RE-COMMONING URBAN SPACES FROM THE BOTTOM-UP

Empowering Urban Communities: A Digital Toolbox for Bottom-Up Intervention in Kottbusser Tor, Berlin

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Abstract. Urban planners and bodies of urban governance maintain an inherent divergence in the internal structures governing the integration of local communities and the fulfilment of their needs. Theoretical frameworks and contemporary digital tools often reinforce those inherent power imbalances, further exacerbating the disconnection between communities and their urban environments. While public administration holds the authority to access and utilise extensive datasets derived from digital urban statistics, they frequently lack the grassroots, bottom-up intelligence that local communities possess. On the other hand, local communities find themselves denied access to their urban data and face limitations in both capability and authority to generate meaningful changes in the urban fabric. This paper explores the empowerment of local communities with the tools, knowledge, and skillsets necessary to act upon their inherent bottom-up local intelligence to enable community-generated interventions and solutions to urban challenges. Through the context of Kottbusser Tor, Berlin, Germany, this study develops a toolbox designed to equip communities with the means to facilitate self-organised actions.

Keywords. participatory urbanism, digital tools, self-organisation, community empowerment, ethical smart urbanism.

1. Introduction

> Adequate housing was recognised as part of the right to an adequate standard of living in Article 25 of the 1948 Universal Declaration of Human Rights and in Article 11.1 of the 1966 International Covenant on Economic, Social and Cultural Rights (UN- HABITAT, 2009).

As cities have transitioned from their role as centres of production to the newer "creative economy", small-scale, community-oriented initiatives, also referred to as "Tactical Urbanism" (Mould, 2014), became a brand in their own right. Utilised by governments following the neo-liberal agenda in the era after the 2008 recession,

ACCELERATED DESIGN, Proceedings of the 29th International Conference of the Association for Computer-Aided Architectural Design Research in Asia (CAADRIA) 2024, Volume 2, 241-250.

authority among disadvantaged and marginalised urban populations. This is, however, not a new problem and the shift towards democratisation and participation in the urban realm can be observed already in 1947. In "The Right to the City" Lefebvre argued that urban citizens possess a collective right to participate in decision-making and the production of urban space, rather than act as passive consumers of the environments that were created for them. Lefebvre called for the development of practices that allow citizens to challenge existing urban power dynamics and influence the development of their communities.

Despite the substantial theoretical background, academic research, and conceptual projects exploring participatory urbanism, it has remained in utopian imagination. As reported by the UN-Habitat in 2016, further development of effective governance is needed, as well as fostering partnerships between governments, urban residents, and private investors, to promote sustainable urban development and design cities that can meet the needs of all their inhabitants, especially those of vulnerable and marginalised groups. Rising costs of living in urban regeneration areas have been steadily pushing out exiting populations, putting a strain on communities and resources. In light of an increasingly developing culture of participation, emphasised and driven by digital means, might we propose the shift of participative urbanism from the theoretical to the practical realm? Participatory urbanism can flourish in a new framework of planning, a culture informed by grassroots initiatives, transparent decision-making processes, and transversal communication between various stakeholders. A participatory culture of urban planning must also exist within a suitable urban policy and frameworks of governance that stretch beyond community engagement strategy, and allow grassroots urban projects to materialise.

2. Why self-organise in cities? Research gap

As a fundamentally top-down approach, initiated by existent urban governance, the smart city tends to reinforce prevailing social inequalities (Kitchin, 2015). The creation of urban big-data collection technologies and their placement in the hands of the governing authorities have created a reality where code and algorithms increasingly negotiate the interpretation, presentation, and organisation of space. Individuals and urban spaces alike are classified due to empiric factors into "software-sorted geographies". This limits the access of certain populations to various resources and opportunities, fostering a new culture of data-based segregation (Graham, 2005). By engaging local communities in the design and implementation of digital urban solutions, the community-led digital urbanism approach challenges the top-down, market-led "smart city" paradigm and rather aligns itself with progressive urban movements, geared towards democratisation of the planning process and the promotion of social justice (Kitchin et, al., 2017).

Neo-liberal market-led urban governance and developments of recent decades have allowed the private sectors to take over previously common urban infrastructures and spaces. To "re-common" urban infrastructures and public spaces, there is a need to develop cities within a democratic structure of governance and management, that would inform new ways of planning, with the urban citizen in mind (Sadowski, 2016). According to Thompson (2021), urban commons possess vast potential for reclaiming democratic control over urban planning and development. Urban commons can act as

the background and action frame for the organisation of collective action and fostering decision-making processes around shared resources and spaces. These developments are situated within the rights-based discourse of social justice, arguing that all urban residents have a right to exist in urban space and should possess the liberty to participate in decision-making processes affecting their daily lives - a right that existing citizen participation mechanisms fail to meet fully, by catering mainly to the needs of the already wealthy and powerful social actors (Purcell, 2002).

3. Kottbusser Tor, Kreuzberg , Berlin. Study case

Kottbusser Tor, situated in Berlin's Friedrichshain-Kreuzberg district, exemplifies a case study of urban spaces that have a history of a connection between historical self-organisation and top-down initiatives. During the 19th century, Berlin experienced a rapid expansion driven by industrialisation, leading to an influx of workers seeking residence within the city. Consequently, the area developed into a working-class district, accommodating the residential needs of the growing population. The aftermath of the Second World War inflicted significant damage on the area, leaving many of its buildings in a state of dilapidation and needing to be rebuilt. Following the war, the Berlin Senate, envisioned a transformation of the intersection into a roundabout, demolishing and reconstructing of the houses that surrounded it. In 1963, a group of architects led by Hans Scharoun was commissioned to develop West Berlin's first urban renewal program. (Momper, 1973)

Throughout the 1980s, Kreuzberg's identity as a hotbed of political activism and social engagement was solidified through persistent protests, demonstrations, and advocacy efforts aimed at securing affordable social housing. These collective endeavours and the area's reputation as the haven of left-wing self-organisation in Berlin contributed to the development of community-driven initiatives within the city's urban fabric. However, since then, the area has been undergoing gradual gentrification (Perdoni, 2017a; Perdoni, 2017b). In the 10999 postal code, which includes Kottbusser Tor rents have increased by 55% between 2011 and 2017. Housing shortages, disproportionately impacting low and middle-income brackets, have become a pressing concern (KottiCoop e.V, 2018).

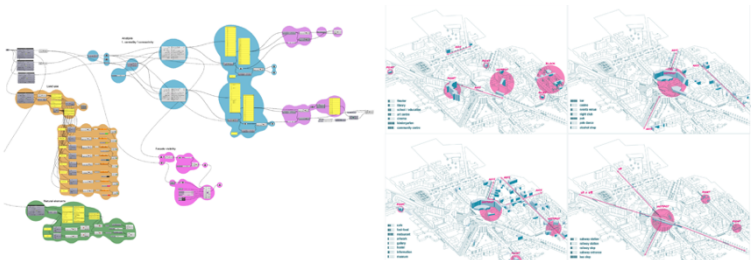

Figure 1Grasshopper code for functional clustering. Created in Author in October 2023.
Figures 2-5. Urban analysis of functional clusters. Data retrieved from OpenStreetMap and QGis. Created by Author, October 2023

3.1. SPATIAL ANALYSIS - SPATIAL GIS DATA AND FUNCTIONAL CLUSTERING

Geospatial data from Open Street Map and GIS was processed through the Caribou plugin in Rhinoceros, developed by designer and developer Philip Belesky, to assess and measure the quality of open public space through functional clustering, identifying significant "hubs" and "hotspots" and prioritising areas for strategic interventions [Fig. 1-5].

3.2. SURVEILLANCE VS. “EYES ON THE ROAD” - ISOVIST

Oriented at self-organisation and community-generated actions, the project must first define what is community-owned space, differentiating it from a space that is being monitored by external stakeholders. Mapping surveillance in cities involves visualising the pervasive network of surveillance cameras in the urban landscape, thus illuminating the instruments of data collection. (Zuboff, 2019)

To map the scope of external surveillance on Kottbusser Tor, I identified the locations of surveillance cameras and their directions. The data was extracted from OpenStreetMap and GIS. Taking into account all surrounding buildings as obstacles to the view range, I visualised the extent of surveillance coverage of each camera, using IsoVist (Gibson, 1966; Van Nes, 2011) [Fig. 6].

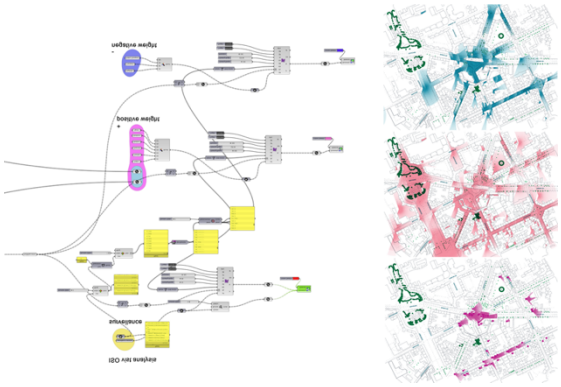

Figure 2iso-vist Grasshopper script. Data retrieved from OpenStreetMap and QGis. Created by Author, October 2023. | Figure 7. Mapping of surveillance camera coverage. Created by Author, October 2023. | Figure 8. Mapping of “positive eyes on the road”. Created by

3.2.1. Input parameters and simulation data:

The input parameters are the origin point of each surveillance camera, boundaries (building curves in the study area), the central axis of the view field (reported direction of the camera), view depth (avg. of 50 meters), and view angle (avg. of 98 degrees). When data is absent, the central axis is set to 0 in the X direction, and the average depth

might not fully represent actual conditions in the site.

The surveillance camera field of view (FOV), is the observable range or angle that the camera's lens can cover. In the simulation, all cameras were assigned the same camera angle of 98 degrees, directing to a 2.8 mm lens and a view depth of 50 meters. The variable component of each camera is the positioning, which was factored into the simulation when reported. However, in cases of missing data, a stand-in value of zero in the X direction has been assigned. [Fig. 7]

3.2.2. "Eyes on the road"

In the Kottbusser Tor context, two categories of "eyes on the road" exist—positive and negative. The "positive" refers to social and public functions with facades to the streets, commercial functions, services, outdoor sports locations, and institutions. Namely, establishments that provide a sense of security [Fig. 8]. The "negative eyes on the road" however, include nightlife establishments and public transport that are linked to local crime [Fig. 9].

In the analysis, the input parameters are the origin point set to the centre of each building with relevant functions on the ground floor; boundaries representing all structures in the study area; a central axis of the view field to simulate the act of "looking outside"; a view depth of 100 meters and a view angle of 120 degrees. No consideration was given to different eyesight conditions.

4. Societal framework, participation types, and synthetic population formation

The neighbourhood around Kottbusser Tor in Kreuzberg, Berlin, has been facing the pressures of gentrification and rising rental costs in social housing. The area, consisting

Figure 3Left: Civic functions and correlating participation types derived from Kotti-Coop e.V. (2018), edited by Author. Right: correlated spatial implementations. Assigned by Author.

of approximately 1000 social housing units built in the 1970s, is home to a predominantly poor working-class population, mostly on social welfare. The residents have diverse migration backgrounds, with around 80% having Turkish origins from the guest-worker programme in the 1960s. The area suffers from high rates of youth and general unemployment, as well as poverty in young and old age, making it one of the most disadvantaged areas in Berlin. The influx of global capital into the Berlin

housing market worsened the shortage of affordable housing, intensifying the already tense situation at Kottbusser Tor.

Despite the disadvantaged situation, the willingness to participate is high. In a research conducted by the social organisation Kotti-Coop e.V in 2018, surveyed tenants exhibit a strong willingness to engage in collective activities. 25% of respondents are actively involved in current initiatives, while 50% express a desire to participate in such activities in the future. However, the potential for full tenant participation remains largely theoretical, as most tenants currently lack practical opportunities for co-determination in their daily lives.

The analysis of reports in the area has led to the identification of six distinct participation types, derived from census data and surveys conducted by the researchers. These personality types serve as the foundation for creating a synthetic population, which is subsequently utilised for further analysis and simulation in this research. Additionally, a correlation is drawn between the existing civic functions in the area and their corresponding suggested spatial implementations [Fig. 10].

5. The codification of human interaction with space

The relationship between urban spatial design and human behaviour challenges the notion that physical layout alone defines a city, arguing that interaction between form, social activity, movement patterns, and personal perception is equally influential. There is a need to understand behavioural mechanisms to create urban spaces that are functional, inclusive, and responsive to diverse societal needs.

In traditional urban studies, the physical layout and form of a city were perceived as the defining elements of the urban fabric. Accessibility, the main parameter, was defined as "the ease of reaching a desired activity at a desired location" (Hansen, 1959). Accessibility has been investigated using various measures such as graph theory (Casalania and Rittel, 1967; Levin, 1964), cumulative opportunities indexes (Bhat, Handy et al. 2001), and gravity (Hansen, 1959). These measures have not yet taken into account the effect of the socio-cultural connotation of spaces on way-finding and navigation. Taking into account the surrounding land-use attraction, utility and time-space indices close the gap between the behavioural and the structural performance of urban space (Waddell and Ulfarsson 2003).

The complexity of urban issues necessitates a multidisciplinary approach. In order to reduce the limiting and discriminatory excessive control on the urban form, the understanding of behavioural mechanisms is imperative. According to Lefebvre, in The Production of Space" (1974), the urban fabric is not merely a neutral container of architectural form, but rather is a complex network of social activity and reaction. Lefebvre argues that space is a social construct, and thus cannot be fully comprehended with solely quantitative means. Rapaport then defines inhibiting and facilitating domains, claiming that environments can either make certain behaviours easier or more challenging. (p. 299) This theory is explored further by De Lange and De Waal (2013) with the introduction of the digital realm into the urban space - reaction equation.

6. Location selection intelligence

The present state of social and community-driven initiatives centred around Kottbusser Tor reveals a deficiency of spatial intelligence - namely, there is a lack of well-defined guidelines to determine optimal action locations and the corresponding appropriate actions for those locations. Through the superposition of all previously created maps, I formulate the spatial rationale to rectify this issue. In addition to the spatial parameters that define the suitable location for the function to take place, and spatial limitations and considerations that dictate its occurrence, each type has its decision-making logic when way-finding to reach the destination [Fig. 11].

The identified participation types exhibit diverse characteristics influencing their engagement with the environment. The "lone warrior" type is marked by individual action, prioritises safety, and tends to navigate towards the main streets. The "meta" type adopts an analytical approach and a neutral attitude towards safety, being more likely to choose a variety of pathways. The "communicative' type prioritises community engagement and advocacy and tends to exhibit a positive attitude toward most functions. The "precarious and well-connected type", characterised by vulnerable living conditions, displays strong ties to the area and is likely to choose all paths and express mixed sentiments based on attainability and familiarity. The "on-off" type is skeptical about collaborative participation and is likely to engage in convenient, short-term activities while holding a neutral stance towards most activities. *Inherent bias: The spatial decision patterns are assumptions and deductions of human interaction with public space made on the basis of the societal and sociological research conducted previously by Kotti & Co.*

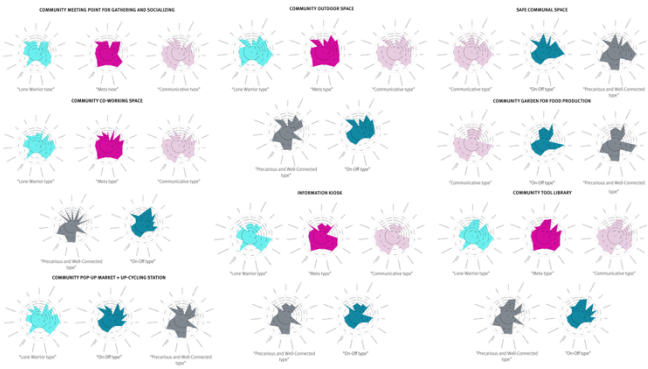

Figure 4Way-finding decision-making graphs for the participation types.
Created by Author, October 2023.

The preferences of the various participation types are translated into usage graphs of the urban network in the study case area through a pedestrian simulation. Weights

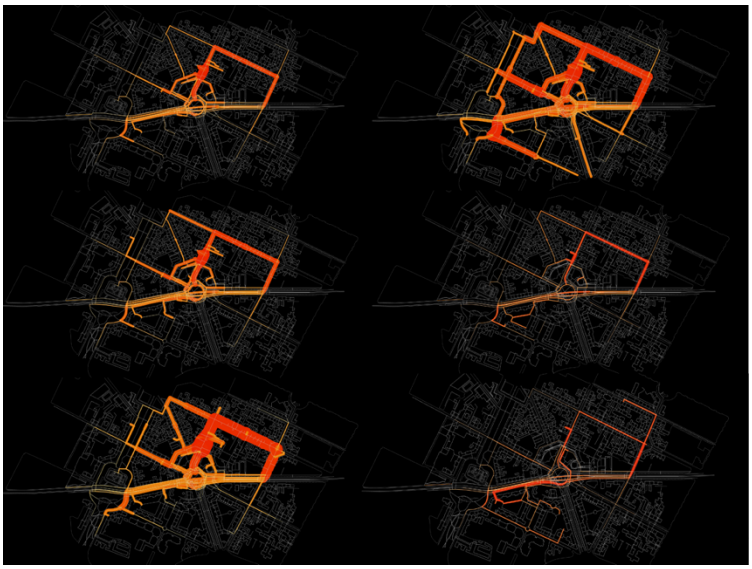

Figure 6Sample urban network usage graphs for the participation types. Created by Author, October 2023.

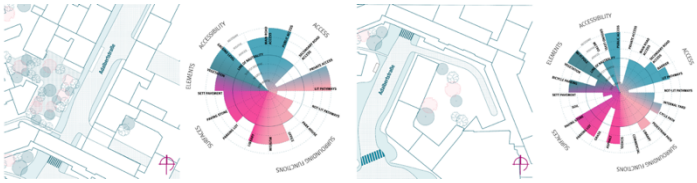

Figure 5 Selected location for intervention and the spatial parameters needed for further design of the spatial function. Created by Author, October 2023.

are assigned to the areas that the types view positively, no weights are given to neutrally associated locations and paths, and negative values are given to locations the types choose to avoid. Each participation type has a different graph for a different function [Fig. 12], the superposition of which allows to locate the most suitable location for a community-generated social intervention, thus re-commoning the correct urban spaces in the area [Fig. 13].

7. Discussion

The accelerated datafication of the built environment initially sought to create a unified and efficient urban fabric. The overarching aim was to establish seamless connections between providers and users, streamline information dissemination and financial transactions, and enhance decision-making processes through informed insights and

improvements. However, the outcomes of these initiatives are disparately distributed across communities, frequently resulting in the marginalisation and exclusion of already vulnerable minority groups. (Graham and Dittus, 2022)

Urban planners, social researchers, and affiliated professionals have been citing the pressing need to forge partnerships between governments, urban residents, and private investors to facilitate urban environments that cater to the needs of all inhabitants, especially vulnerable and marginalised groups. However, the practical implementation of collaborative practices of co-creation in the urban fabric remains a challenge. With the correct handling of data privacy and decision-making patterns, digital analysis and urban planning tools hold the potential to synchronise complex and correlated needs and demands, allowing partnerships between various urban stakeholders to materialise and empowering urban residents to become active participants.

The question of ownership is crucial and central to the discussion - among several layers: ownership over the code that lies in the background of any platform or software that allows physical alternation to the urban fabric to emerge; ownership of and access to the data that is fed into the code, the methods in which it is sourced and the location where it is stored; and most importantly - ownership over the public urban space. Reframing spatial data as a public domain is already being discussed as the next step toward democratic data-based urban governance (Bria, 2019). However, to enable community-oriented urban governance to produce real changes in the city, a discussion is needed concerning the reframing of the ownership of urban commons, from spaces owned by the city and merely marked as "public" in land-use codes, to spaces co-owned by local communities possessing the rights to convene, inhabit, and utilise these spaces. The challenge lies in maintaining the authenticity of urban commons as truly public spaces, devoid of external surveillance, management, and influence, and ensuring they are sufficiently equipped with the tools, resources, skill set, and knowledge required for localised, community-based urban solutions. Shifting away from the trend and profit-oriented urban common, a covert tool for gentrification, the re-commoning of public urban spaces goes through the creation of a shared and inclusive social, economic, and political framework that benefits all members of a community.

Acknowledgements

Many thanks to Prof. Martin Wollensak from Hochschule Wismar, University of Applied Sciences: Technology, Business and Design for guiding this research and the unwavering support throughout my academic progress.

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