

# Mapping Spatial Analysis Methods to User Cognition and Behaviour



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Evidence-Based Design; Spatial Cognition; Spatial Analysis; Architectural Design

## BACKGROUND & AIM

The **cognitive and behavioural** implications of design are essential to foster human-centric architectural and urban design. The design field is undergoing a transformative shift, from relying on subjective intuitions to more objective, data-driven decision-making. Emerging evaluation methodologies rely on a diverse range of tools with varied theoretical foundations. However, these tools are often employed by researchers only for post-occupancy evaluations, and their utilization by practitioners during design remains limited.

- This research seeks to develop a comprehensive taxonomy to:
- Map widely used tools and methods available;
  - Link users' cognition and behavioural aspects with scientific concepts and methods of spatial analysis;
  - Enable effective use of tools for human-centric evidence-based design;
  - Empower designers for data informed decisions, ensuring the integration of tools that align with specific user needs/design focus.

## METHODS

### Systematic Literature Search

- A comprehensive literature exploration;
- Identify scientific methods and tools for integrating user cognition in spatial design.

### Comparative Analysis

- Evaluate tools against relevant criteria;
- Assessment of theoretical basis, coverage of concepts;
- Using common design scenarios for comparison

### Industrial Surveys

- Inquiry on practitioners' use, knowledge, perceived effectiveness, preferences;
- Understand the challenges faced by practitioners.

### Evaluation and Ranking

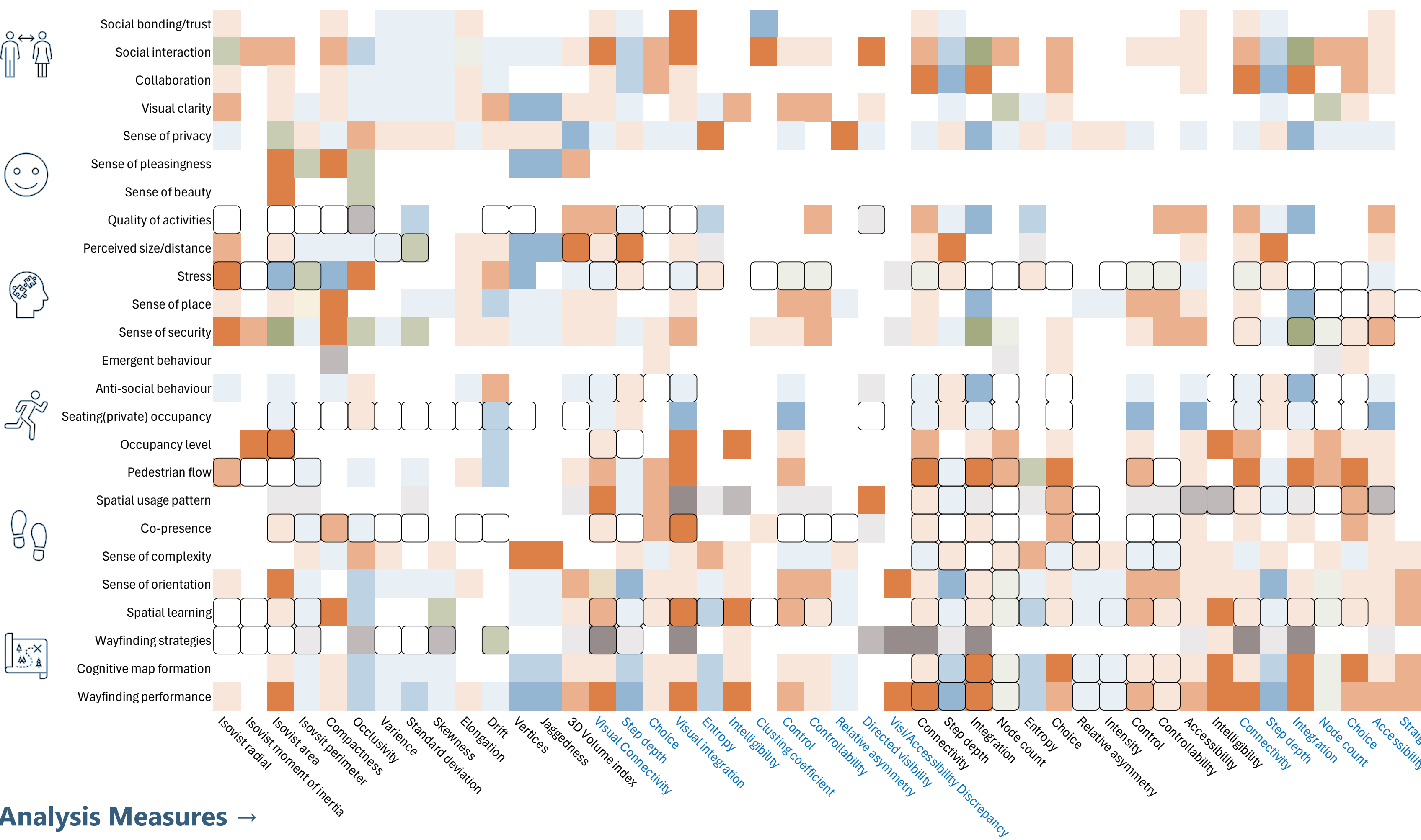
- Evaluation and ranking of more usability factors: flexibility, speed, integration, visualisation, format, availability, accuracy;
- Ranking matrix as a guide for designers.

## FINDINGS



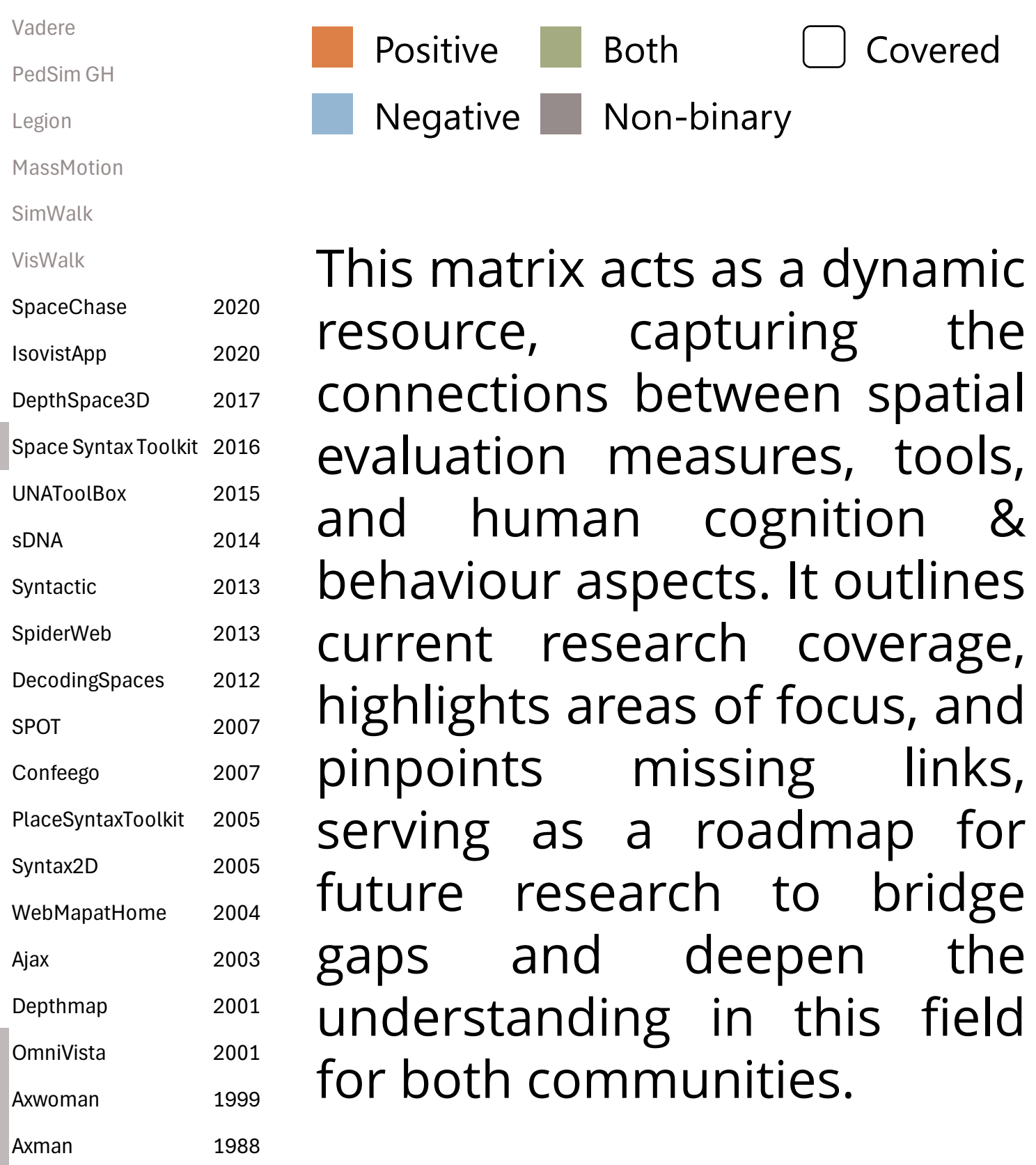
Designer-Accessible Spatial Evaluation Methods and Metrics

### Human-centric Aspects



Analysis Measures →

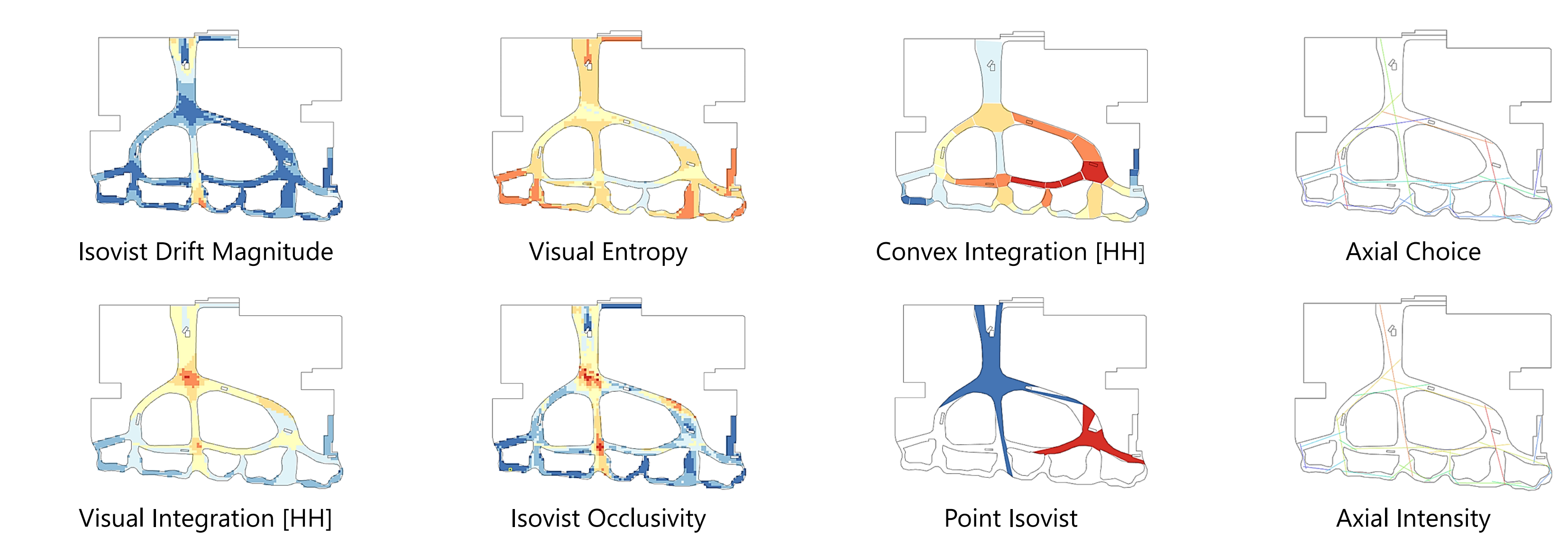
### Tools/Year



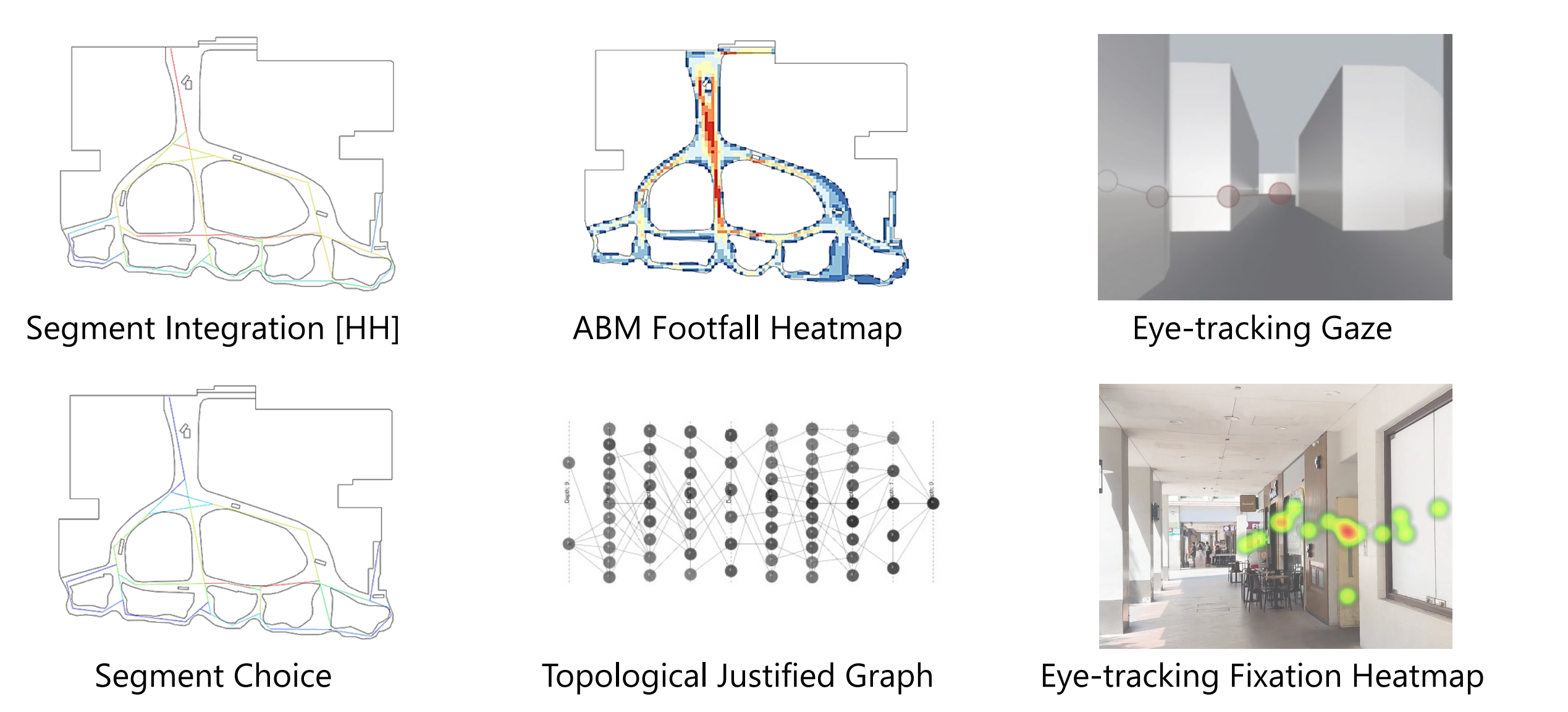
This matrix acts as a dynamic resource, capturing the connections between spatial evaluation measures, tools, and human cognition & behaviour aspects. It outlines current research coverage, highlights areas of focus, and pinpoints missing links, serving as a roadmap for future research to bridge gaps and deepen the understanding in this field for both communities.



### Relationship Between Spatial Evaluation Measures, Tools and Human-centric Aspects



### Example Spatial Evaluation Measures



## EXPECTED OUTCOMES

- Develop an inventory to evaluate tools for integrating cognition knowledge in spatial design, their efficacy, usability and theoretical basis.
- Offer recommendations to improve existing tools and develop new ones for better architect needs.
- Develop a framework for examine new tools and methods for integrating user cognition in spatial design.
- Create a guidebook or platform for architects to select suitable tools based on industry usage and needs, enabling knowledge sharing.