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Urban Safety Via Digitally Augmented Relationality.
Leveraging Gotong-Royong for Collaboration, Empathy, and Re-Enchantment in Indonesia's Public Space

Manfredo Manfredini, Meriky Lo
University of Auckland, New Zealand
m.manfredini@auckland.ac.nz | meriky.lo.alexander@auckland.ac.nz

Abstract
This article addresses urban safety issues, focusing on their relationship with the ongoing effective structural transformation of inborn instrumentalities of progressively vulnerable communities in the Global South. It responds to the United Nations' call for urgent action to reverse the negative trends towards the goals set with the 2030 Agenda for Sustainable Development by redefining urban safety as a crucial factor for the affirmation of sociospatial justice, resilience, and wellbeing in alignment with the objectives of the Global Digital Compact framework. We redress the conventional crime prevention approach by formulating a new framework for defining a differential right to digitally augmented urban safety that leverages locally embedded sociocultural practices and relational networks. We conjuncturally articulate this right for underserved communities within informal settlements in Bandung, Java, Republic of Indonesia, concentrating on the Indigenous gotong-royong cultural practice—a system of commoning combining differential forms of collaboration, relational empathy and imaginative re-enchantment. We develop and operationalise this right, to produce a pilot methodology for creating a mixed reality instrument that converts inadequate securitisation methods of surveillance into effective safety practices of relatedness. By combining digital twinning and gaming technologies, this instrument enhances community-centred care and accumulation of social, cultural, and infrastructural capital. We discuss the development of this instrument, focusing on the conception and implementation phases that involved multilevel, multistakeholder engagement, emphasising its supplementary transformative aspects. Our contribution to the urban safety discourse further articulates the Right to the Safety by introducing a novel approach that upholds the core good city principles—participation, relationality, and cosmopolitics—for regenerative and differential urban development in the increasingly mediatised society.

Keywords: built environment, informality, public space, social justice, urban safety, right to the city, right to safety

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1. Introduction

Increasing spatial inequalities, reflected in the growing inadequacy of housing and access to services and urban infrastructure, undermine the necessary conditions for achieving the objectives of the United Nations' (UN) New Urban Agenda (UN Habitat, 2017, p. 5), contributing to the 2030 Sustainable Development Goals crisis (UN Department of Economic and Social Affairs [UN-DESA], 2023). Safety deprivation is a crucial determinant of this disparity, as it prevents people, particularly the most vulnerable, from living in "freedom from fear and freedom from want, with an equal opportunity to enjoy all their rights and fully develop their human potential," as stated by the UN *urban security framework* (UN, 2012).

According to UN Habitat (2016), guaranteeing the right to urban safety is a core policy challenge for sustainable development as it is essential to provide access to *the benefits and opportunities that cities can offer* to all citizens (UN-DESA, 2017, p. iv), ensuring them a secure and supportive environment for their integrity and wellbeing. This right articulates the normative framework of the New Urban Agenda, the *Right to the City* (UN Habitat, 2016), focusing on its three collective action pillars: *cooperative praxis* (i.e., spatial justice and commoning), *sociopolitical relationality* (i.e., political agency), and *differential transcendence* (i.e., social, economic and cultural convivial diversity). Accordingly, for the implementation of this right, collective action should be mainstreamed, as also indicated by the UN DESA (2023) for the urgent reversal of the negative path towards sustainability. This includes redressing urban safety approaches based on principles of securitisation and behavioural control, as, for instance, elaborated by the methods of crime prevention through environmental design (CPTED; Cozens et al., 2005), which hinder the affirmation of the city as a common good.

We contribute to such rectification by formulating a community-based framework for heightening the accessibility and safety of public space and commons and enhancing sociospatial cohesion that aligns with the objectives of the Global Digital Compact framework of the UN (2024) for a safe, inclusive, and people-centred digital environment. This includes addressing the effects of mediatisation, a major disruptive agency of associative life, by affirmatively adopting digital technology and leveraging it for a progressively *relationally mediatised society* (Fuchs, 2014; Manfredini, 2022b). We conjuncturally engage with a context in Indonesia, as an area of the Global South where spatial inequalities are particularly pronounced, to implement the recent policy framework for urban safety of the Association of Southeast Asian Nations (ASEAN, 2022) that recommends adopting digital augmentation for city-level actions to effectively reduce the urban divide and ensure respect for human rights and privacy.

Consistent with the recommendations of the UN (UN Centre for Regional Development, 2022; UN Human Settlements Programme, 2011) and leading emancipation advocates against Global South asymmetry (Beard et al., 2008), our framework is designed to facilitate *digitally enhanced partnership* and community-based organisations to advance inclusion, participation, and concertation of citizens through multilevel political urban management. We fulfil the 2020 guidelines of the UN for Safer Cities and Human Settlements (UN Habitat, 2020) that recommend integrated, innovative and inclusive approaches to urban safety and security for developing countries where rapid urban growth is accompanied by increased levels of crime, violence, lawlessness, and feelings of insecurity. We focus on empowering and

mobilising communities to ensure that all members of society work together, including those who are marginalised and socioeconomically deprived, by adopting solidarity principles combining social and technological measures.

This article discusses the framework, which was part of the comprehensive global programme *Safe and Sound Cities* (Global Infrastructure Basel Foundation, 2021). It begins by offering a definition of the *digitally augmented right to safety, integrity and wellbeing in urban Indonesia,* leveraging embedded sociocultural practices of community-based organisations and relational networks. It articulates this right for underserved informal settlements, concentrating on the Indigenous system of collaboration and reciprocity deeply rooted in Javanese society, known as *gotong-royong*. With reference to Amin's (2006) *good city* dimensions for a common weal urban ethic of solidarity, we articulate this entitlement as a bundle of rights to safety, interpreting the three Right to the City pillars: *the right to cooperative collaboration*, for cooperative praxis*; the right to relational empathy*, for sociopolitical relationality, and *the right to imaginative re-enchantment* for differential transcendence. We then discuss a pilot project for the implementation of this three-right framework with and for a community in Bandung, Java, through a multidimensional co-creative stakeholder engagement process. This includes the creation of an instrument using state-of-the-art digital technologies and gaming techniques that deploys mixed reality (MR) intertwining extended reality (XR) and actuality to build the relational capacity of community-based networks both locally and translocally. We eventually reflect on the transformative potential of the outcomes that, while converting abstractive surveillance-based apparatuses into solidarity-based systems, undergird a vision of public space as the privileged place of participatory political action, anti-abstractive citizenship, and cosmopolitical relationality for all, particularly the disadvantaged and excluded.

2. Framing the Right to Safety, Integrity, and Wellbeing in Urban Indonesia

In Indonesia, one of the world's emerging economies, the pathway to sustainability faces various critical challenges. The country's longstanding issues surrounding adequate housing, schooling, health services, safe water, and sanitation access, aggravated by its increasing position on global measures of wealth inequality (World Inequality Lab, 2022) and greatest digital divides (World Bank, 2022), have advanced the disenfranchisement, uncertainty, and *temporariness* of the underprivileged (Bracken, 2024; Simone, 2020, p. 233). Disadvantaged communities have weakened their capacity to uphold their commons, redistributive relations, affective endurance, and safe environments (ICLEI, 2021; Jones, 2019). The pervasion of mediatisation has exacerbated this situation by expanding the digital divide and the gap between the adoption of digital technologies and the social adjustments required for the sustainable use of those technologies. This has led to new forms of exclusion, fragmentation, and the erosion of social, cultural, and environmental community capitals sustaining established solidary social norms and practices (Jones, 2017a; Raharjo, 2010). These communities are mainly situated in informal neighbourhoods of disparate extended aggregations of mixed economy peri-urban regions that merge multiple settlement types, known as *desakota*. These neighbourhoods, identified as *kampungs*, are the key elements of cities' constitutive processes through amalgamation, and are home to more than 50% of the urban population (UN Indonesia, 2022). They are characterised by rapid growth, self-

organisation, incremental and irregular development, polarisation of low-income groups, lack of secure land tenure, and inadequate social infrastructure and public service access (Widjaja, 2013). Their buildings are generally illegal, small, and substandard (Suhartini and Jones, 2023). They have different development stages—*infancy*, *consolidation*, *saturation,* and *stabilisation* (Maula et al., 2019, p. 3)— and are classified based on their socioeconomic deprivation: *mild*, *moderate,* or *severe* (Jones, 2017a). The severe cases, statistically considered *slums*, have inadequate access to safe drinking water and sanitation, less than 7.2 sqm of living space per capita, and uncomfortable dwellings (Republic of Indonesia, 2021, p. 20).

Beginning with Indonesia's 1998 Reform, several settlement upgrading and regeneration programmes have been launched, framed by policies for power decentralisation and multilevel governance. Although they increasingly recognise the kampung's community-based organisations, self-governance structures, and Indigenous sociocultural practices, their outcomes have been constantly subject to critiques. While the early programmes were notably successful in poverty alleviation but limited in local empowerment efficacy, more recent initiatives have mainstreamed collaboration principles and community-based participatory planning and have achieved better results (Republic of Indonesia, 2021; Shirleyana et al., 2018). However, these initiatives have also been found inadequate due to their ineffectiveness in surmounting deep-rooted socioeconomic divides (Das, 2015).

A core mechanism for the upgrading programmes has been the institutionalisation of the Indigenous Javanese cultural practice of gotong-royong. This practice is a normative informal system of relational self-governance, collaboration, value sharing, and reciprocity that is complemented by other solidarity customs, such as voluntary contribution (Bowen, 1986; Hüsken and Koning, 2007; Ley, 2023). Its institutionalisation has persisted through different political regimes since the Dutch occupation, progressively consolidating this practice into an all-inclusive social ethos intended for *jointly bearing burdens to attain shared goals* (Slikkerveer, 2019, p. 309). Yet, while projects activating it have typically involved efficacious interventions—including environmental and sanitation infrastructure, waste management, creativity development, and securitisation—its institutionalisation has been ambivalent (Kharisma and Dermawan, 2020; Suwignyo, 2019). On the one hand, the grassroots differential embeddedness of the practice has been critically sublated by an abstract central government's overcoding that created an implausible state/non-state polity. On the other hand, it has constructively stimulated the growth of state resistant counterforces that have gained power, self-consciousness, self-reliance, and leadership in concerted governance, reinforcing community territorialisation, emotional connections, reciprocal trust, and safety (Bowen, 1986). It is through these counterforces that a new wave of locally based *civic commoning* for the reclamation, defence, and maintenance of the coming together of communities, despite differences, has emerged (Jones, 2019).

To capture the capacity and agency of these counterforces, we have conceptualised the right to safety in urban Indonesia as the *Right to Digitally Augmented Safety by Critical Gotong-Royong Practice* (hereafter DASC entitlement). We define it as a right for a digitally augmented regime of care, interdependence, responsive reciprocity, and distributive justice in cross-scalar habitats. Drawing on work on urban solidarity and commoning (Borch and Kornberger, 2015; Harvey, 2008; 2011; Huron, 2017; Lo, 2024;

Manfredini, 2019; 2022a; Williams, 2018), we enshrine this right within a relational paradigm focused on the dynamic agency of connections (Law and Singleton, 2005), affection (Massumi, 2015) and associations (Latour, 2024). Through a progression that moves across our interpretation of the Right to the City pillars and addresses gotong-royong practices in a progressively mediatised society we have identified three primary rights:

- *The right to urban safety by community differential resilience and collaboration* interprets the labour practices of production integrating work, socialisation, and leisure that reinforce collective identitarian individuation. This entitlement recognises the inherent practice of cultural, social, and affective self-constitution of the collective of gotong-royong through *inclusive work exchange*, as posited by Bowen (1986, p. 547). It establishes territories of *balanced reciprocity* (Hüsken and Koning, 2007, p. 50) with indefinite weighting in which justice is the normative principle for individual contribution to the activation, conservation, and accumulation of collective resources. It moderates *differentially* (Amin, 2006, pp. 1017–1019) situated relations of *democratic inclusiveness* (Calhoun, 2002, p. 167) and *solidary spatial justice* (Amin, 2006; Soja, 2010) that guarantee collective stewardship and care of shared capital. It leverages digital applications to enhance labour productivity, recognition and reciprocity by expanding collaboration and feedback loops across hybrid yet situated presences, resource sharing, interaction arrangements, and operations management. It promotes conditions of *safety-by-world-building*, where collaboration enriches life-sustaining relations of production across digitally extended actions and actors infusing solidarity into everyday life.
- *The right to urban safety by suffused empathy and mutualism* expresses the *politics of relatedness* (Amin, 2006, pp. 1015–1017) that shape power dynamics, social structures, and individual identities grounded in inclusionary, partnership, and dialogic practices. This entitlement recognises the *generalised reciprocity* of gotong-royong that, as defined by Bowen (1986), supports the local solidary relationality of the customary *kinship-grounded general obligation to mutuality* (pp. 547–548). It ratifies the embedded unconditional *duty of care* manifested in the incorruptible yet indefinite expectation of non-lucrative exchange between members of the community. It confirms the primary role of *persistent participation* (Lefebvre,1996, p. 145) of all the actors of a *situated community network* in a sociospatial production that maintain, stabilise, and thicken their relational processes (Calhoun, 2002). It leverages digital applications to expand its domains and enable the intensification and widening of relational systems through multimodal translocal and real-time interactions. It promotes conditions of *safety-by-creative-interdependence*, where mediatisation enriches relations of kinship affinity across actual and mediated genders, ages, cultures, and social statuses that produce spatially and temporally continuous support networks.
- *The right to urban safety by collective imagination and re-enchantment* embodies the commitment of community members to envision, plan and carry out duties of common interest based on emotional connection, resonance, and conviviality. This commitment articulates the Indigenous practice of communal experiences and collective management of common resources, affirming togetherness and communion through a *political status-based 'labour' mobilisation* (Bowen, 1986, p.

> 547). It acknowledges the agency of commoning through partnerships for what Calhoun (2002) defines as *social imagination* and *social action*: imagining of counterfactual possibilities—utopias, for example—but also foregrounding ways of imagining social life that actually make it possible (p. 152). It produces atmospheres of *re-enchantment* (Amin, 2006) with resonant realms of shared meanings that revitalise communal bonds through wonder, desire, and creative projection, enabling the transcendence of the individual into larger dimensions of living together in association and sociality (pp. 1019–1020). The digital gamified augmentation of these atmospheres magnifies people's desire production by constituting playful virtual and hybrid milieus that make the ordinary extraordinarily vibrant, projective, and enjoyable. It promotes conditions of *safety-by-relational-wonder*, where a reality–virtuality continuum reinforces desire as common resource for collective creation of the absolute positive.

We advocate for establishing the DASC entitlement as a solidarity framework for safe city regeneration for urban kampungs in Bandung, and maintain that their communities, which have built resilience around deep identitarian and relational commons—particularly the gotong-royong practice—have a decisive capacity to implement the right to urban safety by preserving and developing their social, cultural and environmental capital and affirming social relatedness, justice, and re-enchantment as superior values. We submit that this bundle of rights is essential to sustain digitally advanced *good city* re-politicisation, relational commoning, and self-governance, and contribute to the reversal of the negative trends toward the goals set with the 2030 Agenda for Sustainable Development.

3. DASC entitlement framework implementation

In 2023–24, the University of Auckland, with the support of the Bandung Institute of Technology (ITB), set out to design a process for implementing the DASC entitlement framework in urban Indonesia. It aimed to collaboratively develop a pilot methodology with analytical and creative components for creating a subsidiary XR instrument that builds capacity and empowers local communities to guarantee these rights in public space. The project adopted constructivist, grounded theory methodology and action research through conjunctural, multistakeholder relational methods that privilege experiential knowledge. Based on a thorough review of literature, policy and plans, it included an action plan with multilevel engagement and an activity plan focused on vulnerable communities, guaranteeing a practice- and language-sensitive, respectful, and recognitive approach. The engagement focused on young people, a crucial cohort for their prominent safety vulnerability and agency potential. While they are highly exposed to urban crime and antisocial behaviours, whether as victims or perpetrators, they possess a significant resilience reserve, innovation desire, and tech-savviness. We evaluated and developed our project seeking guidance, cooperation, and critical reflection through participatory in-person and platform-based coworking methods, including interviews, workshops and follow-up informal interactions. Engagement formats were designed for diverse settings, involving a pool of 24 youth participants with balanced representation by gender and residency status (permanent and temporary residents, such as local university students), and facilitated by Kami Ruang Ketiga (a youth-led NGO promoting public space in undeserved areas that was created as a

result of the *Safe and Sound Cities* programme in 2023). Sessions varied in group size, composition, venue, and media to optimise engagement while minimizing disruptions, biases, and inhibitions.

Data collection on situated people's experiences included a mix of ethnographic fieldwork and dialogic methods, including observations, visual documentation and mapping, integrated with data from informal sources, such as social media and uncategorised studies. Collation of data through CAD and GIS software geolocated, assembled, and triangulated information to offset the scarcity of formal documents due to the settlement informality and to retrieve and activate distributed resources. A *reality–virtuality continuum* environment (Rauschnabel et al., 2022) was created by using multiple interconnected digital platforms that enabled collaboration between multiple individuals, actual and virtual as well as synchronous and asynchronous (Benford et al., 2001). A proprietary version of such an environment was also created for the MR instrument after a thorough analysis of the employability of gaming techniques for digital placemaking (Lo et al., forthcoming).

The action plan was articulated into five partially overlapping phases: literature review and urban context selection, stakeholder engagement, implementation type and case study selection, site selection and specific crime issues identification, and MR instrument development. In the first phase, a literature review (Lo and Manfredini, 2025) was conducted to identify key urban safety issues and existing measures in the wider study context, assessing their impact on sociospatial solidarity, cooperative collaboration, relational empathy, and imaginative re-enchantment. It focused on both actual and perceived aspects, including crime, violence, antisocial behaviour, nuance, conflicts, and exclusion affecting vulnerable urban communities, with a particular emphasis on public space. The review found that Indonesian cities' prevalent urban crimes include gang-related activities, brawls, drug abuse, street-children delinquency, and sexual violence, often perpetrated by individuals facing economic, relational, and opportunity challenges. Current approaches, such as CCTV installation, gated communities, and CPTED methods, have limited effectiveness due to inconsistent implementation and failure to address underlying causes. Importantly, the review found wide consensus that empowering local communities and fostering community cohesion may offer a more sustainable solution to urban crime.

The review also enabled us to identify the specific urban context, the city of Bandung. Greater Bandung, the country's second-most populous metropolitan area and the capital city of the West Java province, has rapidly grown through the informal agglomeration of kampungs (Firman, 2010). Its settlements include many severely deprived kampungs hosting 5% of its residents, the second-largest national cohort (Tarigan et al., 2016). Notably, Bandung has had a preeminent role in the politics of institutionalisation of the gotong-royong practice, and during the Dutch domination, such practice was central to its government subcentre development policies. In the post-independence era, this practice was first declared as a core characteristic of the New Order, and in the post-reform period, it has been mainstreamed in multiple integrated community-managed development programmes (Slikkerveer et al., 2019). However, recent research has shown that the city's kampungs have been experiencing uneven development of social cohesion and solidarity and acknowledges the values and importance of the practice (Rismayanto, 2016).

The second phase, stakeholder engagement, started by mapping the relevant stakeholder groups of the kampungs of Bandung at the urban level. The categorisation, selection, and recruitment strategy of relevant actors active in kampung research, governance, support, and daily life was executed to navigate their high cultural, social and economic heterogeneity. A multilevel involvement structure was established by identifying informants, consultants, collaborators, and co-creators. Selected parties included research experts in urban planning, sociology, and architecture from ITB; public officers of the municipal, subdistrict (kecamatan), suburb (kelurahan), and neighbourhood (rukun warga) authorities; members of *Ruang Ketiga* and *Bandung Creative City Forum*—local non-governmental organisations dedicated to improving public spaces in disadvantaged communities; two kampung activists; and leaders of two resident groups in two representative settlements. The plan implementation also formulated the actions necessary to identify the study details; outline the problems, threats, countermeasures, and opportunities; recognise enablers; and codevelop the action-design initiative to affirm and advocate for the DASC entitlement framework. The contribution of local research team members was essential to leverage their existing relationships and knowledge of the specific key actors, social and cultural practices, spatialisation, rhythms, networks, and power relations. As confirmed by many stakeholders, the engagement was respectful and recognitive, and ensured representation, particularly of the most marginalised, fragile, and underserved individuals and groups.

The third phase, implementation type and case study selection, was held in autumn 2023 and included workshops, interviews, informal conversations, and guided site visits informed by planning and policy documents and cartography. The appropriateness of the approach and proposed framework and context were confirmed. Bandung's appropriateness for the research was unanimously recognised. It was emphasised that sociospatial cohesion and community empowerment in its kampungs represent a primary challenge to the resilience of their inhabitants and sustainable development policies and interventions. Conducting case research focusing on a single instance was identified as the best design, providing in-depth knowledge of insufficiently understood conditions. Case salience over representativity was recommended due to the heuristic character of the study. Key selection criteria were delineated: i) severely deprived and stabilised settlement, ii) demonstrated effectiveness of self-governance and gotong-royong practices, iii) high youth resident quota, iv) innovation preparedness and digital technology uptake, and v) availability of documental studies.

We classified the severely deprived cases in relation to accessibility, character, and functional specialisation. We identified i) *segregated kampungs,* recently formed suburban or peri-urban settlements with significant geographical isolation; ii) *creative kampungs,* suburban settlements with significant inborn artistic practices recognised and supported by state programmes; and iii) *semi-central service kampungs*, suburban settlements with specific external transactional interdependencies. Semi-central service kampungs were preferred as they best met the criteria. The disenfranchising standby condition of their residents is severe but moderated by relatively easy access to external social and urban amenities and employment—their residents mainly work informally in the service sector as security guards, carers, janitors, and vendors. This quasi-integration in the urban landscape makes them more receptive to innovation and digital technology. Their

stabilisation supports robust self-governance regimes, typically rooted in traditional cultural practices. Significant studies have generally documented them due to their consolidated development and urban location.

For the case study selection, semi-central service kampung cases were examined with an emphasis on collaboration capacity, demonstrated by the articulation of local government structure and resident associations and the number of youth residents with advanced digital literacy. After a shortlisting process, *Kampung Lebak Siliwangi* (Fig. 1), located in the inner suburban Coblong District, was chosen as it is a typical example of inner-city urban service kampungs with rich social diversity, including a substantial number of young, technology-savvy residents. Many are ITB students who live there temporarily. The kampung comprises eight neighbourhoods with composite public and private land ownership (Jones, 2019; KAA, 2022). It has a semi-random spatial configuration, is structured by two primary roads, and has a labyrinthine network of narrow alleyways accessible on foot or by bike. Its community structure is highly organised and has cohesively grown since its establishment by Javanese migrants in the latter half of the 20th century. Its spatial boundaries are three main urban infrastructures: Cikapundung (the city river), the zoological garden, and Jalan Pasupati, a primary urban artery (Rosadiana, 2023). Interviews and workshops confirmed that the socioeconomic deprivation of the kampung's residents is not only conspicuous but perceptively exacerbated by the kampung's immediate urban environment. Cihampelas Walk, a modern, high-end, all-inclusive shopping centre; Jarrdin Apartment, an upscale residential and hospitality development; and ITB all offer unaffordable goods, services, and lifestyles to most permanent residents. Conversely, the proximity to these facilities provides significant informal economy opportunities, such as room rental, street vending, and cleaning services.

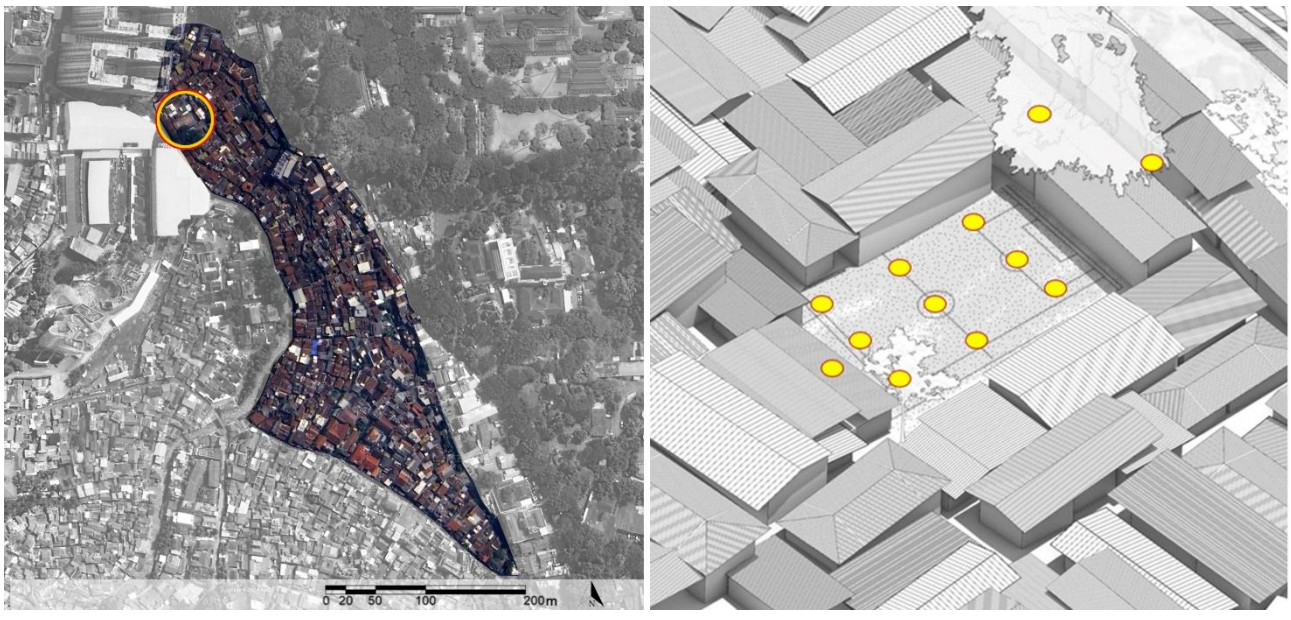


Figure 1. Lebak Siliwangi: left) aerial view of the kampung with localisation of the Community Centre; right) visualisation of the Community Centre, with LiDAR scanner station positions. © Manfredini, 2025.

The fourth phase of the plan, site selection and specific crime-issues identification, was held in the spring of 2024. It adopted the same methods as the previous phase but mainly involved local residents, including the chief and the secretary of the kampung, the leader of one of the neighbourhoods, and a representative of *Karang Taruna*, a youth resident group. *Lebak Siliwangi Community Centre* (LSCC; Fig. 1 and 2), the principal social infrastructure of the settlement, was chosen as the study site. The centre, located in the dense housing area of the kampung, was built between 2008 and 2013 as a gotong-royong project through the adaptive reuse of a disused agricultural water pond on land owned by the Indonesian Railway Company and granted free use rights. It hosts multiple associative, cultural, and recreational activities and community meetings, including major public ceremonies and sports competitions, and is home to 10 resident associations (Rosadiana, 2023). The centre comprises a multifunctional building, a sports field, and a sitting loggia, locally called Ruang Delapan (Room 8). As test sites for the project, the stakeholders recommended using the sports field and the loggia, the more accessible, indeterminate, use-flexible parts of the centre.

The activities also addressed relevant literature review findings. Conversations regarded young people's vulnerability to urban crimes by youth criminal gangs, which are the most recognised source of organised offences and fear among the general population (Alcano, 2014; Nilan, 2010). The conversations addressed local manifestations, drivers, and implications of criminal and antisocial behaviours, such as a diffused random-assault phenomenon called *Kilith* (Wijanarko and Ginting, 2021). Dysfunctional social relations (Agustina and Appulembang, 2017), marginalisation, emotional immaturity (Aprilia and Indrijati, 2014), and resultant drug dependence or abuse (Nasir and Rosenthal, 2009) were confirmed as expected background conditions. However, the community solidarity regime of the kampung was identified as an effective preemptive shield, as demonstrated by the limited incidence of major offences, such as violent gang activities. This aligns with broader Indonesian research, showing the positive effect of sustained community activities involving youths, regardless of their background, through responsibilisation tactics (Nilan, 2010), as well as with international studies on the efficacy of politically active public space (Mitchell, 2003, pp. 128–130).

Advocacy for the improvements of the current situation, however, was unanimous. Antisocial behaviour and other public-space threats, particularly at night, such as non-compliance with customary privacy, verbal bullying, and minor property crimes such as theft of motorbikes and mobile phones are not infrequent. Common mitigation strategies were also discussed, such as CPTED methods for addressing collective space trespassing, encroachment, poor illumination, and neglect (Sakina, 2020; Satiawan et al., 2019). Intrusive forms of securitisation such as fortifying, walling, and extensive CCTV surveillance (Doni, 2020; Laurens, 2006) were deemed detrimental as they merely dislocate crime to other areas and aggravate social isolation and problem concentration (Sampson and Bean, 2006). Solidary strategies were praised for contributing to community-building and embedded-cultural practices, including supervision resulting from enhanced territoriality, care, and the community-invested eyes on the street of local store vendors and street players (Karsono et al., 2017). Research on Bandung's public space demonstrates that active individual participation and engagement in social activities improve social relations, integration, and collaboration while enhancing safety (Chandra and Budiyuwono, 2021; Kharisma and Dermawan, 2020). Notably, there was

particular and unsolicited appreciation for the contribution of mobile digital technology to the enablement of *mediatising eyes on the street*, which supports the integrity and wellbeing of vulnerable people utilising recently developed safe-wayfinding applications (Pindarwati and Wijayanto, 2019).



Figure 2. Lebak Siliwangi Community Centre (during LiDAR scanning survey, March 2024): left) sitting loggia and southwestern futsal court boundary; right) court area and multifunctional communal building. © Lo, 2024.

For the digital improvement of existing actions to advance the publicness of communal space, the kampung secretary mentioned regular team games and sports matches organised at the LSCC structures and the *relationally active posts* of the kampung entrances complemented by nightly *comforting patrols* that are manned by three to four community members. Noting that investments in new technology that intensifies kinship relations should be made, he added: "There is no price for safety; that is why we constantly build the community here so that we have a cohesive society" (interview, Feb. 2024). Congruently, the kampung chief confirmed that it might reduce current involvement challenges to "include everybody in public activities regardless of their backgrounds and genders. Everybody is welcome to join. This way, we build our community" (interview, Feb. 2024). Regarding the employment of digital applications for the involvement of the youth in LSCC-based activities, he added that their engagement is problematic due to the inappropriate and addictive use of poorly moderated social

media platforms. He noted, "They are more interested in online screen time. Many young people gather here [at LSCC] every evening after school or work. However, they do not talk to each other; they look at their own phones, probably at social media. They are here only for the free Wi-Fi." However, workshop participants insisted that using social media offers great potential to reach out to and engage the kampung youths, as demonstrated by many resident group activities that use daily media such as Instagram or Facebook to communicate with their members.

The fifth and last phase of the plan, MR pilot instrument development, focused on defining the framework and functionality paradigm and constructing, testing, and reflecting on a sample model. This included the codesign of a basic proprietary XR instrument with online gaming functionalities using digital twinning and computer vision applications that promoted *social presence* for both public and private gathering and interaction, synchronically activating local and remote (latent) social, cultural, and spatial resources (Wolf et al., 2020). The adoption of mediatisation for collaborative actions was to support *diverse embodiments* of presence through the formation of *plausible spaces* where illusion emerges into reality (Slater et al., 2022), while minimising undesired forms of reductionist mediation (Miller et al., 2019).

This phase was held in parallel with the third phase and engaged the same stakeholder groups in three main workshops and a sustained flow of informal communication via our platforms. The initial stakeholder workshop was devoted to the framework development and was introduced by an experiential session to become familiar with the immersive VR devices and interfaces. Residents confirmed their excitement for this technology. They indicated that the instrument's effectiveness would be enhanced by adopting gaming principles to produce user-co-created immersive environments that enable creative expression, storytelling, playfulness, and fun. Unanimous recommendations indicated the necessity of guaranteeing high accessibility to digitally augment inclusionary relationality and reinforce solidary territorialisation.

Following these recommendations, the construction of the sample model involved conventional digital twinning techniques. A high-resolution 3D LiDAR scanning survey collected data on the configuration of the study site, capturing information on the appearance, geometry, and materiality of the selected LSCC spaces to enable seamless integration of the virtual and physical worlds. Data were transferred, cleaned, harmonised, and optimised to form a workable point cloud file and converted into a CAD model. Once finalised, the model was imported into Unity®, a cross-platform game engine, and transformed into a dynamic element by adding interactivity functionalities and material textures. Finally, the model was moved to Spatial®, a user-generated-content gaming platform, and made accessible through the web. This platform allows users to experience and create new spatialities through multiple interfaces: mobile phones, VR/XR headsets, and PCs. Sample games were added to experiment with learning, engagement, and personal-growth functionalities.

The second and third workshops centred on testing, refining, and reflecting on the model's capacity against the DASC entitlement framework objectives. Two games were used for the testing: a game of human-scale electronic chess for player-collaborative interaction and a multilevel collecting game for reward-based spatial explorations (Fig. 3).

The workshops confirmed the appropriateness and potential of the model across the three DASC entitlement framework axes and emphasised the importance of introducing

serious game modules that, beyond entertaining experiences, can help bridge the digital divide and address solidarity, collaboration, and re-enchantment by addressing issues such as insecurity of land tenure; and employment, education, and public service access. In the last workshop, a session identified themes for games with high relationality-enhancing potential. Football games that enable real-time streaming of actual games topped the list for suggested future implementations. The capacity of this sport, popular among the youth, to override disagreements, unify, and cheer together is patent when there are games for the city team, *Persib Bandung*, or the Indonesian national team. Also, the implementation of serious games that address kampung issues was strongly recommended. Their capacity to inform, engage, and deliberate on crucial issues, such as the right to housing, was highlighted as central to the framework's solidarity register.

Workshop and platform-based discussions also addressed the risk of adverse effects arising from the MR instrument if it is accessed and manipulated by third parties with ill intentions. A consensus was reached regarding the necessity of granting the community and its groups exclusive governance privileges for the settings and terms of use of the instrument. Although it was agreed that autogestion of the augmented territory is paramount, given the novelty and the instrument's complexity, it was recognised that continuing external support might be necessary to guarantee technology updates and prevent the emergence of new threats to human rights and privacy. It was also unanimously determined that it is imperative to keep this testing and discussion running by involving a more comprehensive range of stakeholders and consultants and adequately briefing them about the identified questions concerning the DASC entitlement framework objectives.

Accordingly, it was decided that further development of the functionality framework should address two seemingly contradictory yet only contingently resolvable issues. The first issue concerns the dualism of the commonness of the application. On the one hand, it should produce an array of *closed systems* that, to foster *dialogic and interactional cohesion,* require tight access control, friendship-based networkability, and associative stability to guarantee the privacy and agency of the community and its groups. On the other hand, it should maintain an *open system operability* that supports *differential and collaborative production*: "It is only in encountering the uncontrollable that we really experience the world" (Rosa, 2020, p. 2). The second issue involves the two-fold functional flexibility of the system: while fixed functions and protocols are essential to sustain users' habitus, to sustain *solidary and transindividual commoning* dynamics in this complex social environment, the continuous and conjunctural modulation of their settings is indispensable to enable dynamic relatedness across not only public and private statuses but also those that are "collective and associational, nested hierarchical and horizontal, exclusionary and open" (Harvey, 2011, p. 107).

The model created a more-than-public hybrid space, enabling the integration of the physical with multimodal digital access—virtual, augmented, and mixed. Simultaneous multiparticipant admission and multidevice use were guaranteed. Multiple subsets and variable settings were built-in, including i) *access control*, moderating public, semi-public, semi-private, and private conditions; ii) *presence type*, integrating on-site and remote participation; and iii) *appearance*, regulating the degree of participant visibility. The design included risk assessment against the dangers of infringing on human rights, privacy, solidarity, and trust.



Figure 3. Lebak Siliwangi Community Centre VR and point cloud models comparison. © Manfredini, 2025.

4. Conclusion and Future Work

This study leveraged digitally enhanced instrumentalities to foster urban safety to contribute to the achievement of the UN's Sustainable Development Goals through capacity building and empowerment actions with and for vulnerable underserved communities of the Global South. It demonstrated that community-led processes for the developmental conservation of social, cultural, and environmental community capitals that convert inadequate securitisation methods of surveillance into effective safety practices of relatedness can be fostered by actions that facilitate the creative adoption of state-of-the-art technologies.

Firstly, it provided a framework for the Right to Safety in urban Indonesia from the tripartite Right to the City perspective. Grounding the framework in integrity and wellbeing, and *good city* principles, and leveraging inborn regimes of instrumentalities—such as the gotong-royong ethos—it formulated a social-solidarity-rights triad: the right to urban safety by community differential resilience and collaboration, the right to urban safety by suffused empathy and mutualism, and the right to urban safety by collective imagination and re-enchantment. Secondly, it discussed the community-based development and implementation processes of this framework for the collaborative development of a methodology with sustained multilevel and multimodal stakeholder engagement. This included identifying a case study—the self-built community centre of an urban kampung in Bandung—eminently suited for the affirmation of the proposed entitlement triad in which urban transformation and mediatisation threat consolidated community resilience built around deep identitarian and relational commons. Thirdly, it presented the sequence of codesign phases for the creation of a pilot subsidiary MR model for the community centre with gaming functionalities that synchronise multiple modes of participation: actual, virtual and hybrid.

The development of the digital instrument provided important insights into its effectiveness and potential. The cocreation with the local youths, the primary cohort for the daily protection, activation and maintenance of the commons of the community centre—i.e., social, cultural and sport practices—enabled us to organise the rich mix of possible combinations of production, exchange and consumption modes by articulating the key perspectives and insights of the kampung's community of communities. This was not only essential to regulate relations between the functionality statuses of the MR model—e.g., public and private, collective and associational—but also to determine the potential threats that impose extreme caution on the use the in the collective powers. The protection of the common good of its communities is fundamental to strengthening their sensitive interdependence, responsive reciprocity, and distributive justice and preventing their abstractive and disempowering institutionalisation.

An early indication of the project's effectiveness emerged constantly within its own collaborative processes. During stakeholder workshops—particularly those involving the codesign and testing of the MR instrument—participants actively embraced the three-right framework. Cooperative collaboration materialised through collaborative problem solving in game design and testing sessions, where residents and researchers jointly negotiated spatial safety solutions. Relational empathy developed as youth groups articulated shared vulnerabilities in storytelling phases, fostering cross-gender and cross-status understanding. Most notably, the workshops generated instances of imaginative re-enchantment during playful interactions within the MR environment that transformed the meeting venues, such as Ruang Delapan's loggia, into a resonant space of collective projection, where participants reimagined their commons through serious and semi-serious games. These research actions themselves facilitated new productive encounters, spontaneous friendships, and palpable feelings of togetherness—often culminating in enthusiastic convivial atmospheres that extended beyond formal sessions—demonstrating the framework's capacity to foster the solidary relations it seeks to institutionalise.

As a concluding remark, it is essential to note that results are only tentative, given this project's heuristic character and limited resources. As the Global Digital Compact advocates, future work must comprehensively address digital divide, inclusion, openness, safety and integrity of digitality, with a particular focus on gender equality, trans-generational and inter-generational integration, and social, cultural and economic growth within kampung communities. This includes adoption of an equitable, concerted, balanced, inclusive and risk-based governance approach to the evolution of the MR instrument that while introducing innovation, such as artificial intelligence augmentation, must ensure universal access and the rights of the differently abled, and prioritising community-specific inventions over technical novelty. Particularly, it should (i) expand community engagement to ensure recognition of difference (e.g., gender, age, culture, status), guarantee representation, privileging the most vulnerable and marginalised, and ensure non-exclusionary, collaborative governance; (ii) develop incremental modularity with applications for collective identitarian individuation and cross-platform interoperability that foster reciprocal support and co-creativity; and (iii) increase playability options and modes that modulate connection depth and affective responsiveness that facilitates resonant connection and relational wonder. Crucially, as the framework implies the assumption of ownership and activation of core material and

cultural commons of the local community, its scalability and transferability can only occur through radical re-contextualisation.

By redefining the right to urban safety as a tripartite entitlement of cohesive collaboration, relational empathy, and imaginative re-enchantment, our research advances the discourse on the Right to Safety and operationalises it within a community-led and culturally grounded urban process through the cocreation of a supplementary instrumental set. We contribute a novel approach for regenerative urban development in an increasingly mediatised society that upholds core *good city* principles—participation, relationality, and cosmopolitics.

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