

Stadiums that ignore the city. Normative and empirical analysis of urban complexity and safety perception in Lima (Peru)

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INTRODUCTION & AIM

Large-scale sports infrastructures represent one of the greatest challenges for contemporary urban planning. As Müller (2015) points out, these megaprojects often suffer from a “planning syndrome”; that disconnects them from their urban environment, prioritizing monumentality over the human scale. Historically, in cities like Lima, the insertion of these megaprojects has been governed by a functionalist zoning that conceives the stadium as an isolated architectural object. By prioritizing the segregation of uses in two-dimensional normative plans, the potential and reality of these venues as nodes of public life have been almost completely ignored.

The city is a system that degrades energy because its order—meaning its functioning and structure—depends on that degradation (Fariña and Ruiz, 2001). However, functionalist planning has created infrastructures that operate as highly inefficient systems: they consume immense amounts of energy during events but generate voids and disorder in their surroundings the rest of the time. This morphological degradation has an asymmetrical impact on women’s perception of safety. The absence of real commercial mixing eradicates street vitality, multiplying “blind spots”.

This study evidences the morphological gap in the city of Lima through the analysis of four venues: Nacional, Alejandro Villanueva, Alberto Gallardo, and Monumental. The main objective is to contrast the planned normative order (H normative) with the actual empirical complexity (H empirical) of their surroundings, demonstrating that livability and pedestrian safety from a gender perspective depend on active functional diversity rather than static planning.

METHOD

To evaluate spatial dynamics, a 500-meter pedestrian isochrone was established from the perimeter of the four selected stadiums, representing a 5 to 10-minute walk. The research adopted a mixed-methodological approach in three phases:

- **Calculation of Normative Complexity (H normative):** Land use stipulated by official municipal plans was categorized into five macro-categories (Commercial, Infrastructure/Equipment, Residential, Open Spaces, and Inactive Land). The Shannon Diversity Index formula was applied to obtain theoretical diversity.
- **Spatial Survey and Empirical Complexity (H empirical):** Using QGIS software, every active commercial unit within the isochrones was georeferenced and counted. A second empirical Shannon Index was calculated to measure the true micro-urban diversity experienced by pedestrians.
- **In-situ Fieldwork and Qualitative Mapping:** Geospatial data were validated through site visits. Morphological mapping identified “blind spots”; (perimeter walls, road barriers, lack of ground-floor commerce) that create hostile environments for women.

$$H = - \sum_{i=1}^n p_i \log_2 p_i$$

Shannon Diversity Index Formula (H)

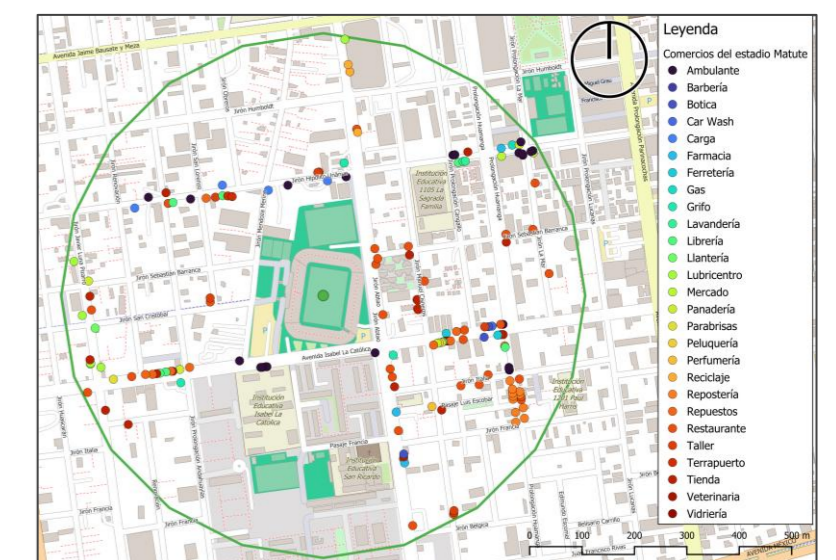
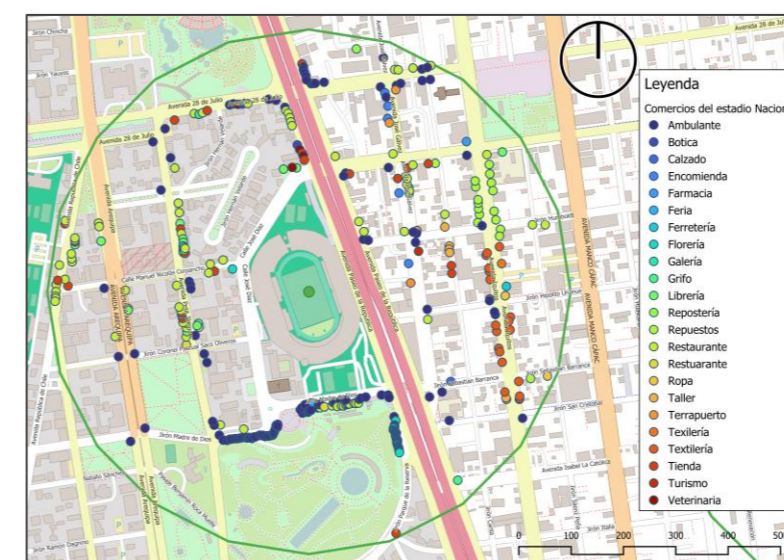
RESULTS & DISCUSSION

Estadio Nacional: Validation of Complexity

Empirical findings (H=2.85) significantly outperform normative expectations, proving that 343 mixed-use units sustain temporal vitality. This commercial micro-diversity reinforces "eyes on the street," directly linking urban complexity to enhanced pedestrian security.

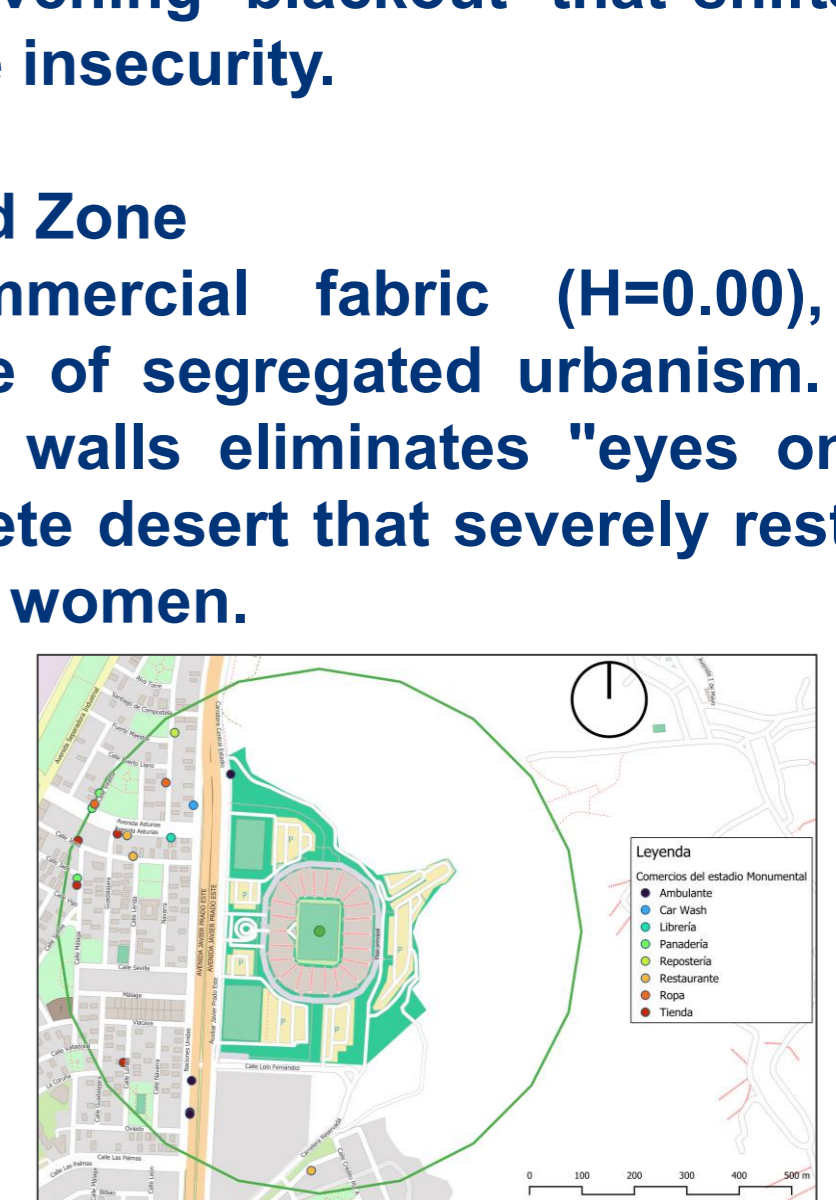
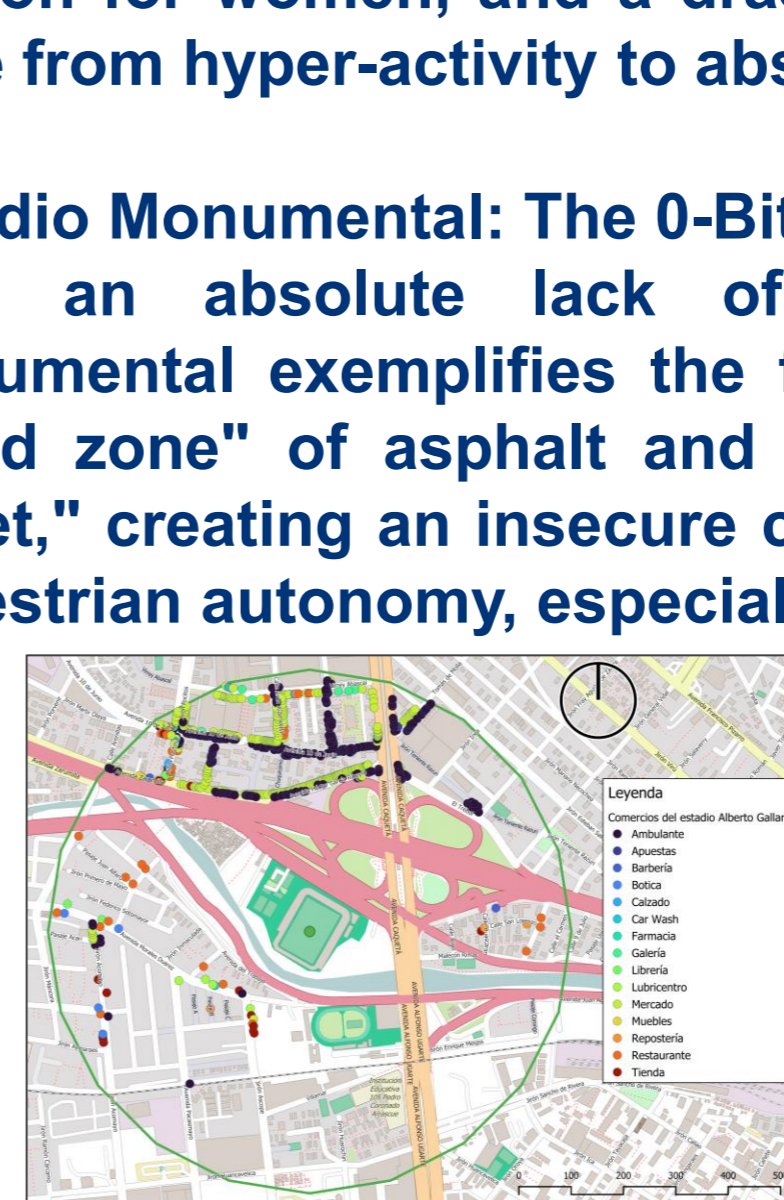
Estadio Alejandro Villanueva: Automotive Specialization vs. Informal Rescue

Functional hyper-specialization in the automotive sector reduces empirical complexity (H=1.75), creating a hostile environment and nighttime "blind corridors." However, informal commerce mitigates this vulnerability by injecting diversity and providing the natural surveillance necessary to activate the urban space at a human scale



Estadio Alberto Gallardo: Market Saturation Paradox

Despite a high business volume (577 units) and complexity (H=2.15), the Caquetá market area suffers from monotonous saturation. This results in degraded public space, high social friction for women, and a drastic evening 'blackout' that shifts the zone from hyper-activity to absolute insecurity.



Estadio Monumental: The 0-Bit Dead Zone

With an absolute lack of commercial fabric (H=0.00), the Monumental exemplifies the failure of segregated urbanism. This "dead zone" of asphalt and blind walls eliminates "eyes on the street," creating an insecure concrete desert that severely restricts pedestrian autonomy, especially for women.

CONCLUSION

Urban safety and vitality are directly proportional to functional complexity: while the Estadio Nacional (H=2.85) proves that mixed-use and micro-commercial networks foster essential 'eyes on the street,' the Monumental (H=0.00) reveals how functional monotony and blind walls create 'dead zones' that restrict the right to the city, especially for women.

FUTURE WORK / REFERENCES

- Examine urban equipment and accessibility as additional safety variables.
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