PRAXIS OF URBAN MORFOLOGY

ISUF Belgrade

30th CONFERENCE

International seminar on urban form - ISUF: Conference proceedings PART I

CONFERENCE PROCEEDINGS - PART I

XXX CONFERENCE OF THE INTERNATIONAL SEMINAR ON URBAN FORM (ISUF2023)

PRAXIS OF URBAN MORPHOLOGY

ORGANIZED BY

University of Belgrade - Faculty of Architecture
MorphoLab Research Unit,
and

SNUM
Serbian Network of Urban Morphology (SNUM)

SUPPORTED BY

Република Србија
МИНИСТАРСТВО НАУКЕ,
ТЕХНОЛОШКОГ РАЗВОЈА И ИНОВАЦИЈА

Ministry of Science,
Technological Development and Innovation (Serbia)

IMPRESSUM

EDITORS:
Vladan Djokić
Aleksandra Djordjević
Milica Milojević
Aleksandra Milovanović
Mladen Pešić

TITLE:
ISUF 2023 PRAXIS OF URBAN MORPHOLOGY: Conference Proceedings Part I

PUBLISHER:
University of Belgrade - Faculty of Architecture

FOR PUBLISHER:
Vladimir Lojanica, Dean

DESIGN & LAYOUT:
Aleksandra Đorđević
Mladen Pešić, Aleksandra Milovanović

PRINTED BY:
BIROGRAF COMP

NUMBER OF COPIES:
100

PLACE AND YEAR OF ISSUE:
BELGRADE, 2023

ISBN-978-86-7924-341-6

TABLE OF CONTENTS

Women's safety and urban form: a perspective from Kochi (India)

Alessandro Venerandi [1], Vija Viese [2], Kavya Kalyan[3], Nitin Bhardwaj[4], Ombretta Romice[1], Sergio Porta[1]

[1] Urban Design Studies Unit, Department of Architecture, University of Strathclyde, UK, alessandro.venerandi@strath.ac.uk (AV), ombretta.r.romice@strath.ac.uk (OR), sergio.porta@strath.ac.uk (SP)

[2] Department of Architecture and Planning, Norwegian University of Science and Technology, Norway, vija.viese@ntnu.no

[3] StudioPOD, Mumbai, India, kavyakalyan12@gmail.com

[4] Nitte (Deemed to be University), Nitte Institute of Architecture (NIA), Mangalore, India, nitin.b@nitte.edu.in

ABSTRACT

The world is urbanising fast. Official estimates report that around 70% of the global population will live in cities by 2060. While this phenomenon is assumed to be beneficial, social inequality and safety issues are on the rise. Among the latter, women's safety in the urban environment is a topic of particular concern due to rising numbers of assaults, especially in South Asia. However, systematic investigations of the relationship between women's safety in cities and urban form lack. In this paper, we explore such a relationship in Kochi (India) by correlating 24 urban types (UTs), i.e. distinctive patterns of urban form, obtained from previous work, with four scores of women's safety (i.e. presence of people in streets, feeling safe, visibility, gender diversity), extracted from an open dataset by Safetipin, a social organisation focusing on gender issues in the urban space. Four UTs out of 24 are consistently correlated with the set of four scores. Three of such UTs are inversely correlated, with two of them presenting sparse, relatively low-density urban fabrics with very small or very large buildings; one UT shows a very fine grained, relatively dense, mainly residential fabric with very small buildings. Conversely, one UT shows a positive correlation with safety. It is characterised by a compact, fine grained and more orderly urban fabric with averagely sized buildings hosting multiple functions.

Keywords: women's safety, urban morphometrics, correlational study, Kochi, India

INTRODUCTION

The world is undergoing a process of fast and unprecedented urbanisation. Official estimates report that 68% of the total population will live in urban areas by 2050 (UN-DESA, 2018). While such a concentration is considered to be beneficial due to the agglomeration of economic activities which will supposedly benefit the wider population (ODI, 2008), inequality (UN-HABITAT, 2008) and violence – especially towards women – are on the rise in many global megalopolises (UN Women, 2017). While this is a worldwide phenomenon, it seems disproportionately affecting South Asia and, in particular, India (BBC, 2018; Narayan, 2018). Indeed, most of the literature on women's safety in urban settings focuses on case studies located in Indian cities, such as Delhi (Viswanath and Mehrotra, 2007; Datta 2020), Kolkata (Sur, 2014) and Ahmedabad (Mahadevia and Lathia, 2019), among several others.

Viswanath and Mehrotra (2007) conducted more than 30 audits and a survey of 500 women in Delhi to assess what contributes to women's perception of safety. Findings show that inadequate infrastructure, such as underground parking lots, lack of adequate lighting and social norms are among the main factors. The article ends with a discussion on the need for more evidence-based measures to improve women's safety and create inclusive public spaces in Delhi. In the same city, Datta (2020) used various participatory techniques, including time-mapping, workshops, WhatsApp diaries, and interviews, to examine the "smart safe city" concept and its meaning for women who are digitally and physically marginalised. Findings highlight the relationship between technology, gender, time, and violence in urban spaces and the need for more inclusive urban planning to address the specific safety needs of women living in marginalised communities. Sur (2014) focused on Kolkata and analyses through qualitative in-depth interviews how women navigate public spaces while considering their personal safety. The author reports that the main factors affecting women's fear of crime are street harassment, inadequate lighting, and lack of public transportation and highlights the importance of community support and collective action in creating safer urban places for women. Mahadevia and Lathia (2019) assessed the perceived safety of the Sabarmati Riverfront, Ahmedabad city's largest public space, for women through time-mapping and qualitative interviews. Results show that more than half of the interviewees were visually or verbally harassed at least 3-4 times during the survey. The interviewees expressed preference for places that are well-lit, well-maintained, and have more footfall and tend to abide by the social norm of having male peers when walking along the riverfront to avoid harassment. These studies are in line with a rich collection of established work on perception of safety, fear of crime and victimisation which started in the 1960s with Jacobs and Newman but expanded and diversified significantly over the past 50 decades. One important finding from this work is that fear of crime can be as important as real crime, with different but negative consequences i.e. resulting in the retreat from specific places or the public realm as a whole by vulnerable groups (Carmona et al., 2021). This point plays a particularly important role in South Asia and India, where women are already particularly vulnerable. Voluntary self-exclusion and the real risk of violence are not acceptable alternatives; instead, better understanding of the locations and features most associated with fear of crime can guide prompt, targeted and effective intervention.

Other studies investigated the matter through more quantitative, space related approaches. For example, Bahrainy and Khosravi (2013) analysed the relationship between urban design features, walking behaviours and health both from a men and women perspective, in environments under-construction, which were particularly diffuse in the case study under examination (i.e. Hashtgerd New Town, Iran). The study found that the most important factor associated with women's weekly amount of physical activity was safety, intended as the presence of other people on the street or inhabited buildings. However, this work did not directly test correlations between women's perceived safety and features of the urban environment as the former was one of the independent variables used in the model to explain levels of physical activity. More recently, Navarrete-Hernandez et al. (2021) investigated the gender difference in the perception of safety in public spaces by considering different urban interventions (i.e. presence and absence of public toilets, graffiti and blind walls). The researchers asked 104 participants to rank photo simulations of pre- and post-scenarios according to perceived safety and reported that removing blind walls from the streets had a significant impact on the perceptions of safety for women, removing graffiti only had a weak impact, while the presence of public toilets had no impact. While these studies provide useful insights on women's safety in cities through qualitative and quantitative approaches, urban design features of the case studies under examination were hardly investigated in a comprehensive and systematic manner. Furthermore, the few features considered usually have to do with street management issues (e.g. inadequate street lighting) rather than morphological characteristics of the built environment.

In this paper, we take a morphological stance on the matter and investigate the relationship between women's perception of safety in Kochi (India) and a comprehensive description of its urban form through a quantitative methodology based on spatial mapping and correlation analysis. To do so, we i.) obtain point data on four scores of women's safety (i.e. presence of people in streets, feeling safe, visibility, gender diversity) from an openly accessible dataset provided by Saftipin, a social organisation investigating safety issues of women in the urban space; ii.) gather data from previous work on the different UTs, i.e. distinctive patterns of urban form, of Kochi (Venerandi et al., 2021); iii.) perform correlation analysis between safety scores and presence or absence of specific UTs. Results show that 4 UTs out of 24 are consistently, although weakly, correlated with the four tested safety scores. More specifically, UTs characterised by sparse, both fine- and coarse-grained urban fabrics, with very small or very large buildings are negatively associated with the safety scores. Conversely, one UT characterised by a compact and dense urban fabric with averagely sized buildings is positively associated with the tested scores highlighting, as previous studies already did, the importance of urban density and compact grain in relation to the perceived safety of women in the urban space.

THE CITY OF KOCHI

Formerly known as Cochin, Kochi is a coastal city and an important port of the Arabian Sea, located in the Indian state of Kerala. The city is composed of the mainland Ernakulam, the Mattancherry and Fort Kochi peninsula, as well as a cluster of islands, notably Willingdon Island, Vypin Island, and Gundu Island.

Kochi was a fishing village of little importance until the 14^{th} century, when the Kerala flood of 1341 is attributed to having changed the landscape significantly, including the formation of the current Vypin Island (originally Puthuvippu). This new landmass turned the previously landlocked harbour into one of the safest ports on India's southwestern coast, thus putting Kochi on the map as a strategic commercial hub. Following its strategic growth, in 1405 Kochi was named the capital of the then-kingdom and has kept its significance until today, still being the capital of the present-day state of Kerala.

Due to its importance in the Arab, Chinese and European trade, the city earned its sobriquet as the "Queen of the Arabian Sea." Nevertheless, this prominence brought with it subsequent rounds of colonisation by the Portuguese (1503-1663), the Dutch (1663-1814), and finally the British (1814-1947) until India's independence in 1947. These successive dominations have left significant influence on the city and are still present in its culture, practised religions, used languages, architecture and urban form. These cultural differences are most clearly present on the Fort Kochi peninsula, where various ethnic and religious communities have historically occupied specific areas, leaving their mark on the built environment. This is reflected not only by the architectural form (temples, mosques, synagogues, and basilicas stand side by side here), but the public spaces differ as well. The spatial configurations are influenced by the way the spaces are used, which is directly related to the cultural identity and tradition. To preserve this singularity many symbolic gateways and walls between communities still exist, creating spatial boundaries.

Kerala consistently ranks high on national indicators for literacy rates, access to healthcare, and low infant mortality, which has been attributed to the decentralisation, empowerment of vulnerable communities and active civic participation (Parayil, 2000). These measures are part of a progressive system of governance adopted through the state to further human development, also known as the Kerala Model, which is regarded as a success story for the whole of India.

Comparing different indexes of women's empowerment in India, Kerala routinely ranks high in numerous metrics, including high education, cell phone use, personal income and finance and low spousal violence (Bansal, 2017). The state has been on a steady path of improvement over the last decades. Nevertheless, women's safety and perceived safety in public space within big cities of the size of Kochi remains problematic. Police inefficacy and lack of response, lack of urban infrastructure and of public amenities are often cited as main reasons, in addition to the general culture of low acceptance of women's ownership of the public realm (Simon, 2023).

DATASETS

Safetipin Nite data

The Safetipin Nite dataset of Kochi consists of 1,003 data points representing each a streetview image scored according to the Saftipin parameters (i.e. walk path conditions, presence of transport, visibility, presence of people, quality of lighting, gender diversity, presence of police, levels of openness) by a team of data analysts, from 0 to 3 (where 3 represents the best performance). The overall score (i.e feeling safe) is calculated using an algorithm specifically developed for the Safetipin Nite app. Since the

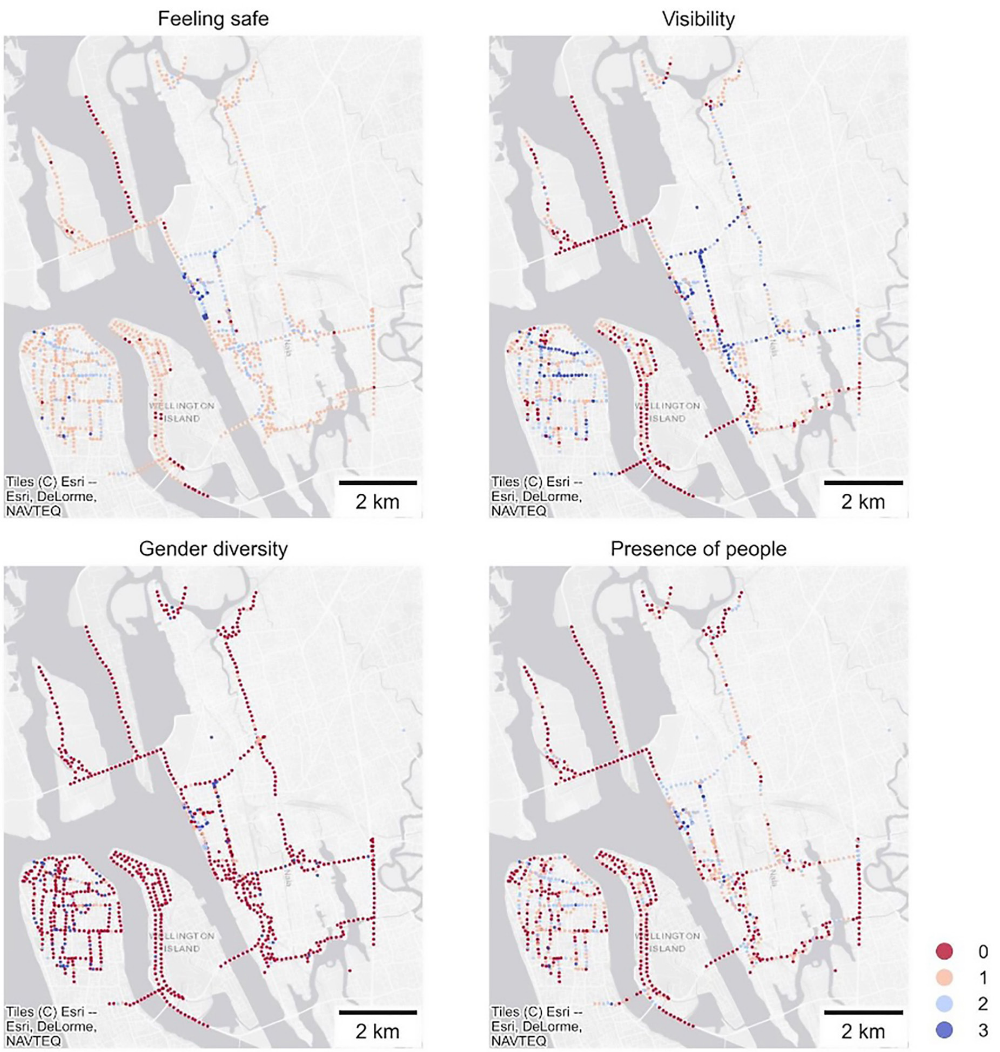

Figure 1. *The Safetipin scores used in this study: feeling safe, visibility, gender diversity, presence of people.*

focus of this paper is on safety aspects directly related with the configuration of the built environment, we filtered out those scores that measure other features, that is street management issues (i.e. walk path conditions, quality of lighting), offering of public transport (i.e., presence of transport) and street policing (i.e., presence of police). In Figure 1, we present the four Safetipin scores (i.e. feeling safe, visibility, gender diversity, presence of people) retained in this study.

Urban types

UTs are city parts characterised by distinctive patterns of urban form. They generally present similar, recurring configurations of buildings and streets. However, they may also be characterised by more heterogeneous patterns, consisting in a mix of different configurations of buildings and streets in the local context. Operationally, UTs are extracted through an unsupervised method called Urban MorphoMetrics (UMM) (Porta et al., 2022), that first computes hundreds of metrics of urban form (e.g.

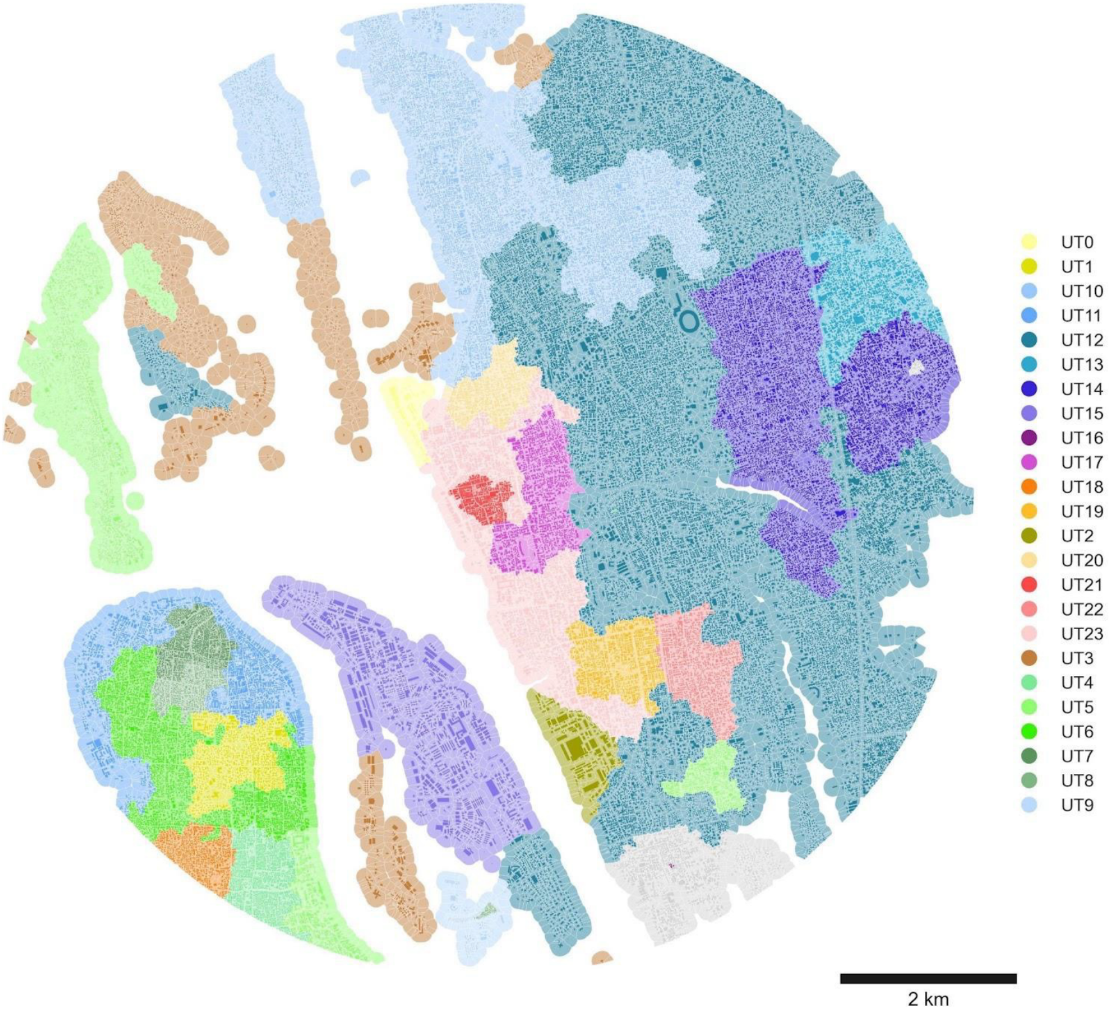

Figure 2*. The 24 UTs of Kochi. Buildings are colour-coded according to their respective UTs and level of morphometric similarity.*

building footprint, floor area ratio, local closeness centrality), at the scale of single buildings, from two input layers (i.e. building footprints and streets), and then uses agglomerative hierarchical clustering (AHC) on such metrics to identify recurrent patterns of urban form (UTs) in cities. The advantage of using clustering is that the morphometric similarity between clusters (or UTs, in the context of this study) can be evaluated through a tree graph called dendrogram and directly mapped on the UTs themselves by using similar colours for UTs belonging to the same branch of the dendrogram. The UTs used in this study are obtained from previous work focusing on the city of Kochi (Venerandi et al., 2022).

The application of UMM to Kochi identified 24 UTs (Figure 2). Buildings in each UT are coloured according to the degree of morphometric similarity across UTs, that is the more similar the colour, the higher morphometric resemblance between two (or more) UTs. Development phases of the city and functional distribution seem to align well with the location and extension of the identified UTs. For example, the historical part of Kochi located in the west peninsula (bottom left in Figure 2) characterised by a dense, informal urban fabric of small buildings is well captured by UTs with green shades (UT6, UT7, UT8). Similarly, the old port area of Fort Kochi and Mattancherry in the west peninsula, characterised by a compact urban fabric with a mix of large and small buildings (historical warehouses, public buildings, smaller residential units), is well captured by UT11. We refer the reader to Venerandi et al. (2022) for more information on UMM and detailed discussion of the results.

METHODOLOGY

The methodology used in this paper mainly consists of two main steps: aggregation of data on UTs for the Safetipin points and correlation analysis to ascertain the relationship between UTs and the four Safetipin scores considered in this work. In terms of spatial aggregation, since UTs and Safetipin points have different spatial units (buildings and survey points, respectively), to make the analysis possible, the latter are aggregated at the level of the former by assigning to each building the safety scores of the closest survey point. By doing so, we obtained a dataset of 1,003 data points with information on both safety scores and UT labels. Since the latter is a categorical variable and correlation assumes that both tested variables are continuous, a dummy variable with value 0 (absence of a specific UT) and 1 (presence of a specific UT) is created for each of the UTs in the dataset. Given the skew distributions of both safety scores and absence/presence of UTs, Spearman correlation (Corder and Foreman, 2014) is preferred to the more widely diffused Pearson correlation as the former, by assessing a monotonic relationship based on ranks rather than continuous values, is more robust in case of skewed distributions. The Spearman correlation test outputs two values: a coefficient (r_s) between −1 (i.e. perfect negative relationship) and 1 (i.e. perfect positive relationship) and a p-value providing information on the statistical validity of the test.

RESULTS

Spearman correlations between absence/presence of an UT and safety scores are presented in Figure 3. 33 statistically valid, although weak (ranging between 0.07 and 0.40), correlations were observed. Generally, correlations are scattered, that is an UT tends to be associated with no more than one or two safety scores (see, for example, UT11 and UT21). Only 4 UTs (i.e. UT10, UT15, UT23, UT3) are consistently associated with all 4 safety scores. UT10, UT15 and UT3 are inversely correlated, with rs coefficients varying between -0.07 and -0.30. Such inverse relationships are stronger for visibility and presence of people. Conversely, UT23 is positively associated with all safety scores, with rs co-efficients varying between 0.20 and 0.40, with the strongest correlations being for feeling safe and presence of people. Next, we present the morphometric profiles of these 4 UTs (Figure 4) and suggest explanations for the correlations found.

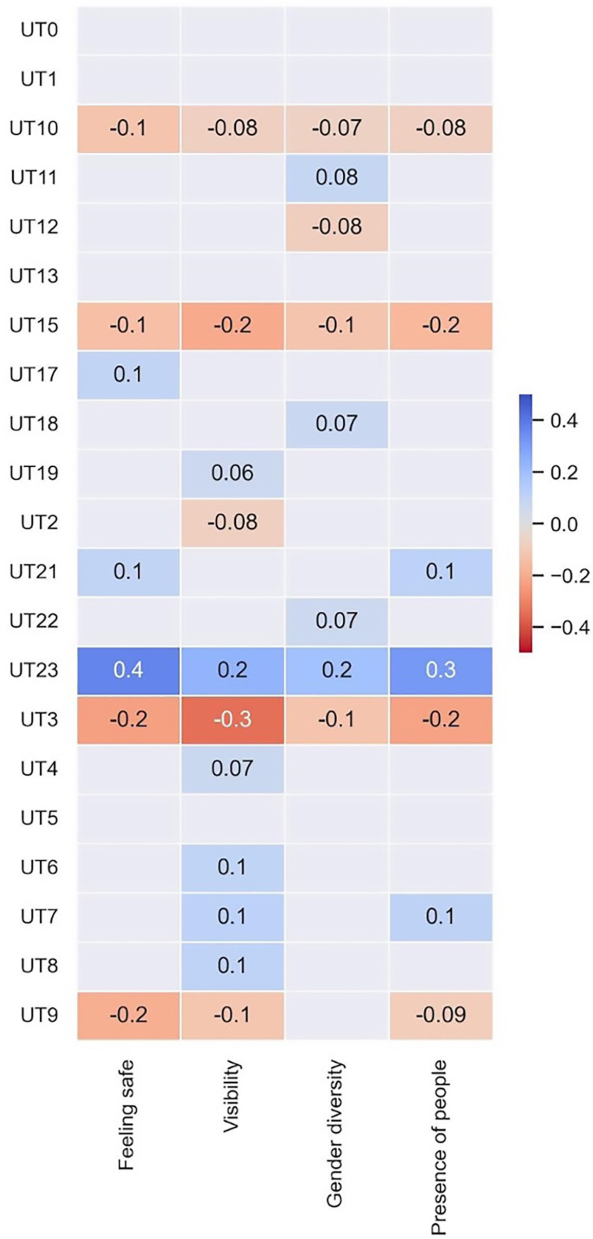

Figure 3. *Spearman correlations between absence/presence of UT and the four safety scores considered in this study. Darker the blue, greater the correlation coefficient. Darker the red, smaller the correlation coefficient. Grey represents non-statistically valid correlations (p-value>0.05).*

UT10

The morphometric profile of UT10 suggests a granular urban fabric, with about 35% of the plots measuring between 105.1 to 313.5m2 and 39% between 313.5 and 470.9m2. Building footprints follow a similar pattern, with about 80% measuring 32.3 to 130.6m2. Roughly 73% of the plots of UT10 have coverage percentages between 25% and 42%, suggesting low plot coverage. Buildings tend to be close to each other with around 70% being less than 9.8m away from their respective neighbours. The buildings tend to be aligned with each other with 86% diverging by 5 degrees or less. Finally, building footprints tend to be more square-shaped, with about 81% having an elongation between 0.69 and 0.8 (where 1 corresponds to a square). The inverse relationship with all safety scores is likely due to the low built density and mainly residential vocation of this UT. Both features may, in fact, not provide a sufficient level of informal control on the streets for making them safe or being perceived safe.

UT15

The morphometric profile of UT15 suggests a coarse urban grain, with about 80% of plots measuring between 1663.8 and 4364.4m2. Roughly 80% of the building footprints measure between 287.8 and 750m2. The plot coverage is less than that of UT10, with roughly 84% of the plots showing coverage percentages between 8% and 25%. Buildings tend to be sparse with about 91% being 18.7 to 40.4m away from each other. Buildings tend to be fairly aligned with each other with 71% diverging by 5 degrees or less. UT15 has more elongated rather than square-shaped building footprints with about 83% having an elongation between 0.29 and 0.61. The inverse relationships with all safety scores are generally stronger than the ones observed for UT10. This is likely due to an even sparser urban fabric characterised by low density and much larger plots and buildings, which, in turn, may negatively affect real and perceived safety levels.

UT23

The morphometric profile of UT23 indicates a granular urban fabric, with 81.5% of the plots measuring between 313.54 and 641.86m2. Around 75% of the building footprints measure between 151.86 and 287.81m2. The plot coverage is more than those of UT10 and UT15, with roughly 67% of the plots showing coverage percentages between 31% and 45%. Buildings tend to be closely knit with around 89% being less than 13.4m away from each other. Buildings also tend to be aligned with each other with 91% diverging by 5 degrees or less. UT23 has mildly elongated building footprints, with about 72% showing an elongation between 0.61 and 0.72. The positive relationships found between this UT and all four safety scores is likely due to a denser urban fabric compared to UT10 and UT15, with buildings and plots larger than those of UT10 (but not as large as those in UT15) and able to better accommodate more than just the residential function. The higher density and functional mix may, in turn, positively impact the perceived safety of this UT as more informal control may be present throughout the day.

UT3

The morphometric profile of UT3 suggests a very coarse urban grain, with 69% of the plots measuring between 470.92 and 3216.55m2. However, 75% of the building footprints measure only between 12.02 and 110.82m2. Indeed, plot coverage is minimal, with roughly 90% of the plots showing percentages between 1% and 14%. Buildings tend to be sparse with around 75% being 18.71 or more (up until 93.20m) away from each other. Buildings tend to be less aligned with each other as com-

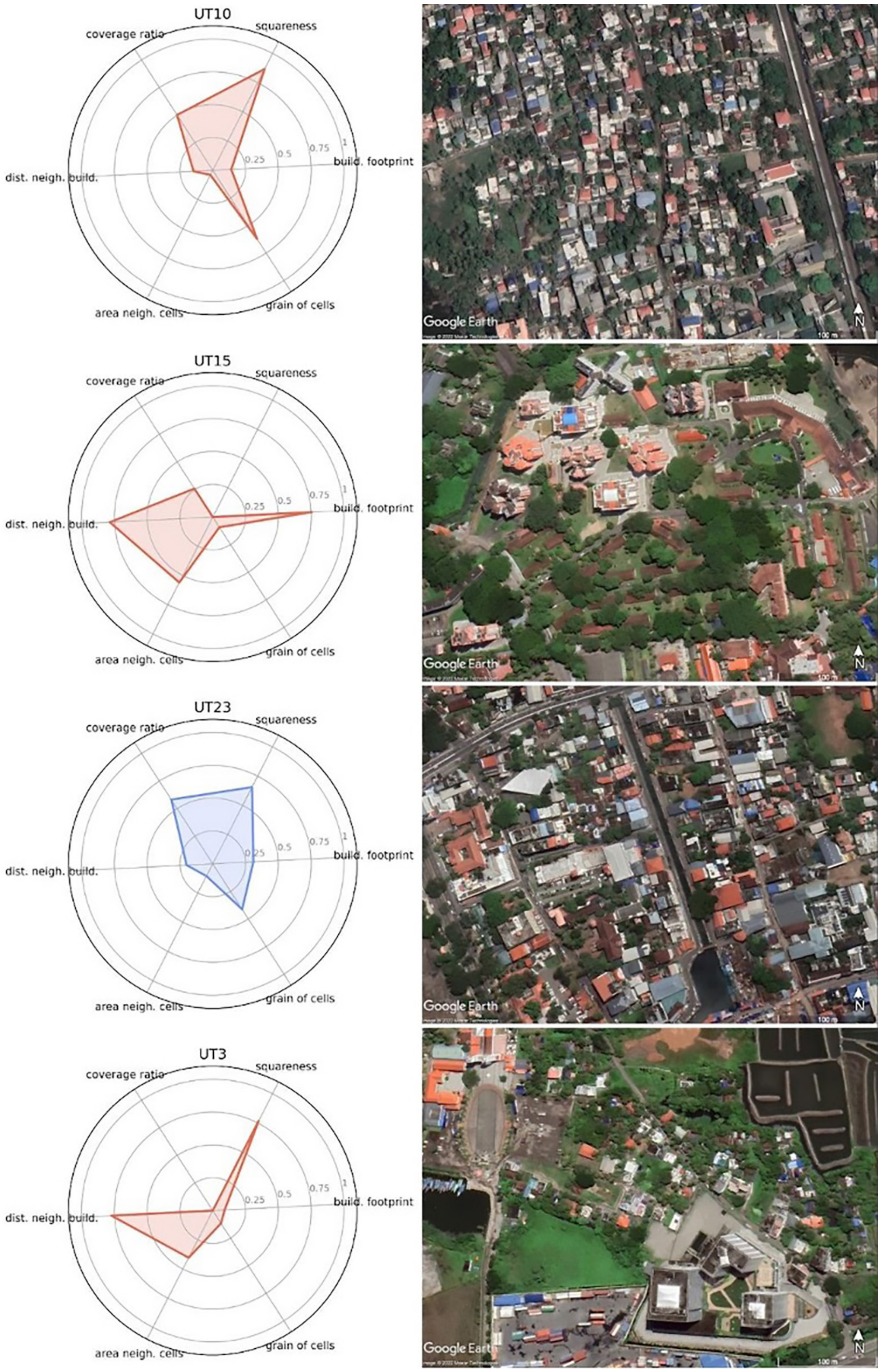

Figure 4. *Map extracts of the 4 UTs most consistently correlated with all safety scores. Red represents inverse correlation. Blue corresponds to positive correlation. Values in the spider graphs are standardised to make comparison possible across the selected metrics of urban form. Source of map extracts: Google Earth.*

pared to the other UTs with 77% diverging by 4.1 to 10 degrees. UT3 has mildly elongated building footprints, similar to UT23, with about 71% of them having an elongation between 0.64 and 0.77. UT3 shows the strongest inverse relationships with all safety scores considered suggesting that a very low density (indeed the lowest of the 4 UTs presented in this section) and scattered urban fabric is related to less (perceived) safety and this is likely due to low levels of informal control on the streets.

DISCUSSION

The findings of this study suggest that more chaotic urban fabrics (where buildings are less aligned to each other) with low built densities, sparse to very sparse large and small buildings (UT15 and UT3) but also small, tightly knit ones organised in an overly fine grained/dendritic, mainly residential urban fabric (UT10) are associated with less perceived safety at the street level. Conversely, denser urban environments (UT23) featuring structured and compact urban fabrics with buildings of average dimensions, better aligned to each other, hosting a mix of functions are positively associated with perceived safety. We suggest that this is because denser, functionally mixed and more compact urban fabrics, with buildings aligned to create continuous street fronts can provide a higher level of informal control on the public space due to the direct intervisibility that this morphological configuration offers. This, in turn, might ensure higher levels of (perceived) safety. Such findings seem to align with previous theories and works by Jacobs (1961), Newman (1972) and Martinez et al. (2019). Indeed, they all support the idea that compact/dense urban fabrics with buildings directly abutting on streets provide the necessary "eyes on the street" (Jacobs, 1961), "natural surveillance" (Newman, 1972), which can deter criminal activity, ultimately rendering streets safer places, whilst the opposite is triggered by lack of territorial demarcation and defined boundaries along streets and public spaces (Martinez et al., 2019).

This study has several limitations. Firstly, although data on perceived safety is available for different street types (from major roads to residential ones), it covers only part of the study area thus results might not provide a full picture of the tested relationship. The correlations found do not imply causation: designing according to the results of this study might not concretise in a place perceived safer than others. Finally, urban form is only one aspect of a much more complex puzzle. Future work will look into adding further variables (e.g. social norms, visibility levels) in the statistical analysis to better understand the relative impacts that the configuration of urban form and other factors have on perceived safety levels.

CONCLUSIONS

Women's safety in the public space is a very current and urgent topic, especially in South Asia, where cases of violence and harassment are particularly widespread. While there exist several studies focusing on the social and infrastructural causes of this negative phenomenon, there are only a few investigating in a systematic manner to what degree the morphology of cities plays a role in this. We thus proposed and applied a methodology to study the relationship between four scores of perceived women's safety in Kochi and the UTs characterising the city, through correlation analysis. Results revealed that four UTs were consistently associated with all safety scores, with three of them being inversely correlated and one being positively correlated. Their characteristics suggest that sparser and more chaotic urban fabrics with relatively large buildings or small ones organised in an overly fragmented plot system show negative associations with perceived safety. Conversely, denser and more structured urban fabrics featuring averagely sized buildings and functional mix are positively associated with perceived safety. These findings are aligned with previous theories suggesting that denser urban fabrics characterised by buildings aligned to each other creating continuous street fronts promote safer urban spaces. While the results of this study are not generalisable, the methodology proposed in this paper allows the replication of this very same analysis in other contexts to understand whether the patterns found in Kochi are shared across different cities and ultimately increase our knowledge on how to design cities that are safer for women and the larger population.

ACKNOWLEDGEMENTS

This work was supported by the Axel and Margaret Ax:son Johnson Foundation as part of "The Urban Form Resilience Project" at the University of Strathclyde.

REFERENCES

Bahrainy, H., and Khosravi, H. (2013). The impact of urban design features and qualities on walkability and health in under-construction environments: The case of Hashtgerd New Town in Iran. *Cities*, *31*, 17-28.

Bansal, S. (2017). Indian states and women: where are they empowered, where are they not. *The Hindustan Times*. Retrieved from: https://www.hindustantimes.com/interactives/women-empowerment-index/

BBC (2018). Is India really the most dangerous country for women? *BBC News*. Retrieved from: https://www.bbc.com/news/world-asia-india-42436817

Carmona, M. (2021). Public Places Urban Spaces: The Dimensions of Urban Design (3rd ed.). London: Routledge.

Corder, G. W., and Foreman, D. I. (2014). *Nonparametric statistics: A step-by-step approach*. Hoboken, NJ: John Wiley & Sons.

Datta, A. (2020). The "smart safe city": Gendered time, speed, and violence in the margins of India's urban age. Annals of the American Association of Geographers, 110(5), 1318-1334.

Jacobs J. (1961). The life and death of great American cities. New York: Random House.

Mahadevia, D., and Lathia, S. (2019). Women's safety and public spaces: Lessons from the Sabarmati riverfront, India. *Urban Planning*, *4*(2), 154-168.

Martínez, C. F., Hodgson, F., Mullen, C., and Timms, P. (2019). Walking through deprived neighbourhoods: meanings and constructions behind the attributes of the built environment. *Travel behaviour and society*, *16*, 171-181.

Narayan (2018). India is the most dangerous country for women. It must face reality. *The Guardian*. Retrieved from: https://www.theguardian.com/commentisfree/2018/jul/02/india-most-dangerous-country-women-survey

Navarrete-Hernandez, P., Vetro, A., and Concha, P. (2021). Building safer public spaces: Exploring gender difference in the perception of safety in public space through urban design interventions. *Landscape and Urban Planning*, *214*, 104180.

Newman, O. (1972). Defensible Space: Crime Prevention Through Urban Design. New York: Macmillan.

Overseas Development Institute (2008). Briefing paper 44: Opportunity and exploitation in urban labour markets. Technical report.

Parayil, G. (2000). Introduction: Is Kerala's Development Experience a Model?. In Govindan Parayil (ed.). Kerala: The Development Experience: Reflections on Sustainability and Replicability. London (UK): Zed Books.

Porta, S., Venerandi, A., Feliciotti, A., Raman, S., Romice, O., Wang, J., and Kuffer, M. (2022). Urban MorphoMetrics + Earth Observation: An integrated approach to rich/extra-large-scale taxonomies of urban form. *Projections, 16. Measuring the City: The Power of Urban Metrics (MIT Press).*

Simon, S. (2023). No country for women?. *The New Indian Express*. Retrieved from: https://www.newindianexpress.com/cities/kochi/2023/jan/06/no-country-for-women-2535034.html

Sur, P. (2014). Safety in the urban outdoors: Women negotiating fear of crime in the city of Kolkata. *Journal of International Women's Studies*, *15*(2), 212-226.

UN-DESA (2018). World urbanization prospects, the 2018 revision: key facts. Technical report.

UN-HABITAT (2008). State of the world's cities 2008/2009 - Harmonious cities. Technical report.

UN Women (2017). Safe cities and safe public spaces: Global results report. Technical report.

Venerandi, A., Romice, O., Chepelianskaia, O., Kalyan, K., Bhardwaj, N., Viese, V., and Porta, S. (2021). Urban morphometrics and the intangible uniqueness of tangible heritage. An evidence-based generative design experiment in historical Kochi (IN). *Heritage*, *4*(4), 4399-4420.

Viswanath, K., and Mehrotra, S. T. (2007). 'Shall we go out? 'Women's safety in public spaces in Delhi. *Economic and political weekly*, 1542-1548.

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

711.4.01(082)
711.4:005.591.6(082)

INTERNATIONAL seminar on urban form. Conference
(30 ; 2023 ; Beograd)
Praxis of urban morphology : conference proceedings. Part 1
/ XXX conference of the International seminar on urban form
(ISUF2023) ; [editors Vladan Djokić ... [et al.]]. - Belgrade
: University of Belgrade, Faculty of Architecture, 2023 (Beograd
: Birograf comp). - 175 str. : ilustr. ; 27 cm

Tiraž 100. - Napomene i bibliografske reference uz tekst.
- Bibliografija uz svaki rad.

ISBN 978-86-7924-341-6

a) Урбанистичко планирање - Зборници b) Градови
- Мултидисциплинарни приступ - Зборници

COBISS.SR-ID 129788169

Belgrade 2023