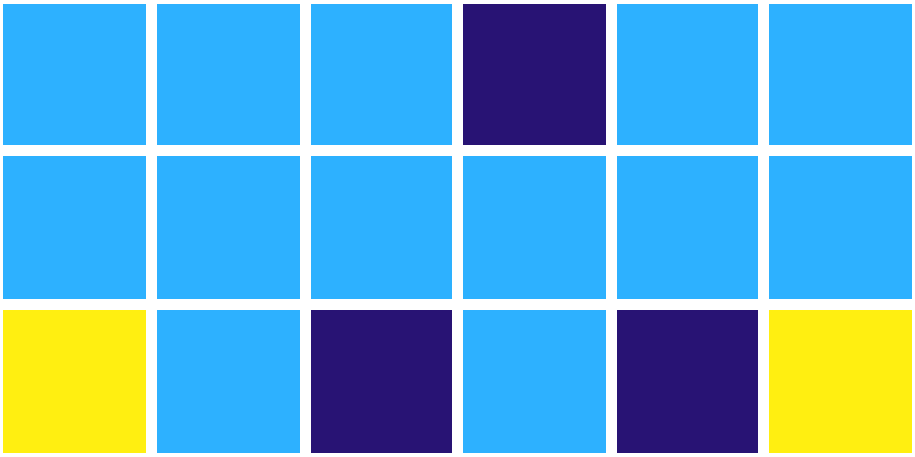
A MEASUREMENT INSTRUMENT FOR URBAN SPACE

Body *Matrix*

Measuring body hospitality: what can a body do in this place?



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The construct: body hospitality

Body hospitality is **the capacity of a space to let concrete bodies stay: free of charge, with dignity, without a purpose being required or attributed.**

It is distinct from accessibility, which concerns entering: a space can be perfectly accessible and perfectly inhospitable.

Accessibility is the precondition (row F9); hospitality is everything that happens, or fails to happen, once the body is in.

The concept of the hospitable city exists in the literature (Bell 2007) but has never been operationalised as a measurement instrument: this is that instrument.

What it measures

The Matrix crosses nine elementary bodily functions with six body types, scoring each cell as free, payment-conditional or impossible.

It does not measure who is present (observation protocols such as Gehl's do that): **it audits the offer of a space**, what a body could do there if it arrived.

Outputs: completed grids per unit, a leash measure per body, different maps of the same space.

What it is not

Not a regulatory accessibility audit, not a moral assessment of venue owners, not a policy instrument.

It produces red cells (unmet demand) and green cells (met demand, possibly to be translated into reusable patterns).

Scores describe what exists and works today.

Three rules

1. **Score only what is verified with the body**: if you are not sure the toilet is open, go and try.
2. **Doubt resolves downward**: a function that exists but degrades its user is scored with the dignity modifier.
3. **The severity rule weighs alternatives and stakes**, and that is where asymmetry enters the numbers.

01 Conceptual basis: *why these functions*

The instrument operationalises the capability approach (Sen 1999; Nussbaum 2011) at the scale of everyday urban space: it audits capabilities (what a person could do or be) rather than outcomes (what people are observed doing). Several of Nussbaum's central capabilities appear directly in the rows: bodily health, bodily integrity, play, affiliation. The observation-based complement is Gehl's distinction between necessary, optional and social activities (Gehl 2011): optional activities, above all staying, are the established indicator of spatial quality.

Two selection criteria

- **Non-deferrability (the two-hour rule).** A function enters the Matrix if a typical body cannot defer it beyond roughly two hours without leaving the space: bladder function (Greed 2016; Kitchin and Law 2001), hydration, rest intervals for older bodies, thermoregulation, infant feeding cycles. **Denial of these functions does not inconvenience a body: it expels it**. Humanitarian minimum standards codify most of them for refugee camps (Sphere Association 2018); European high streets are rarely held to the same test.
- **Constitutiveness of presence.** A second family does not maintain the body but constitutes being in public: staying without purpose (the contested capability documented for women by Phadke, Khan and Ranade 2011, and historically by the debate on the impossible flâneuse, Wolff 1985), children's free play, and connectivity, which increasingly conditions safety and access to services. The same construct has been reached independently from the disability literature: the kubia procedural model adds "Sensing" (feeling at ease and safe) to the four classic accessibility categories (kubia n.d.).

> *Two literatures converging on the same family from opposite starting points is evidence that the family is real.*

Three families

Family	Functions	Grounding
Maintenance	F1 sanitation, F2 hydration, F3 rest, F4 thermal comfort, F5 infant feeding	Physiological non-deferrability; Sphere minimums; Gehl's necessary activities
Presence	F6 staying without purpose, F7 play, F8 connectivity	Capability approach; Gehl's optional activities; Whyte 1980 on sittable space
Access (precondition)	F9 access and egress	If F9 fails, every other row fails for that body (Kitchin and Law 2001)

Two modes: thermometer and prospector

The Matrix runs in two directions.

As a thermometer it hunts red cells: exclusions, ranked by severity, feeding the venue walk-through and its modifications.

As a prospector it hunts green cells: spaces that already hold a body exceptionally well and reverse-engineers what makes them work.

Extracted regularities can become named, reusable design patterns, following the method of A Pattern Language (Alexander et al. 1977): patterns mined from native excellence transfer far better than invented recommendations, because owners imitate what they can see working (the demonstration principle). The pattern library is the content of the owners' toolkit.

Relation to existing instruments

The procedural model exists and is field-validated; the measurement instrument does not.

The nearest kin is the **kubia procedural model for accessible culture** (kubia n.d.), developed within the ESF project Kultura bez Barier and tested by 164 Polish cultural institutions: it crosses functional categories (Moving, Hearing, Seeing, Understanding, Sensing) with fine-grained trait groups and with the touchpoints of a visitor journey, audited in walk-throughs together with the bodies concerned.

The Matrix owes it three elements (the journey level, the Sensing category, the Aesthetics of Access principle) and differs from it on every remaining axis: **kubia organises the work of a cultural institution but does not measure** (no scoring, no comparability), **does not price** (no free/paid dimension), **stops at the institution's door** (no street, no leash), derives its groups from impairment rather than from ordinary bodies, and addresses publicly funded institutions acting on mission rather than private owners acting on revenue.

The concept of **urban hospitality is established but not operationalised** (Bell 2007).

The nearest general instruments are Mehta's Public Space Index (Mehta 2014), which scores overall space quality without crossing body types, and Gehl's Public Life protocols, which observe outcomes rather than audit offers. Single-axis audits were mined for items: disability walkability (SWAN), age-friendly checklists (WHO 2007), women's safety audits (WICI 2008), child lenses (Urban95), toilet provision studies (Greed 2003), micro-scale instruments (MAPS, Millstein et al. 2013). None crosses functions with body types intersectionally (Crenshaw 1989), none scores the free/paid/impossible dimension, none measures the leash.

02 The two *measurement axes*

Horizontal: the street and the network.

Unit: the transect, a 200-400 m walked stretch.

Thin protocol: only the node census (every F1-A and F3-A point marked on the map) plus F9 barriers. Products: the **leash per body** (the median distance between consecutive free nodes, compared with the body's gait: B6 needs seating every 150-200 m), **maps of the same street** (the city shrinking according to who you are: the exhibition format, following the Vienna 1991 precedent, Damyanovic et al. 2013), and the **city scorecard**, defined per unit and per body as the tuple: leash in metres, number of critical cells (section 6), counts nA, nP, nX, n^{+} over the compiled denominator (section 6b). Cheap, repeatable; comparative only across units audited under the same profile, Matrix version and slot structure (section 6b).

Vertical: the place and the object.

Unit: the venue or micro-site, audited in depth.

At place level: **the full grid across both time slots**, plus **the dwell test**. For larger venues, an intermediate level sits between the two: the journey, the chain of touchpoints a body traverses (information, ticketing, arrival, entrance, counter or foyer, the core activity, the toilet), each scored separately, because a single broken link breaks the whole visit (the touchpoint logic is kubia's, tested on 164 institutions).

At object level: **the single artifact decomposed into measurable features**. Example, a public fountain for body B5: spout height in centimetres, step present or absent, basin height, force needed to operate. A cell stops being a judgement and becomes a technical card.

Object cards feed databases (each mapped fountain in a heritage inventory can carry its body hospitality card) and specifications for owners.

Sampling design. The vertical is the atom, the horizontal the molecule: the leash is computed from vertically audited nodes. Stratified design: full grids on few units, thin transects on many. The two axes also split the products: horizontal produces the public restitution (maps, scorecard, exhibition, press); vertical produces the commercial one (venue report, modifications, patterns, certification).

Cross-validation with observation. Where possible, run a Gehl-type stationary count on audited segments (who stays, by apparent gender and age; Gehl and Svarre 2013). Where the Matrix says X, the count should show absence; where an owner fixes three cells, observed composition should shift within 90 days. Disagreement between the two measures is informative: one of them is wrong, and finding which is the point. On units with a dropped-safety outcome (section 3) the stationary count is mandatory: the unit does not remain empty, it remains observed. The count measures outcomes, not offer, and the restitution states the difference.

03 Instructions

Audit units. Transect (200-400 m, 45-60 minutes with thin protocol) or venue (20-30 minutes for the full grid; add the dwell test).

Threshold layer. Every function splits into what is verifiable from the threshold without consent (entrance step, interior visible from the street, customers-only signage, visible seating, displayed prices) and what is verifiable only inside (toilet tried, changing table, door width). The threshold layer is compiled for 100% of the venues on the transect, census-style, consent or not; the interior layer only where the auditors enter. The restitution publishes both coverages, side by side.

Who audits. In pairs, never alone. Wherever possible, each column is audited by the corresponding body; where impersonation is impossible, score by observation and direct trial, and note it. A loaded pushchair is an acceptable proxy for B4 thresholds and gradients, not for toilets.

When. Every unit twice: daytime (10:00-12:00) and evening (19:00-21:00 winter, 21:00-23:00 summer). Column B3 without the evening slot is not compiled: the evening defines it.

Materials. Printed sheets (one Sheet A per unit and slot, one Sheet B per venue), paper map, tape measure for thresholds and object cards, phone for photographs (spaces only, never people), loaded pushchair if available. A web application can substitute all of the above.

Sequence. Reconnaissance walk without sheets (10 minutes). Then the grid, walking. Then the dwell test. In venues: ask the owner's permission; the request itself is the commercial approach (section 9).

Independent double scoring. The two auditors complete the grid separately and compare at the end. Persistent disagreement on a cell is a defect of the definitions in this document: note it in the margin and bring it to the debrief. Margin notes feed a numbered change log; definitions are versioned, and agreement statistics are computed per version, so a pilot can state not only how much disagreement exists but whether one version produces less of it than the previous one on the same items.

Safety and ethics in the field. No photographs of people; no personal data (the Matrix describes spaces, not individuals). Venues are entered with the owner's permission. Evening tests for B3, and all visibility tests (section 8), are run with the pair in sight at a distance and stop at the auditor's discretion: no data point is worth an incident.

Outcome codes. Every planned test receives an outcome, recorded before results are read: completed, dropped-safety, dropped-logistics, refused-consent, each with one concrete line of reason. A cell that could not be tested safely is coded XS, reported alongside tested X, never merged with it and never excluded from the denominator. The owner refusal rate per transect is published next to the Sheet B results (section 9).

04 The bodies *(columns)*

Each column is a concrete person, not a category. Score by asking: this person, here, now, can they?

Examples:

Code	Body	Operational definition and guiding questions
B1	**Healthy adult man, 30-50**	The baseline. Space is calibrated on him: his score exists to make the others visible. Guiding question: is there any cell where even B1 scores X?
B2	**Healthy adult woman, 30-50**	Typically trip-chaining (work, shopping, children, ageing parents). Can she stop here between errands? Is a toilet reachable within the time of one stop?
B3	**Young woman alone, 18-25**	Scored above all in the evening slot. Can she remain here, still, alone, without purchasing, without a purpose being attributed to her? Who else is present, and can they see her?
B4	**Wheeled body**	Wheelchair user; pushchair with carer as proxy for thresholds and gradients only. Can it enter? turn? reach the toilet? Is the toilet genuinely usable or a compliant storeroom?
B5	**Eight-year-old child**	Scored twice: accompanied and alone (the popsicle test). Can they move, touch, make noise, sit on the ground? At object level: heights and forces in centimetres.
B6	**Older person, 75+**	Reduced mobility, reduced continence, seating every 150-200 m. How far is the next seat with a backrest? Is there a toilet reachable at their pace?

Modular columns

Added when a project requires them, same rows: **the displaced body** (no money, no local language), **the anxious or neurodivergent body** (is there a quiet space?), **the trans or non-binary body**, for which one maintenance row is structurally contested: gendered sanitation (F1) is the infrastructure where this body is questioned, exposed or endangered (Cavanagh 2010; Doan 2010), and F6 carries a specific attribution risk.

Sexual orientation: the dyad layer

Sexual orientation, by contrast, is not a column: a gay man uses a toilet like any man, and pretending otherwise would break the instrument's logic. The exclusion mechanism is the visibility of the relationship, not the individual body.

It therefore enters through the test design rather than the column structure: the dwell test in couple variant (section 8), where the unit of audit is the visible same-sex couple performing ordinary co-presence (sitting together, holding hands) in rows F3 and F6. The question is the same as for every body: can they stay, without a purpose being attributed, and at what cost?

05 The nine functions *(rows)*

Code	Function	What is verified, with the body	Grounding
F1	**Sanitation (toilet access, incl. baby changing)**	Does a toilet exist? Free or customers only? Open now? Clean enough that the auditor actually used it? If not, one concrete line why (rule 1). Changing table present, and only in the women's room or in both? For the trans column: gendered access as contested infrastructure.	Greed 2003, 2016; Kitchin and Law 2001; Cavanagh 2010
F2	**Hydration**	A working free water point within the unit. Bottled water for sale scores P, not A. At object level: spout height, step, force.	Sphere 2018; EU Drinking Water Directive 2020/2184 art. 16
F3	**Rest (seating)**	Free seating without purchase obligation, with backrest (for B6 a backless bench takes the dignity modifier). Walls and steps count only for B1, B3, B5.	Whyte 1980; WHO 2007
F4	**Thermal comfort**	Summer: 20 minutes out of the sun? Winter: a free interior to warm up? Score for the current season and note which.	Heat mortality literature; WHO 2007
F5	**Infant feeding**	A seated, dignified place that is not the toilet. Would a mother feed here, or leave?	Hayden 1980
F6	**Staying without purpose**	The sovereign row, measured with the dwell test: remaining still without buying, waiting or doing. Records rules and gazes alike.	Phadke et al. 2011; Wolff 1985; Gehl 2011; Oldenburg 1989
F7	**Play**	Free movement for B5: running, touching, noise, without dedicated equipment. A fenced pay-to-enter playground scores P.	Nussbaum 2011; UNICEF CFCI
F8	**Connectivity**	Accessible socket or charging, open wifi. For B3 in the evening it is also safety.	Digital access literature
F9	**Access and egress**	The enabling row: entrance steps, crossings, distance from the stop, lighting of the route. If F9 is X, the whole unit is X for that body.	Kitchin and Law 2001; Damyanovic et al. 2013

06 Scoring

Three values per cell.

- **A** = available free of charge, no purchase obligation, no permission to ask.
- **P** = conditional on payment or consumption ("customers only" toilets score P).
- **X** = impossible or not provided for that body.

Three modifiers.

- Time (t): available only in certain slots; write which.
- Distance (d): beyond 300 m it is another cell.
- Dignity (†): available but degrading; A† counts as A in every count, with n† reported alongside; no aggregate halves a function.

Severity (triage rule).

A cell is flagged critical when all three gates hold:

(1) the cell is X;

(2) no alternative exists within the leash of that body;

(3) the function is non-deferrable for that body (the maintenance family, F3 for B6, F9 for every body).

Cells are ranked by the number of gates met; ties are broken by the number of bodies sharing the X. Critical cells open the report. No numeric severity score is computed in this version: weights invented before pilot data would be decorative precision.

How to read a column

Top to bottom like a day: if F9 is A, F1 is P(†), F3 is X and F6 is X, that body can arrive, cannot use a toilet with dignity, cannot sit, cannot stay. Translated for the owner: it enters, spends quickly if it must, and leaves. **Dwell time is zero by your choice, not their own.**

6b Profiles and *aggregation*

Profiles. The Matrix is never compiled in full by default. Each deployment declares one profile: P1 transect (node census of F1-A and F3-A points, plus F9 barriers), P2 venue (full grid, both slots, dwell test), P3 walk-through (the Sheet B subset), P4 object (the object card).

A cell not foreseen by the profile is recorded as nc, not compiled. nc is never X: it is absence of measurement, not absence of function. Aggregates are computed over compiled cells only.

Aggregates are counts, nothing else. Per column and per unit: nA, nP, nX, n† over the compiled denominator ("B6: 2A 3P 4X of 9"). The network aggregate of P1 is the leash per body, in metres. Every aggregate prints its denominator: no percentages without it, no comparisons across different denominators.

Comparability. Two units are comparable only under the same profile, the same Matrix version and the same slot structure. The city scorecard is the tuple defined in section 2, computable from P1 onward.

07 Sheet A: the grid *(one per unit, per time slot)*

UNIT | TYPE: TRANSECT / VENUE | DATE

SLOT: DAY / EVENING | AUDITORS | MATRIX VERSION

	B1 man	B2 woman	B3 young woman alone	B4 wheeled	B5 child	B6 older
F1 sanitation						
F2 hydration						
F3 rest						
F4 thermal						
F5 infant feeding						
F6 staying						
F7 play						
F8 connectivity						
F9 access						

Cell notes (number them, write below): every X and every † requires one concrete line ("toilet locked, key at the counter", "single bench in full sun, no backrest"). Modular columns are appended to the right when active.

Worked example (café, evening slot)

A · free | P · payment-conditional | X · impossible

	B1 man	B2 woman	B3 young woman alone	B4 wheeled	B5 child	B6 older
F1 sanitation	P	P(†)	P(†)	X (55 cm door)	P	P(†)

	B1 man	B2 woman	B3 young woman alone	B4 wheeled	B5 child	B6 older
F3 rest	P	P	P	P (1 table)	P	P
F6 staying	A (counter)	P	X (gazes; t: evening)	P	X	A (t: morning)

Reading: the man stands at the counter without buying and nobody asks anything; the woman must purchase; the young woman alone does not stay in the evening even purchasing; the older person has a right to stay, but only in the morning. One venue, four different venues.

08 The dwell test *(row F6)*

The auditor embodying the relevant column enters or stops in the unit and remains 20 minutes doing nothing: no phone for the first 10 minutes (the phone is an alibi and biases the test), no purchases, no declarable waiting.

Record:

Item	Record
Explicit interventions	Staff or bystanders who question, invite to purchase, invite to leave: how many, after how many minutes, in which words (transcribe).
Implicit pressure	Countable events with time stamps: staff approaches, direct addresses, signage. Both auditors log independently (the partner in sight, section 3, keeps the second log); agreement is computed on the event logs. Impressions of gazes go in the notes, not in the score.
Self-rating	Comfort in staying, 1 (I want to leave) to 5 (I could stay an hour). At minute 5, 10 and 20.
Outcome	Completed / interrupted at minute ___ because ___. Would they return alone? yes/no.

Scoring F6 is determined by observables only: A if the test completes with zero interventions; P if it completes only by purchasing; X if interrupted, or if an explicit intervention imposes purchase or departure. The self-rating remains auxiliary data, recorded at minutes 5, 10 and 20; it never produces a score on its own. Methodological note: the test also measures the alibi. If the auditor endured only by pretending to wait or by looking at the phone, note it: **the space does not allow being there, it allows appearing busy, and that difference is the object of this instrument.**

Couple variant (visibility test)

Same protocol, unit of audit: the couple. A visible same-sex couple performs ordinary co-presence (sitting together, holding hands, twenty minutes) in rows F3 and F6; a mixed-sex couple of the same ages provides the baseline in the same unit and slot. Differences in interventions, gazes and self-rating are the measure. This variant carries the highest field risk in the instrument: it follows the safety rule of section 3 without exception, is run only by auditors who volunteer for it, and is dropped in any unit where risk is judged concrete. An XS, not testable safely (section 3), is itself a datum, and among the most severe the Matrix can produce; it is reported alongside tested X, never merged with it.

09 The venue walk-through *(Sheet B)*

For private venues the audit is done with the owner, in 45 minutes; the restitution is commercial, not moral.

1. The opening (5 minutes). Start from the counterexample the owner knows on his own skin: "Remember walking alone into a lingerie shop to buy a present, not knowing where to put yourself? We measure who that happens to in your venue, and what it costs you." No theory, no -isms.

2. The walk (20 minutes). Grid in hand, from the threshold inward: can the interior be seen from the street? steps? does seating require purchase? the toilet: open, locked, customers only? where is the changing table? is there a husband chair, the minimal concession to a body the space does not expect? music, light, prices displayed (a hidden price is an uncertainty tax on the poorer body)? who works the floor, and who does the clientele resemble at 11:00, 15:00, 21:00?

3. The restitution (20 minutes). Sheet B, completed together: two columns plus the three modifications.

Sheet B

MATRIX VERSION

Who cannot stay here	Why (X and † cells)	What it costs (honest estimate)
e.g. B2 with pushchair	entrance step + 55 cm toilet door	the neighbourhood's mothers, 11:00-17:00
e.g. B6	no seating without purchase	the neighbourhood's pensioners, mornings

The three low-cost modifications: one per week, ranked by cost per unlocked cell. Fix the verification date at 90 days: redo the grid and compare receipts with the same quarter of the previous year. The owner already has that number in the till.

Pattern extraction (prospector mode)

When a venue scores exceptionally well for a body (the salon that holds B2 for two hours, the barbershop that holds B1, the library that holds all six), the walk-through inverts: instead of Sheet B, document what produces the green cells (features, rituals, staffing, the alibi the space offers) as a named, reusable pattern in the form of A Pattern Language (Alexander et al. 1977): context, problem, solution, in one page with one photograph and one measurement. The pattern library, not our recommendations, is the content of the owners' toolkit: owners imitate what they can see working in their own trade. The ceiling of prospector mode is the Aesthetics of Access principle (kubia n.d.): the body's perspective used not to retrofit a space

but as a design criterion from conception, the audio description woven into the dramaturgy rather than added in headphones. For cultural venues, hospitality designed this way stops being a service and becomes part of the work itself.

References

Alexander, C., Ishikawa, S., & Silverstein, M. (1977). *A Pattern Language: Towns, Buildings, Construction.* New York: Oxford University Press.

Bell, D. (2007). The hospitable city: social relations in commercial spaces. *Progress in Human Geography*, 31(1), 7-22.

Cavanagh, S. L. (2010). *Queering Bathrooms: Gender, Sexuality, and the Hygienic Imagination.* Toronto: University of Toronto Press.

Crenshaw, K. (1989). Demarginalizing the intersection of race and sex. *University of Chicago Legal Forum*, 1989(1), 139-167.

Damyanovic, D., Reinwald, F., & Weikmann, A. (2013). *Gender Mainstreaming in Urban Planning and Urban Development.* Werkstattbericht 130. Vienna: Urban Development Vienna.

Doan, P. L. (2010). The tyranny of gendered spaces: reflections from beyond the gender dichotomy. *Gender, Place & Culture*, 17(5), 635-654.

Föhl, P. S., Erdrich, S., John, H., & Maaß, K. (eds.) (2015). *Das barrierefreie Museum. Theorie und Praxis einer besseren Zugänglichkeit.* Bielefeld: transcript.

Gehl, J. (2011). *Life Between Buildings: Using Public Space.* Washington: Island Press (orig. 1971).

Gehl, J., & Svarre, B. (2013). *How to Study Public Life.* Washington: Island Press.

Greed, C. (2003). *Inclusive Urban Design: Public Toilets.* Oxford: Architectural Press.

Greed, C. (2016). Taking women's bodily functions into account in urban planning and policy. *Town Planning Review*, 87(5), 505-524.

Hayden, D. (1980). What would a non-sexist city be like? *Signs*, 5(3), S170-S187.

Jacobs, J. (1961). *The Death and Life of Great American Cities.* New York: Random House.

Kern, L. (2019). *Feminist City.* London: Verso.

Kitchin, R., & Law, R. (2001). The socio-spatial construction of (in)accessible public toilets. *Urban Studies*, 38(2), 287-298.

kubia (n.d.). *Eine Party für alle. Das kubia-Vorgehensmodell zur strukturierten Analyse, Planung und Umsetzung von Barrierefreiheit in Kunst und Kultur.* Cologne: kubia. www.kubia.nrw (developed in the ESF project Kultura bez Barier, 2021-2023).

Mehta, V. (2014). Evaluating public space. *Journal of Urban Design*, 19(1), 53-88.

Millstein, R. A., et al. (2013). Development, scoring, and reliability of the Microscale Audit of Pedestrian Streetscapes (MAPS). *BMC Public Health*, 13, 403.

Nussbaum, M. (2011). *Creating Capabilities: The Human Development Approach.* Cambridge, MA: Harvard University Press.

Oldenburg, R. (1989). *The Great Good Place.* New York: Paragon House.

Phadke, S., Khan, S., & Ranade, S. (2011). *Why Loiter? Women and Risk on Mumbai Streets.* New Delhi: Penguin.

Sen, A. (1999). *Development as Freedom.* Oxford: Oxford University Press.

Sphere Association (2018). *The Sphere Handbook*, 4th ed. Geneva.

Whyte, W. H. (1980). *The Social Life of Small Urban Spaces.* Washington: The Conservation Foundation.

WHO (2007). *Global Age-Friendly Cities: A Guide.* Geneva: World Health Organization.

Wolff, J. (1985). The invisible flâneuse: women and the literature of modernity. *Theory, Culture & Society*, 2(3), 37-46.

Women in Cities International (2008). *Women's Safety Audits: What Works and Where?* Nairobi: UN-HABITAT.