In *Urban Planning* 5 (4): 8–19. <https://doi.org/10.17645/up.v5i4.3278>

Certomà, Chiara.

2021. *Digital Social Innovation: Spatial Imaginaries and Technological Resistances in Urban Governance*. Springer Nature.

Debord, Guy.

(1956) 2005. "Theory of the Dérive." Translated by Ken Knabb. In *libcom.org*. <https://libcom.org/article/theory-derive-guy-debord>

DiSalvo, Carl, Andrew Clement, and Volkmar Pipek.

2013. "Participatory Design for, with, and by Communities." In *Routledge International Handbook of Participatory Design*, edited by Jesper Simonsen and Toni Robertson, 182–209. Routledge.

Dourish, Paul.

2001. *Where the Action Is: The Foundations of Embodied Interaction*. The MIT Press.

Duranti, Daniele, Davide Spallazzo, and Daniela Petrelli.

2024. "Smart Objects and Replicas: A Survey of Tangible and Embodied Interactions in Museums and Cultural Heritage Sites." In *ACM Journal on Computing and Cultural Heritage* 17 (1): 7:1–7:30. <https://doi.org/10.1145/3631132>.

Farman, Jason.

2012. *Mobile Interface Theory: Embodied Space and Locative Media*. Routledge.

Haklay, Mordechai, and Patrick Weber.

2008. "OpenStreetMap: User-Generated Street Maps." In *IEEE Pervasive Computing* 7 (4): 12–18. <https://doi.org/10.1109/MPRV.2008.80>

Hornecker, Eva, and Jacob Buur.

2006. "Getting a Grip on Tangible Interaction: A Framework on Physical Space and Social Interaction." In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 437–446. <https://doi.org/10.1145/1124772.1124838>

Ishii, Hiroshi, and Brygg Ullmer.

1997. "Tangible Bits: Towards Seamless Interfaces between People, Bits and Atoms." In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 234–241. <https://doi.org/10.1145/258549.258715>

Ishii, Hiroshi, Dávid Lakatos, Leonardo Bonanni, and Jean-Baptiste Labrune.

2012. "Radical Atoms: Beyond Tangible Bits, Toward Transformable Materials." *Interactions* 19 (1): 38–51. <https://doi.org/10.1145/2065327.2065337>

Lefebvre, Henri.

1991. *The Production of Space*. Translated by Donald Nicholson-Smith. Blackwell.

Manzini, Ezio.

2015. *Design, When Everybody Designs: An Introduction to Design for Social Innovation*. The MIT Press.

Meroni, Anna.

2007. *Creative Communities: People Inventing Sustainable Ways of Living*. Edizioni Poli.Design. https://re.public.polimi.it/retrieve/e0c31c07-cb46-4599-e053-1705fe0aef77/Creative-Communities_low_1.pdf

Meroni, Anna.

2008. "Strategic Design: Where Are We Now? Reflections around the Foundations of a Recent Discipline." In *Strategic Design Research Journal* 1 (1): 31–38. <https://doi.org/10.4013/sdrj.20081.05>.

NESTA.

2015. *Growing a Digital Social Innovation Ecosystem for Europe: DSI Final Report*. <https://ec.europa.eu/futurium/en/content/growing-digital-social-innovation-ecosystem-europe-dsi-final-report.html>

Newcastle Urban Observatory – EPSRC National Edge Artificial Intelligence Hub.

n.d. "Newcastle Urban Observatory." <https://edgeaihub.co.uk/newcastle-urban-observatory/>

Norman, Donald A.

2013. *The Design of Everyday Things*. Basic Books.

Parente, Marina, and Carla Sedini.

2017. "Design for Territories as Practice and Theoretical Field of Study." In *The Design Journal* 20 (sup1), S3047–S3058. <https://doi.org/10.1080/14606925.2017.1352812>

Ullmer, Brygg, Orit Shaer, Ali Mazalek, and Caroline Hummels.

2022. *Weaving Fire into Form: Aspirations for Tangible and Embodied Interaction*. Association for Computing Machinery. <https://doi.org/10.1145/3544564>

Valtonen, Anna.

2010. "Is Systemic Design the Next Big Thing for the Design Profession?" In *Design and Complexity – DRS International Conference 2010*, edited by D. Durling et al. <https://dl.designresearchsociety.org/drs-conference-papers/drs2010/researchpapers/121>

Weiser, Mark.

1991. "The Computer for the 21st Century." In *ACM SIGMOBILE Mobile Computing and Communications Review*, 3 (3): 3–11, <https://doi.org/10.1145/329124.329126>

Vlachokyriakos, Vasilis, Clara Crivellaro, Christopher A. Le Dantec, Eric Gordon, Peter Wright, and Patrick Olivier.

2016. "Digital Civics: Citizen Empowerment with and through Technology." In *Proceedings of the 2016 CHI Conference Extended Abstracts on Human Factors in Computing Systems (CHI EA '16)*, 1096–1099. <https://doi.org/10.1145/2851581.2886436>