**Integrated sub-regional planning informed by weighted spatial network models:**

The case of Jeddah Sub-regional system

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# Abstract

*Existing Space Syntax methodologies provide the tools to measure the impact of proposed spatial changes, but are strongly dependant on the quality and availability of the spatial data. This becomes particularly more complex when major land use changes or development projects are proposed in a large region and there is no or very little spatial layout data available for them. To counter this problem it is suggested that an ‘integrated urban model’ can be developed by using land use and demographic data to supplement the lack of spatial layout data and create a more realistic model for evaluating planning decisions. This paper explores the use of a ‘weighted space syntax’ model to contribute to the process of integrated urban planning for a large urban region in a major planning exercise in Jeddah, Saudi Arabia. The study aims at identifying the growth pattern and development potentials of the Jeddah Sub-regional system along with testing planning proposals for its growth over the next twenty years. The method for allocating the weighting to the segments of spatial networks by dividing the city into ‘superblocks’, identified by the foreground network and morphological similarities or spatial conditions such as existing municipal districts and major development boundaries. The weighting is then applied to the segments per unit length since longer segments have a higher probability of having a higher number of plots. The output is a spatial analysis impacted by the land use distribution, which adds the attraction or repulsion to movement generated by certain land uses to the spatial configuration and provides an accurate depiction of the functioning of the city. With this methodology we are able to estimate the impact of any number of projects of varying scales, at different time periods. This model has been integrated into the planning process through working with the lead planners in Jeddah at different stages of the project in both informative and evaluative modes. The result is an iterative, evidence-based approach and a collaborative framework for the planning and decision making, which could be adopted in future planning for Jeddah or elsewhere.*

# Keywords

*Planning process, sub-regional plans, integrated urban models, weighted space syntax analysis, planning option testing, rapid urbanisation.*

 A picture containing diagram

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**Figure 1**: The City of Jeddah before modern transformations c.1947, left, and in the early stages of rapid growth, right (Space Syntax Limited, 2006)

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