The role of the city prosperity index in sustainable development case study: Infrastructure in the Holy City of Makkah

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Introduction:

The urban population is expected to almost double by 2050, placing urbanization among the most important factors for transformation in the twenty-first century, as threats and risks increase in scope and impact. In the context of the 2030 Sustainable Development Plan, the Paris Agreement and other international agreements, cities can be a source of solutions rather than a source of challenges, provided that urbanization is well planned and managed for prosperity (Habitat 3, 2016). Different data and indicators enable cities to make the right decisions to achieve the best results of development policies and help monitor the evolution of results, which is essential for effective urban prosperity as well as sustainable urban development.

The Habitat Prosperity Initiative is a tool for measuring sustainable urban development that enables city management authorities and different stakeholders to identify opportunities and different areas of development to make cities more prosperous, and the effectiveness of the City Prosperity Initiative has been demonstrated at around 400 cities worldwide as a monitoring framework therefore it has the capacity to monitor sustainable development goal 11 (Habitat, measuring the prosperity of cities without history). Saudi Arabia is one of the most urban developed countries in the world, with 8 out of 10 people living in cities. Rapid development has improved the quality of life of citizens. The research examines one of the main axes of the prosperity index and studies its results in the Holy City of Makkah and its role in developing sustainable development policies.

2- Problem:

Through the challenges of sustainable urban development and significantly increased urbanization in Saudi Arabia, as in the figure (1). The Government of the Kingdom, represented by the Ministry of Municipal and Village Affairs in collaboration with the UN-HABITAT Program for the Implementation of the Saudi Cities Future Program in 2013, which aims to promote sustainable urban and urban development through effective planning and management, including improved urban legislation and institutional frameworks and enhanced support for economically productive cities. It should therefore be studied in general, examine the focus of infrastructure development in detail and develop the relationship between its results in the Holy City of Makkah and the development policy mechanism.
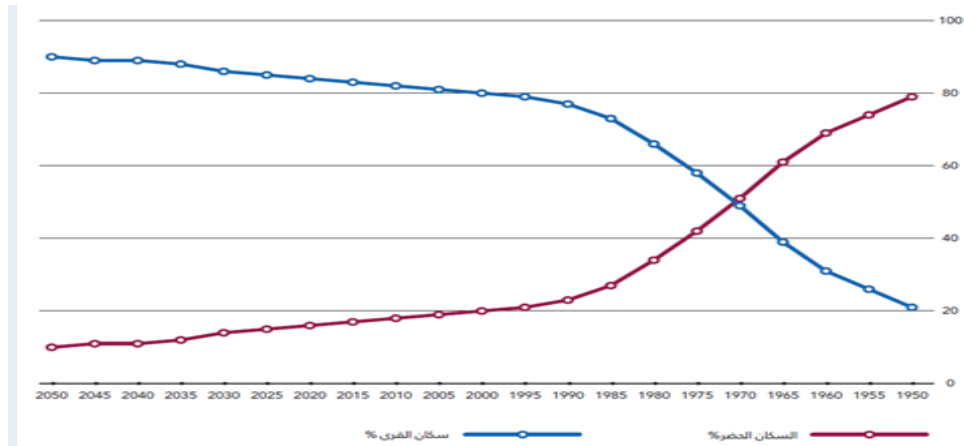
Figure 1 illustrates the change in urban and village population ratios
Source: (Urban 2019)

3- Research questions:

The main question: How can prosperity index (infrastructure Development) be used for sustainable development policies?

Sub-questions:
- What are the indicators of urban prosperity (definition, dimensions, characteristics)?
- What is the relationship between prosperity index and sustainable development?
- What are the indicators of infrastructure (sub-dimensions, variables, weights)?
- What are the results of the infrastructure indicators in Makkah?

4- Methodology:

The research curriculum relies on the analytical descriptive approach of reports and studies on urban prosperity with a focus on the infrastructure development dimension, as well as the Saudi Cities Future Programme, specifically the city of Makkah, to analyze the study elements and devise how to link prosperity indicators (infrastructure development) and development policies as in the figure 2.
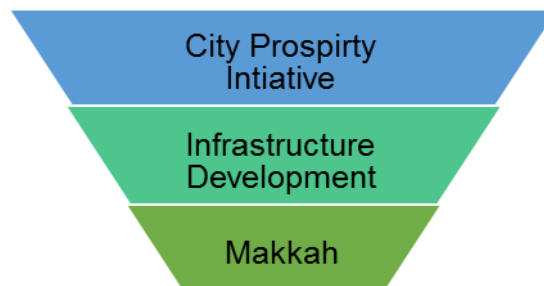

Figure (2) to clarify the methodology and incorporate the research elements - source: The Researcher

5- Case study of the city of Makkah -Dimension of infrastructure:

Under the Saudi Cities Future Programme, the Urban Observatory of the Secretariat of the Holy Capital was used to produce prosperity index, including infrastructure prosperity index. The Observatory is also working to provide relevant urban information that supports decision-making in urban development and urban planning in the city.

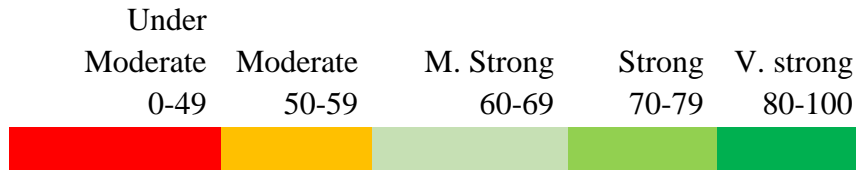|	Under Moderate	Moderate	M. Strong	Strong	V. strong
	0-49	50-59	60-69	70-79	80-100

Figure 3 shows the degree of classification of indicators according to value. Source: (Habitat, State of Prosperity Report for the City of Makkah 2019)

Sub-Dimension	Indicator	Actual	Units	Standardized	Comments
Housing Infrastructure (77.13%)	Access to Electricity	95.18	%	95.2%	V. Strong
	Access to Improved Sanitation	68.50	%	68.5%	M. Strong
	Access to Improved Water	71.90	%	71.9%	Strong
	Access to Improved Shelter	63.46	%	63.5%	M. Strong
	Population Density	9,553.94	Inhab/Km2	63.7%	M. Strong
	Sufficient Living Area	97.33	%	100.0%	V. Strong
Social Infrastructure (25.2%)	Number of Public Libraries	0.21	#/100,000 inhab.	0.0%	Under moderate
	Physician Density	2.10	#/1,000 inhab.	50.4%	Moderate
ICT (71.1%)	Average Broadband Speed	-	Mbps	-	-
	Home Computer Access	55.50	%	55.5%	Moderate
	Internet Access	86.60	%	86.6%	V. Strong
Urban Mobility 33.3%	Average Daily Travel Time	27.00	minutes	100.0%	V. Strong
	Affordability of Transport	-	%	-	-
	Length of Mass Transport Network	-	Km/1M Inhab.	-	-
	Road Safety (traffic fatalities)	40.14	#/100,000 inhab.	0.0%	Under moderate
	Use of Public Transport	5.37	%	0.0%	Under moderate
Street Connectivity (77.3%)	Intersection Density	111.10	#/km2	100.0%	V. Strong
	Land Allocated to Streets	23.12	%	57.1%	Moderate
	Street Density	14.98	Km/KM2	74.9%	Strong

Figure (4) the results of the greeting structure indicators according to the classification approved by the source: (Habitat, State of Prosperity Report for the Holy City of Makkah 2019)

SOWT Analysis:

Strengths: The city has a strong infrastructure as well as access to basic facilities and services, in particular water, electricity, living space and sanitation. Weaknesses: Urban transport: poor use of public transport and low safety rates, and poor social infrastructure as a result of the low density of doctors and the number of public libraries. Opportunities: Intensive use of the Internet is an opportunity to expand use and encourage innovation in the information technology sector, especially in young groups, offering high density of roads and street intersections that should encourage the use of alternative means of transportation, cycling and walking, especially in the early morning and evening. Risks: Poor reliance on renewable energy and high reliance on fossil fuels threaten a better future for the city .

Evidence-based input methodology:

The evidence-based method of planning leads to a deeper understanding of the urban area, through the collection of data and various physical information, comparisons such as density, land uses and road network analysis. They are expressed in the form of indicators that can be compared to best practices in physical development, as they provide a clear vision of key

development issues as well as the expected impact of development proposals on indicators. The Programme therefore recognized that the methodology it relies on focuses on integrating different methods to provide evidence to understand problems, then assess issues and then make recommendations which are consisted of the elements outlined in the figure 5.
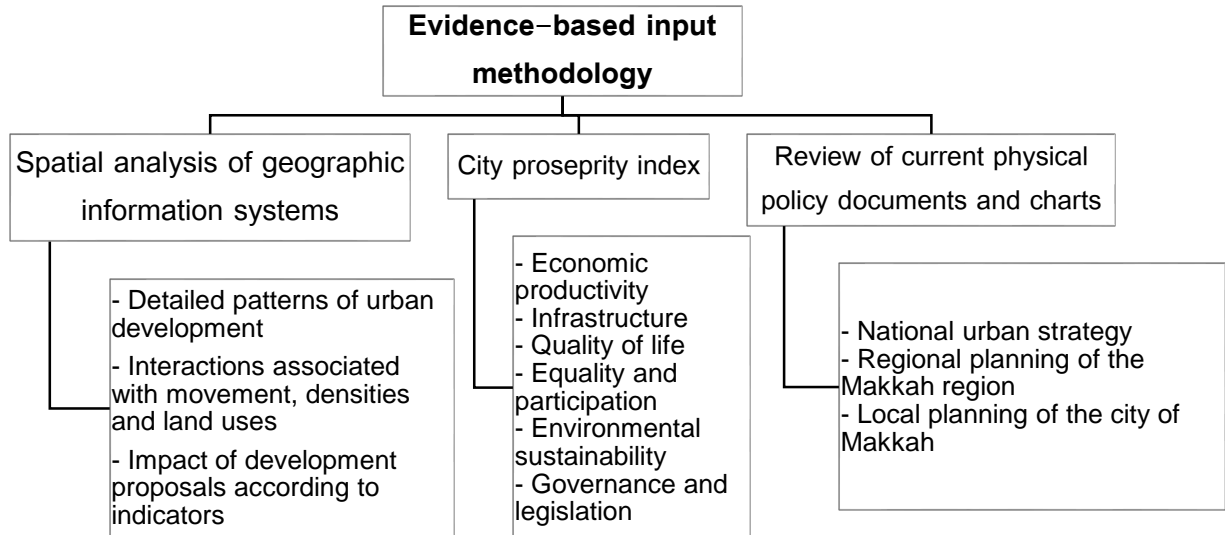

Figure 5 illustrates the basic elements of the evidence-based input Methodology-Source: The researcher

Results:

From the above, the stages of overall development and the role of the City Prosperity Index can be inferred in these phases, which have been undertaken by the Ministry of Municipal and Village Affairs and UN-Habitat in several steps, as in Figure 6
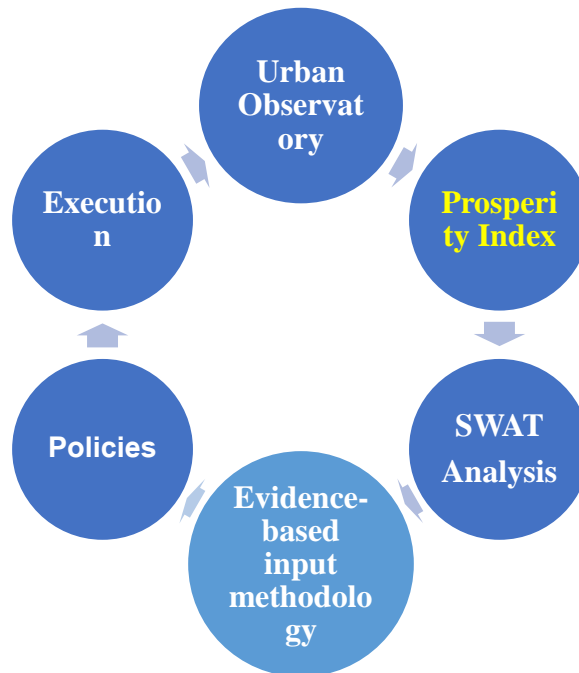

Figure 6 illustrates the stages of overall development- Source: The Researcher

The Multi-dimensional, Integrated City Prosperity Index measures the status quo and a holistic understanding of the city that takes into account all aspects but is quantitative and

does not have qualitative indicators.

- In the infrastructure index there are some indicators that have not been produced, such as the average speed of the Internet and the transport affordability index.

- The Urban Prosperity Index has adopted a standard methodology for measuring and comparing cities against each other to benefit from comparison and other experiences.

- The prosperity index is a global monitoring framework for sustainable development goal 11, which is to make cities and human settlements inclusive, safe, sustainable and sustainable, as it is a goal of direct relevance to urban development.

- Infrastructure indicators in Makkah have shown some strengths (housing infrastructure - street connectivity) and weaknesses (social infrastructure - urban mobility).

- The quadric analysis tool is one of the strategic tools for analyzing the state of the city and an important stage for developing policies.

- The importance of the role of the Urban Observatory in producing indicators to support decision-making in urban planning as well as measuring progress in sustainable development goal XI, city prosperity index and other urban indicators.

- The evidence-based input methodology has relied on the Urban Prosperity Index as a key element in measurement, understanding, change and follow-up.

-٦ **Discussion**:

The results could be discussed through a set of elements:

- Standardized measurement methodology: It gives an important area for comparing the outcomes of different cities with one another, drawing on global experiences.

- Weighing sub-dimensions and indicators: Depending primarily on the number, the researcher considers it important to develop a system or method for determining relative importance according to each society, so that the first method of comparison with other cities is used, or the second method of development policy.

- Indicators of infrastructure development: The prosperity index was based on quantitative indicators and the researcher considers it important to add qualitative indicators because they provide other dimensions not provided by quantitative indicators such as satisfaction with the services provided.

- Production of infrastructure indicators: Some indicators that have not been produced indicate a lack of awareness on the part of some presenters of the importance of the indicators, which requires the importance of awareness-raising for the relevant presenters.

-٧ **Recommendations**:

- The importance of developing a system of qualitative indicators, such as indicators of satisfaction with facilities and services.

- A system of relative importance of indicators has been developed and does not depend solely on numerical weighting.

- Development of study materials on indicators and their importance for sustainable development at the university level.

- Awareness-raising and training of personnel involved in key performance indicators and their importance as a basis for development and sustainability policies.

References

1. Habitat, UN. 2013. *STATE OF THE WORLD'S CITIES 2012/2013.* report, Nairobi: United Nations Human Settlements.

2. Sustainable Development. 2014. *Indicators for Sustainable Development Goals.* Report, the Leadership Council of the Sustainable Development Solutions Network.

٣. alr2yt al3mranyt. 2019. alr2yt al3mranyt al4amlt lmdynt mkt almkrmt. t8ryr ،alrya'9: wzart al42wn albldyt wal8rwyt.

٤. almstw6nat alb4ryt. 2012. mbadrt azdhar almdn. 1 12. tary5 alw9wl 12, 2020 . https://unhabitat.org/ar/node/3246.

٥. almn9t alw6nyt almw7dt. bla tary5. altnmyt almstdamt. tary5 alw9wl 27 4, 2021 .

٦. almw2l b. bla tary5. "8yas azdhar almdn ".cpi methodology arabic .tary5 alw9wl 1 12, 2020.

٧. almw2l. 2011. brnamg alamm almt7dt llmstw6nat alb4ryt. tary5 alw9wl 1 1, 2021 .

٨. almw2l. 2019. t8ryr 7alt azdhar mdynt mkt almkrmt. alrya'9: wzart al42wn albldyt wal8rwyt.

٩. almw2l3. 2016. al56t al7'9ryt algdydt. t8ryr ،brnamg alamm almt7dt llmstw6nat alb4ryt.

١٠ brnamg almw2l. bla tary5. brnamg almw2l lmst8bl 7'9ry af'9l. tary5 alw9wl 1 1, 2021 . https://unhabitat.org/ar/node/3246.

١١ brnamg mst8bl almdn als3wdyt. 2018. t8ryr 7alt almdn als3wdyt. t8ryr ،alrya'9: wzart al42wn albldyt wal8rwyt.

١٢ brnamg mst8bl almdn als3wdyt. 2019. t8ryr 7alt almdn als3wdyt. t8ryr ،alrya'9: wzart al42wn albldyt wal8rwyt ،almw2l.