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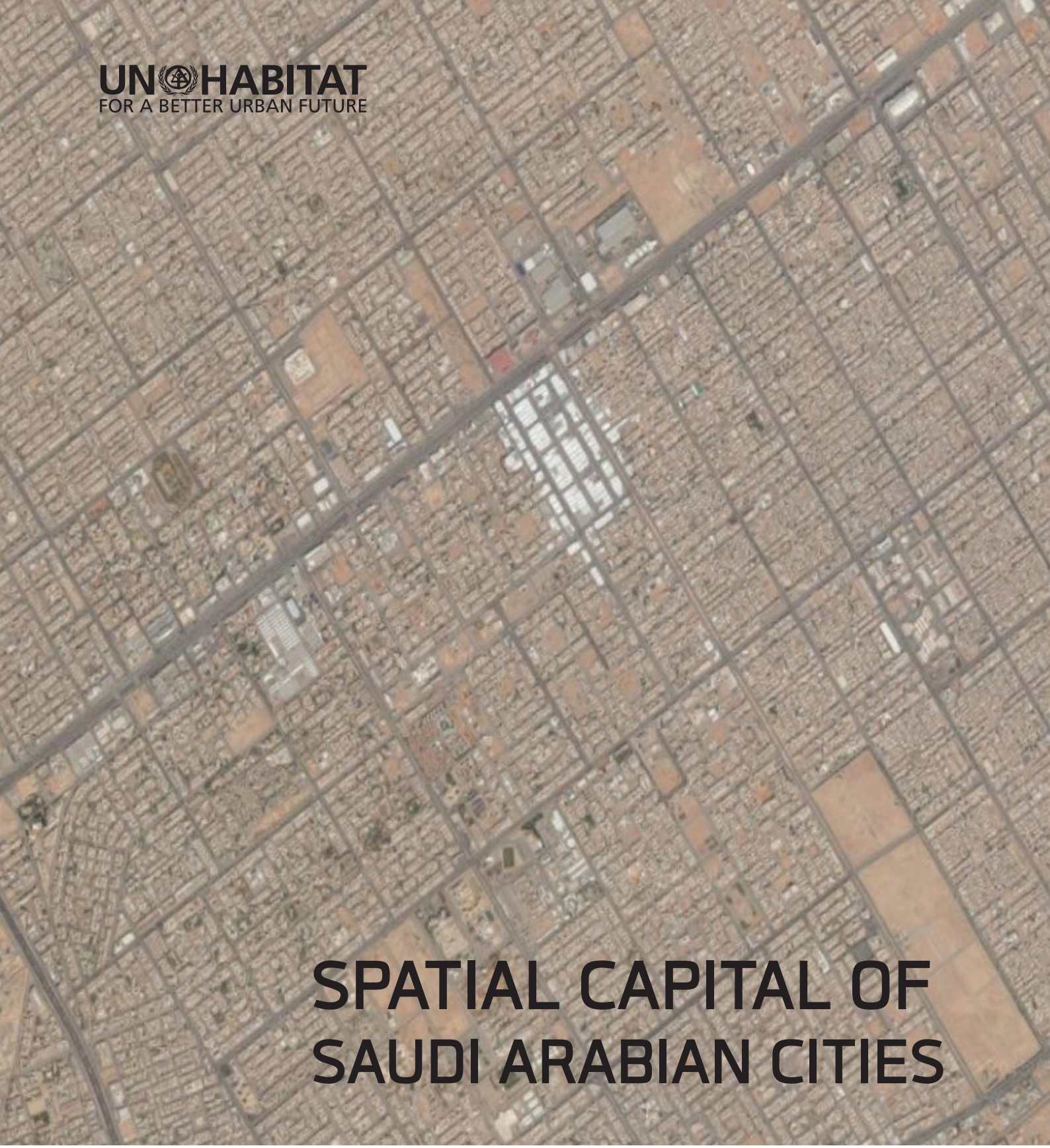

SPATIAL CAPITAL OF SAUDI ARABIAN CITIES

STREET CONNECTIVITY STUDY FOR THE CITY PROSPERITY INITIATIVE

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Spatial Capital of Saudi Arabian Cities.
Street connectivity study for the City Prosperity Initiative

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KEY FINDINGS

Spatial Capital in Saudi cities

01. The Street Connectivity Index results from the combination of the three variables that assess the urban form of the city (the width, the length and the number of intersections of the street network). High connectivity translates in better accessibility, penetration, mobility and coverage of the whole city. In general terms, Street Connectivity values of Saudi cities correspond to other cities from the developing world. However, the factors and conditions creating these values are obviously different.

02. Largely based on the use of the automobile, the physical layout of Saudi cities has created low-density, single-use development, with spacious houses and buildings. This configuration in cities from Saudi Arabia has led to horizontal spreading of the urban areas with high fragmentation of spaces and some level of dispersion of house and buildings. Land ownership has historically created huge areas of open or vacant land inside city boundaries.

03. In most of the cities of Saudi Arabia open space and vacant land, constitute up to 46 per cent of the total land within city boundaries as UN-Habitat spatial analysis in the 17 cities shows. 'White land', as open and vacant land is called, is served with state infrastructure and despite the fact that it is complete with roads, water and streetlights it sits empty. This land is located mostly in the middle of the city and the city centres.

04. The analysis of street connectivity is determined to some extent by the existence of open land. High portions of non-occupied land in the city and the fragmentation of the urban fabric affect the overall connectivity of the city. This fragmentation and interstitial development compromises the street connectivity and affects the form and functionality of the city.

05. In general terms, street connectivity in the Saudi cities that are part of this study are varied. Excluding open space, in three cities connectivity is high, which means that conditions of connectivity are met with regards to land allocated to streets and intersection density. While in twelve cities connectivity is moderate, in the remaining two cities, connectivity is extremely low.

06. The study disaggregates the results of the Street Connectivity Index in seven typologies grouped by residential and non-residential. The residential type includes formal and informal subdivisions, housing projects and atomistic (organic) development. The non-residential type is comprised of urban amenities, vacant land and open space.

07. Values disaggregated at intra-city levels shows that, within the residential typologies, the informal subdivision has on average, the highest values. This type is characterized by some level of informality; yet informal subdivision does not refer to slum areas. The second residential typology with high values corresponds to the mass housing projects; followed by the formal subdivision type, which has moderate connectivity values. Among the residential typologies, the atomistic type has the lowest connectivity values.

08. Paradoxically, layouts in formal subdivisions are similar to the layouts of informal subdivisions, but exhibit a higher level of infrastructure and paved roads. Formal subdivisions also have better connections to arterial road networks and well-delimited sidewalks. Formal subdivisions cover as much as 45 per cent of the residential land uses. They are followed by informal subdivisions that represent nearly one third. Atomistic typology covers, on average, slightly less than one fifth of the residential surface.

09. On the other hand, non-residential land uses (urban amenities, vacant land and open space) account for slightly over two-thirds of the total areas of the 17 Saudi cities. The Street Connectivity Index in the non-residential land uses varies greatly. Vacant land has the highest score, followed by urban amenities and open space with the lowest values. Vacant land category is characterized by areas with urbanized land and clear street layouts that are not yet occupied. In principle, they represent the future urban developments.

COMPONENTS OF THE STREET CONNECTIVITY INDEX

10. Land allocated to streets. In general terms, most of the Saudi cities allocate a relative adequate proportion of land to streets. However in some cases, this proportion is over-dimensioned, which seems to be a distinctive case of the cities of the Kingdom. With important variations, informal subdivisions are the typology with the closest values to UN-Habitat standards. Interestingly, the formal subdivision typology provides land to streets in excess; slightly above the recommended threshold. In some cities values exceed –by far- those of developed cities, mainly due to disproportionally wide streets.

Based on the land allocated to streets and the street density, it is possible to determine the average street widths. Data shows great variations within cities. Cities like Riyadh, Dammam and Tabuk, have the widest streets in the Kingdom, which is indicative of the widespread existence of large boulevards and avenues mostly designed to for private vehicles. The analysis at intra-city level shows large disparities. The typologies of formal and informal subdivisions of the city of Tabuk have an average street width of 19 m, while the atomistic typology of Medina, with the same amount of LAS, has street widths of only 8.6 m due to its extensive street network.

12. Intersection density, a good indicator of compactness and walkability, can make cities more conducive to the use of non-motorized transport. Saudi cities the average value is 136 intersections per square kilometre, above the optimal level estimated by UN-Habitat at around 100 intersections per square kilometre. Cities like Medina, with an organic street pattern at its core, and the city of Taif developed on the slopes of Sarawat Mountains, are optimal range. When open space is taken into consideration, the average value of is dramatically reduced. Due to fragmented urban development, eight cities fall below the minimum recommended values.

Atomistic or organic-development areas have the