

Impact of Urban Attributes on Human Happiness and Health in Alexandria as an Egyptian City

Lamiaa Abd-Rabo, Mohamed Abdelall, Zeyad El Sayad

(Lamiaa Abd-Rabo, University of Alexandria, Faculty of Engineering, Alexandria, Egypt, englamiaa_lmiaa@yahoo.com)
 (Prof. Dr. Mohamed Abdelall, University of Alexandria, Faculty of Engineering, Alexandria, Egypt, abdelallmai@yahoo.com)
 (Assoc. Prof. Dr. Zeyad El Sayad, University of Alexandria, Faculty of Engineering, Alexandria, Egypt, zelsayad1@alexu.edu.eg)

1 ABSTRACT

Creating livable, safe, healthy, and sustainable urban spaces requires the prioritisation of interactive urban environments (UE) and social connections in city design. Previous studies have examined the relationship between sustainability, health, and happiness, focusing primarily on macro-level factors like air pollution, temperature, wind speed, ambient noise levels, economics, and life satisfaction. Consequently, this research aims to address the following question: How can urban planners establish cities that promote happiness, health, and overall quality of life? This paper specifically explores these aspects in the context of Alexandria, Egypt, with a focus on mental health outcomes and the notions of an "all-inclusive city." Furthermore, the study examines the key elements of inclusive notions for creating happier spaces, as in the case study area (Pharos promenade (PP)), based on Alexandria's historical importance. Methodologically, this paper employs a systematic review approach, incorporating both quantitative and qualitative indicators to establish measurement tools and design principles for happier cities. Ultimately, the study concludes by presenting design principles relevant to creating a sustainable and healthy city that prioritises the health and happiness of its residents within the scope of Alexandria.

Keywords: Happier city, urban environment, mental health, all-inclusive city, measurements for the happier city

2 INTRODUCTION



Fig. 1: Model of the pathways linking the built environment to subjective happiness. Source: Researchers.

The growing interest in understanding and measuring happiness in society has led to a focus on the relationship between happiness and social, environmental, and health factors. The built environment of a city is crucial for creating liveable, secure, healthy, and sustainable cities, as illustrated in Figure 1 (Gehl, 2010). Factors such as urban sprawl (Rong, 2018), megacities, anxiety and depression disorders, and insufficient resources contribute to dissatisfaction with city life. A healthy environment affects human activities and characteristics, including individual happiness, intelligence, and talent. So, the present study highlights the potential of urban design to harness the attributes of the urban environment to promote mental health and happiness while simultaneously mitigating or minimising factors that pose a risk to these outcomes. Two sets of city planner concepts are developed and displayed, analysing how happiness is linked to city design and highlighting the city's enablers of happiness (Najmeh Bitaab, 2018). This discusses the most important notions of an "all-inclusive city", with a particular emphasis on Alexandria City for its historical importance. These concepts are investigated and analysed through three key pillars: influential factors, modifiers, and pathways (McCAY, 2021). The study area on (Pharos Promenade (PP)), Alexandria, Egypt, aims to support psychological and emotional happiness through strong and human-centred design. The paper also investigates how improvement strategies for urban environments impact people's happiness and how happiness is measured. It also presents a framework for designing happier cities and guidelines that will be flexible enough to design happier cities in the future while establishing a model unique to the city's identity.

3 METHODOLOGY AND SCOPE

A literature review focuses on designing happier cities, particularly historical ones like Alexandria, Egypt. Through correlating various studies and examining their relevance by considering important factors such as environmental, potential, physical and mental health, and social connection aspects. following qualitative study (inductive and deductive approaches) are used to identify happiness-affecting factors and the link between urban design and happiness. Participatory Design Research (PDR) is used to analyse and evaluate design and environmental elements contributing to happiness. Alexandria, Egypt, is the scope of this study. As shown in Figure 2, since Mohammed Ali's reign (1805), the city has since extended east and west and has 2,679 km² (Pierre-Arnaud Barthel, 2020). Its recent unorganised expansion has generated urban restrictions and vulnerabilities. So, the study applies inclusive city notions. In addition, as shown in Figure 8 and Table 1, happiness in Alexandria might be affected by light, nature, access, surprise, sociality, and identity. Based on that, the happier city design framework and guidelines are designed to promote happiness, sustainability, and positive health for urban planners, architects, and decision-makers.



Fig. 2: Expansion of Alexandria during different periods of time. Source: Trethewey.

4 HAPPINESS ACROSS THE WORLD

Nations vary widely, as in Figure 3; Finland, Norway, Denmark, and Netherlands, top 2022 stats (all with averages above 7). The Central African Republic, South Sudan, Tanzania, and Rwanda had the lowest national ratings (below 3.5), and Egypt in 2020 (below 4.5). Particularly, the Subjective Well-Being worldwide ranking for Egyptian cities is No. 158 for Alexandria with a rating of 4.660 and No. 177 for Cairo with a rating of 4.088. (John F. Helliwell, 2022)

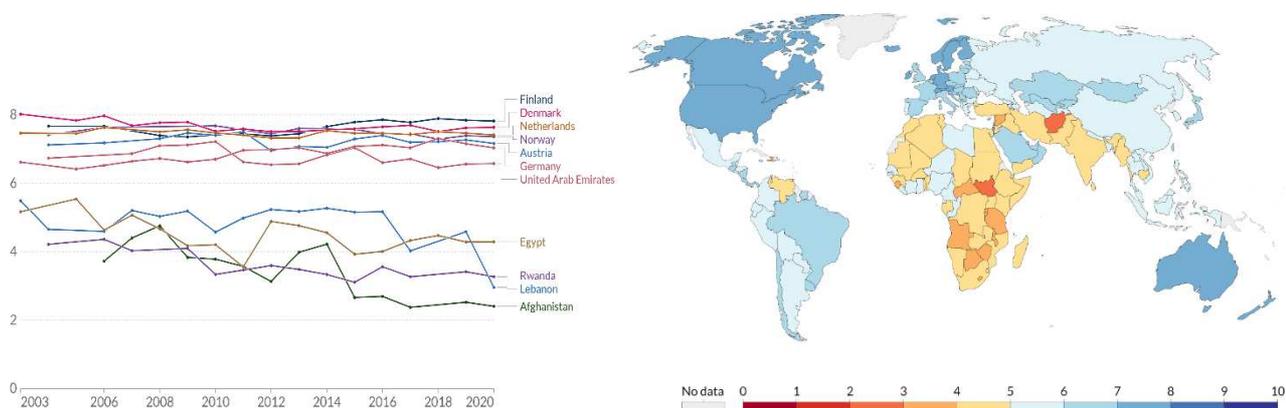


Fig. 3: Self-reported life satisfaction, 2003 to 2020. Source: World Happiness Report 2022. (Roser, 2020)

5 URBAN ENVIRONMENT AND HEALTH

Urban environments significantly impact mental health and happiness globally. Figure 4 shows the urban health implications at the city/neighbourhood, street, and building scales, with mental illness costs amounting to over 4% of GDP, as estimated by the OECD (2014). This includes increased risks of physical illness, education challenges, unemployment, and homelessness. Designing urban environments that promote

physical activity, green space, recreational facilities, and affordable healthy foods can be crucial for enhancing health and happiness.



Fig. 4: Exposures and health effects at three scales (city/neighbourhood/street/building). Source: Researchers.

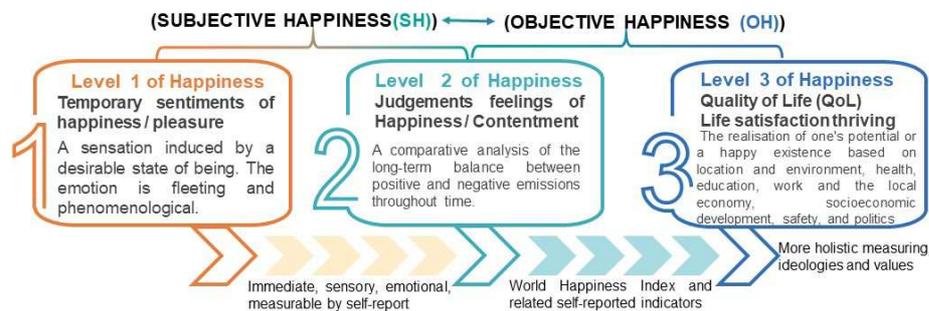


Fig. 5: Using Nettle’s graphic from “Happiness: the science behind your smile” to define happiness. Source: Researchers.

5.1 Psychology of happiness

Multidisciplinary researchers split happiness into three phases, as shown in Figure 5: Level 1 of immediate happiness differs from Level 2 of satisfaction or contentment, but both are related. Contentment and joy are essential for a successful existence to reach Level 3, depending on one's potential or purpose in life.

5.1.1 Level 1 of happiness

Emotional happiness involves joy or pleasure. The pleasant sentiments are not permanent. These sentiments are detectable by equipment that recognises brain activity and questionnaires. These evaluations use pleasure centre activation and reduced stress and frustration as indications of happiness.

5.1.2 Level 2 of happiness

Subjective happiness and life satisfaction are studied. Level 1 and level 2 of happiness are related because someone with a high level of life satisfaction has likely experienced many joyous and restorative feelings. This is reflected in the World Happiness Index and related self-reported indicators. Subjective happiness (SH) includes emotional (level 1) and cognitive happiness (level 2) measurements.

5.1.3 Level 3 of happiness (Objective happiness (OH))

For a more complete perspective on happiness, researchers use indices that encompass numerous factors that impact “Objective Happiness” (level 3). which recognises the significance of location and environment, design of the urban environment, health, education, work, the local economy, socioeconomic development, safety, and politics in determining individual happiness. Subjective happiness (Levels 1 and 2) affects objective happiness (Level 3).

5.2 Influence of urban design on mental health and happiness

The Centre for Urban Design and Mental Health (UD/MH) aims to promote community mental health.

through happier and wiser urban design. They recognise the need for social capital and mental-health-friendly architecture to create a happier and healthier city (MH, 2018). The GAPS Framework, as shown in

Figure 6, highlights the link between social connections, security, and environmental aspects of happiness. Copenhagen, Denmark, has successfully developed a socially linked society to create a happy city. Traffic planners created a double-wide bike lane to encourage cycling and strengthen citizen connections.

6 DESIGN PRINCIPLES OF HAPPIER CITIES WITH POSITIVE HEALTH

Design and policy initiatives can enhance health and happiness in urban areas, e.g., Alexandria, as shown in Figure 7. The first theme (a) focuses on the physical and social fabric of the city, such as streets, piazzas, buildings, cycling routes, and parks that may be seen and touched. On the other hand, the second theme (b) highlights the conceptual aspects, such as city culture, community relationships, and services, which are symbolic and relational despite being concrete.



Fig. 6: MIND the GAPS Framework. Source: www.urbandesignmentalhealth.com

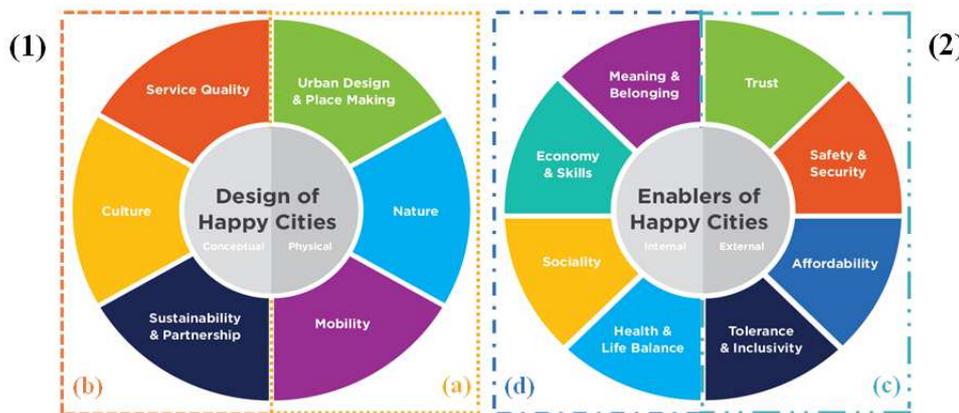


Fig. 7: This shows two sets of categories as a practical tool for city makers. Source: Aisha Bin Bishr, 2019

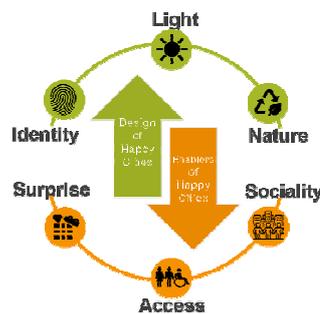


Fig. 8: Approach to happy and healthy cities. Source: Researchers.

7 APPROACH TO HAPPY AND HEALTHY CITIES

This research highlights that better-designed streets and public spaces are more important than a quicker path. In Alexandria, it is better to cancel highway projects and invest the money in cycle paths, gardens, and open spaces. Planners should also alter the car-centric design of the city, reducing hospital admissions by a third and reducing air pollution. So, nature, light, surprise, identity, access, and sociality positively affect people's happiness in Alexandria, so urban planners and policymakers should follow the suggestions for a happy city as in Table 1.

Environmental aspects	PRINCIPLES	DESCRIPTION
NATURE 	Clean Cities of Blue and Green	Green parks and shoreland areas are crucial for creating a happier city with a clean atmosphere.
	Public Spaces	City prioritizes parks, natural landscapes, seashore, plazas, and accessible roads.
	Healthy And Security	Prioritize health and safety, focusing on air quality, freedom of fear, zero crime targets, mental and physical health, and natural light cycle.
LIGHT 	Sustainability & Efficiency	Sustainable cities that use less energy and materials and incorporate green technologies
SOCIALITY & INTEGRATION 	Community Spirit	A strong community-based home with friends, family, and neighbors is essential for outdoor activities and socializing.
	Integrated Neighborhoods	Living, working, and receiving essential services in one's area with mixed zoning.
SURPRISE 	Humans Priority	Cities surprise with unexpected features, while machines detract from metropolis, blending into the backdrop when needed.
	Surprise Elements	happy and unexpected surprises, inclusive beauty to lessen class conflict
ACCESS 	Walkable & Accessible	Cities with walkable, efficient transportation prioritize pedestrian and cycling, with excellent public transit and housing proximity.
	Compactness	Compact designs minimise distances. Wide roadways and parking lots have a lower passenger capacity than light rail.
	Regionalism	Cities and regions are integrated. Without regional connections, transportation is useless.
IDENTITY 	Cultural & Civic Pride	Clean, distinct areas preserve identity and culture, engaging but not overwhelming the senses.
	Quality Of Life (QoL)	Urban design enhances self-reported quality of living, attracting economic activity and investment, enhancing overall well-being.

Table 1: Approach to happy and healthy Egyptian cities based on 6 environmental aspects. Source: Researchers.

8 CASE STUDY: (DEVELOPMENT OF THE PHAROS PROMENADE (PP))

In 2001, the Ministry of Tourism and the Governorate of Alexandria developed a master plan for the PP and QC with the objective of establishing an integrated urban space with historical significance within six months (Asmaa Abdelrahman, 2018). Figure 9 depicts a pedestrian spine PP that respects human scale and provides visitors with a sense of place. Table 2 compares the physical and behavioural qualities of Pharos promenade before and after development. Currently, once a prominent tourist attraction, the Pharos Promenade has lost regional prominence due to poor design, a lack of entertainment amenities, and poor maintenance. As shown in Table 3, it also lacked comfort and safety for pedestrians and vehicles.



Fig. 9: Site plan for the development of Pharos Promenade in 2001. Source: https://www.binaomran.com/tnews_details.php?n=2

Before Development	After Development 2001
<p>Two primary paths experienced pedestrian and vehicle interference, affecting comfort and safety; the former location deteriorated due to a lack of maintenance.</p>	<p>PP has three levels: two for pedestrians and one for vehicles, using an open-continuous staircase to preserve shoreline views and QC. The third trail is extended with a 42-m tongue.</p>
<p>In this region, limited landscaping and lighting units resulted in a lack of activities and engagement.</p>	<p>Landscape elements like planting, lighting, urban furniture, pavement materials, and public art create a unique experience in the study area, influencing people's interactions with PP.</p>

Table 2: Comparison of development after and before. Source: Asmaa Abdelrahman, 2018, Ragheb, 2014.

	Problems Identification	Resources and Approaches
Cultur	<p>1. The large-scale development of the urban waterfront is considered the start of a modern urban development aimed at encouraging investment. But it's difficult to revitalise historical waterfronts by generating a new design identity while retaining its overall character.</p>	<p>The heritage areas improvement strategy is based on three major pillars:</p>
	<p>2. No civilised entrance reflected the area's history.</p>	<p>The first strategy is to protect existing historic sites. For this strategy to work, all the built-up blocks' facades must be changed to match the local history and bring the design's spatial character together.</p>
	<p>3. Restoring the study area's design identity. This necessitates understanding the need of having a thorough waterfront plan in order to prevent future design blunders.</p>	<p>The second strategy is to restore and redesign the surrounding buildings using the same architectural components and materials as the QC.</p>
	<p>4. The absence of architectural identity of surrounding buildings as well as the usage of distracting materials and components.</p>	<p>The third strategy is to make existing buildings and open spaces more efficient and come up with creative designs to create more jobs and places for people to visit and bring more tourists to the area.</p>
	<p>5. Uses and activities in the area did not suit the region's culture.</p>	
Social And Urban Environment	<p>6. Insecurity from overlapping bikes, vehicles, and pedestrians' lanes.</p>	<p>Providing a safe passage from outside of the PP for bikes, vehicles, and pedestrians.</p>
	<p>7. Parking for vehicles and buses is limited.</p>	<p>Parking spots for all kinds of vehicles are a must, and the promenade should be designed in a way that reduce driving speed.</p>
	<p>8. The absence of recreational venues and green spaces</p>	<p>Redesigning the place based on sustainability, health, and happiness principles</p>
	<p>9. The inadequacy of landscape furniture, poor pavement materials, and public art. All of these elements do not contribute to a happy environment</p>	
	<p>10. Few lights in the research area are insufficient.</p>	
	<p>11. Misuse and uncleanliness of the waterfront</p>	
	<p>12. There are no well-designed selling units for street vendors.</p>	
	<p>13. Absence of a tourist and informative support facility.</p>	
	<p>14. Insufficient public services and locations for recreational and cultural activities (diving centres, yacht berths, restaurants, etc.) and constrained usage of private clubs.</p>	

Table 3: Problem identification and analysis of available tools and approaches. Source: Researchers.

9 RESULTS

9.1 Measurements and Policies for the Happier City

Experts are identifying factors that promote happiness and health in urban areas, with a focus on Egypt As depicted in Figure 10. Happy City, established in 2010, aims to combat the notion that economic development is the primary measure of human happiness. The organization creates measuring tools to recognize, analyze, and enhance happiness in people and places. Important instruments, such as the “Collection of Happiness Measure” in the World Database of Happiness (WDH), are analyzed in this section (Veenhoven, Ruut, 2017).

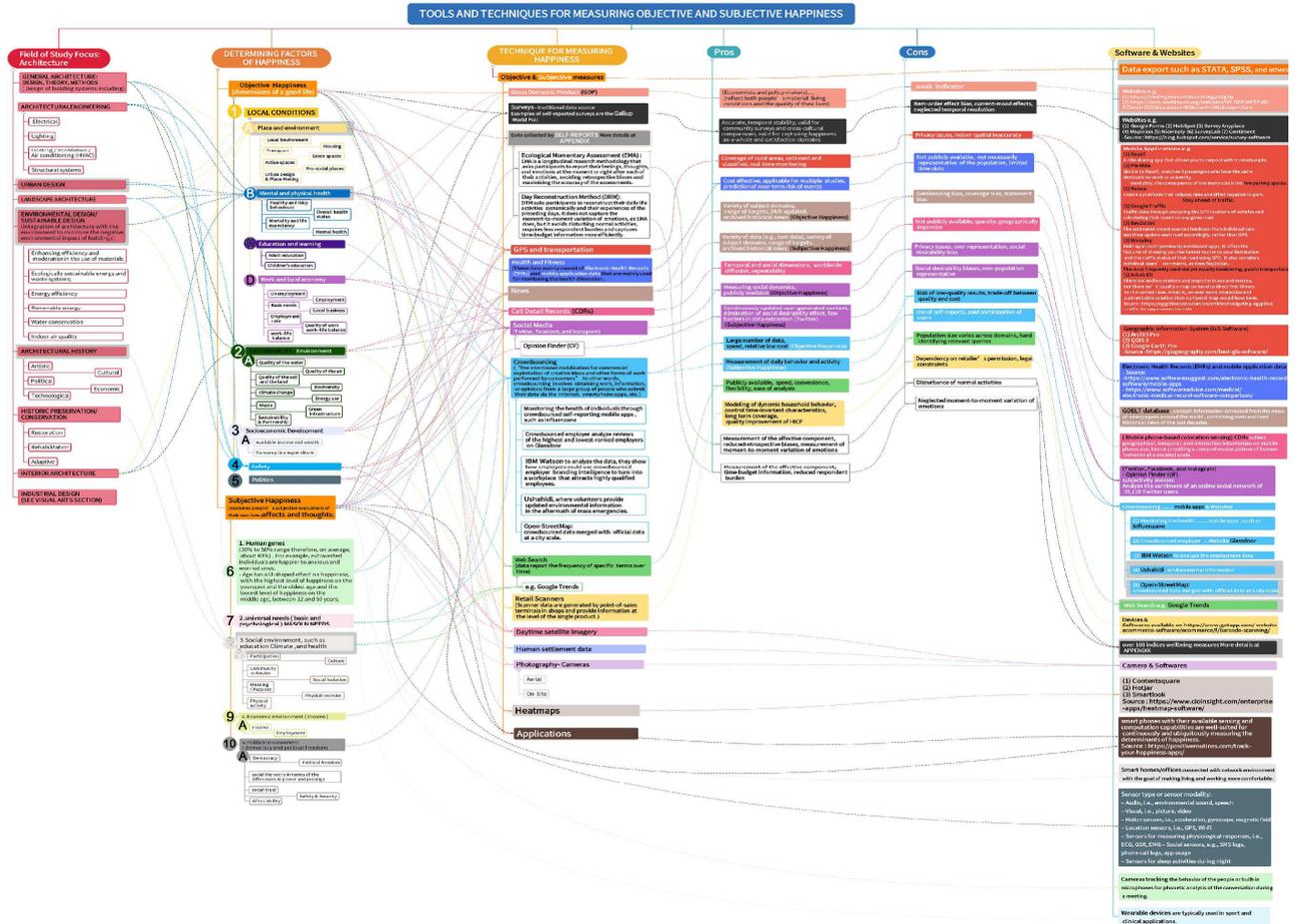


Fig. 10: Tools and techniques for measuring objective and subjective happiness are needed to assess happiness levels in the city. Source: Researchers.

9.2 Framework for a Healthy and Happier City

This study sets out a new framework for “happier urbanism” based on the “all-inclusive city” idea that examines how city and neighbourhood design may create happiness, focusing on mental health outcomes as:

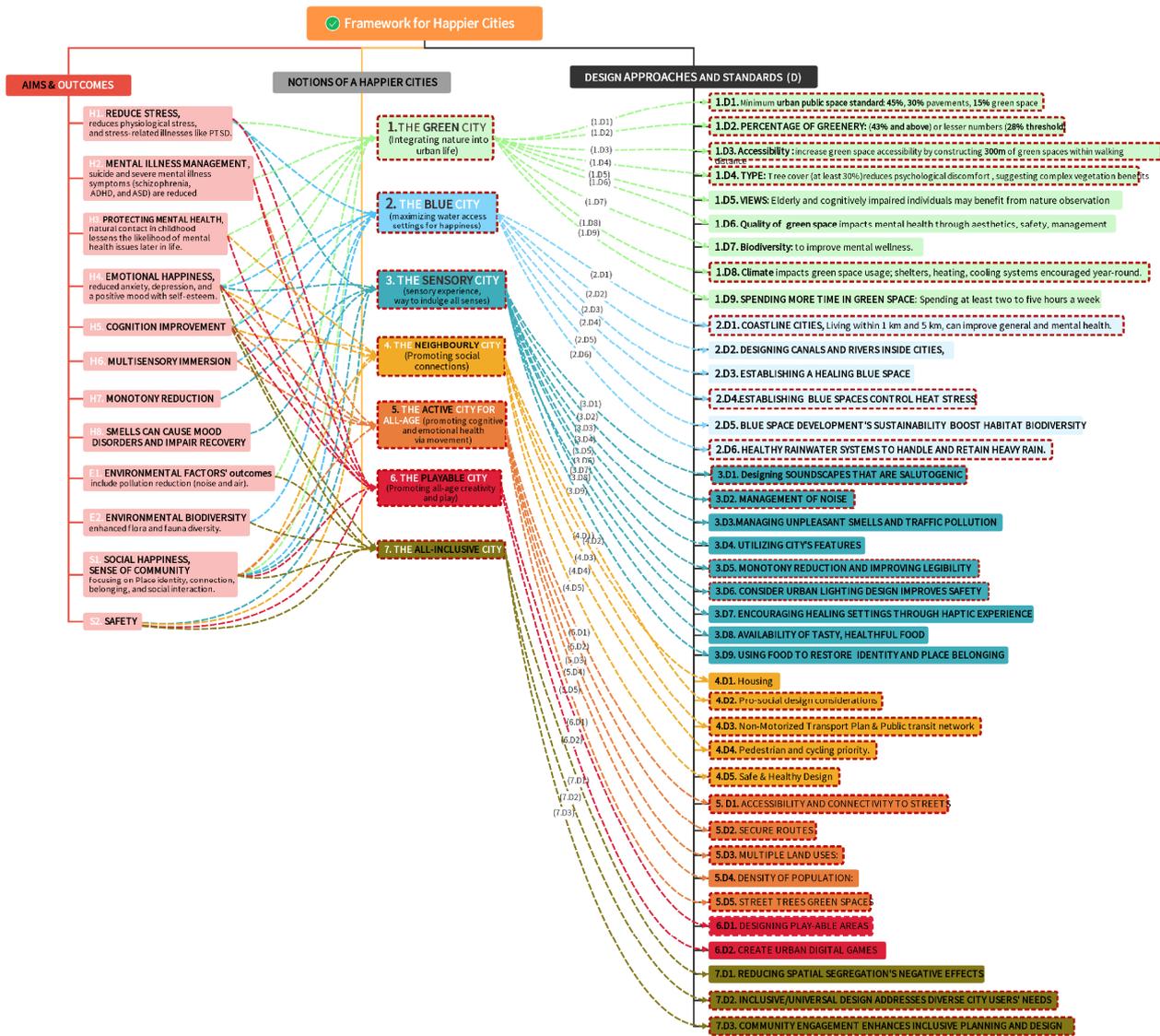


Fig. 11: Framework for a healthy and happier city. Source: Researchers.

10 CONCLUSION

Few studies explore happier cities' design principles for architecture and urban design. To promote health and happiness, architects and planners should use the GAPS Framework to create Green spaces, Active spaces, Pro-social places, and Safe places based on sustainability principles.

To design or plan a happier city, there are three distinct factors that may be applicable:

(1) Urban Design for Health and sustainability

- Cities are hubs of creativity and innovation, but they also contribute to climate change and planetary health problems. Global sustainability involves more than treating urban woes; that requires rethinking urban systems.
- Citizen happiness is tied to city planning and design. So, architects and urban planners should create active designs with walking and cycling access, social contact, and a direct link between humans and the environment by putting activities in green areas in diverse neighbourhoods with health and sustainability in mind. Good urban design and reliable public transit allow individuals to conveniently travel and be active.
- Nature, light, accessibility, and identity are also keys to urban attractiveness. So, green landscapes, water, and natural light are restorative; a complicated spatial plan adds interest and encourages exploration; and visual markers aid direction and offer relaxation.

(2) Participation at work

The work-life balance contributes to national happiness. Example: flex time, working from home, and a year of maternity leave for both parents. This helps citizens enjoy life and be happy at work while maintaining strong family relationships.

(3) Reduce impediments

- Health care and education are provided. People can access these services effortlessly. Less stress increases their happiness.
- Although happiness cannot be quantified, the quantitative environmental elements influencing human happiness, such as fluctuating temperatures, wind speed, water and air pollution, and other factors, may be measured and compared. As a result, public places are created in accordance with agreed-upon sustainable environmental criteria.
- Based on the facilities, resources, and data that are available, the designer must figure out the best ways and tools to measure happiness.
- In Egypt, particularly in the city of Alexandria, there is a noticeable lack of open-access data and data repositories, which is regarded as a barrier to any improvement.
- The Thriving Places Index (TPI) is a modern compass. It helps decision-makers from all sectors evaluate and prioritise policies based on people's well-being and community sustainability. Businesses of any size can utilise the TPI and Happiness Pulse together. So that may be useful in Egyptian projects by analysing happiness elements and how individuals are doing.

11 REFERENCES

- Alter, Lloyd. "How Should We Measure the Happiness of Cities?". October 2018.
- Asmaa Abdelrahman, Khalid Al-Hagla, and Dina Saadallah. "The role of landscaping elements in enhancing passive and active engagement in urban promenade: The case of Pharos Promenade, Alexandria, Egypt" *Alexandria Engineering Journal* (Faculty of Engineering, Alexandria University. Production and hosting by Elsevier B.V) 57 (November 2018): 3227–3236.
- Bhutan. "Defining a New Economic Paradigm: The Report of the High-Level Meeting on Wellbeing and Happiness" New York: United Nations headquarters, 2012.
- Chinmoy Sarkar, Chris Webster, John Gallacher. "Neighbourhood walkability and incidence of hypertension: Findings from the study of 429,334 UK Biobank participants" *International Journal of Hygiene and Environmental Health* 221, no. 3 (2018): 458-468.
- Foley, Ronan. "Healing Waters: Therapeutic Landscapes in Historic and Contemporary Ireland" Routledge, 2010.
- Forburkerrådet. "DECEIVED BY DESIGN: How tech companies use dark patterns to discourage us from exercising our rights to privacy" 2018.
- Gehl, Jan. "Cities for people". Washington- Covelo -London: ISLAND PRESS, 2010.
- Gesler, W M. "Therapeutic Landscapes: Theory and a Case Study of Epidaurus, Greece" *Environment and Planning D: Society and Space* 11, no. 2 (2016).
- Gianoglio, Martina. "Dubai's route to world's happiest city" *Living Map*. 2017.
- Jenny J. Roe, Catharine Ward Thompson, Peter A. Aspinall, Mark J. Brewer, Elizabeth I. Duff, David Miller, Richard Mitchell, and Angela Clow. "Green Space and Stress: Evidence from Cortisol Measures in Deprived Urban Communities". *Int J Environ Res Public Health* 10, no. 9 (2013): 4086–4103.
- Joanne K.Garrett, Mathew P.White, Junjie Huang, Simpson Ng, Zero Hui, Colette Leung, Lap Ah Tse, Franklin Fungm Lewis R. Elliott, Michael H. Depledge, Martin C.S.Wong. "Urban blue space and health and wellbeing in Hong Kong: Results from a survey of older adults". *Health & Place* 55 (2019B).
- Joanne K.Garrett, Theodore J.Clitherow, Mathew P.White, Benedict W.Wheeler, Lora E.Fleming. "Coastal proximity and mental health among urban adults in England: The moderating effect of household income". *Health & Place* 59 (2019A).
- John DHetherington, Shmuel Burmil, Terry CDaniel. "Human values and perceptions of water in arid landscapes". *Landscape and Urban Planning* 44, no. 2–3 (1999): 99-109.
- John F. Helliwell, Richard Layard, Jeffrey D. Sachs, Jan-Emmanuel De Neve, Lara B. Akinin, and Shun Wang. "World Happiness Report 2022". New York: Sustainable Development Solutions Network, 2022.
- Jolanda Maas, Sonja M E van Dillen, Robert A Verheij, Peter P Groenewegen. "Social contacts as a possible mechanism behind the relation between green space and health". *Health & Place* 15, no. 2 (2009): 586-595.
- Marc G Berman, Ethan Kross, Katherine M Krpan, Mary K Askren, Aleah Burson, Patricia J Deldin, Stephen Kaplan, Lindsey Sherdell, Ian H Gotlib, John Jonides. "Interacting with nature improves cognition and affect for individuals with depression". *Journal of Affective Disorders* 140, no. 3 (2012): 300-305.
- Marco Helbich, Derek de Beurs, Mei-Po Kwan, Rory C O'Connor, Peter P Groenewegen. "Natural environments and suicide mortality in the Netherlands: a cross-sectional, ecological study". *The Lancet Planetary Health* 2, no. 3 (2018): e134-e139.

- Mathew P. White, Ian Alcock, James Grellier, Benedict W Wheeler, Terry Hartig, Sara L Warber, Angie Bone, Michael Depledge, Lora E Fleming. "Spending at least 120 minutes a week in nature is associated with good health and wellbeing". Scientific Reports, 2019.
- McCay, Jenny Roe, Layla : "Restorative Cities: Urban Design for Mental Health and Wellbeing". London: Bloomsbury visual arts, 2021.
- Najmeh Bitaab, Farahbod Heydari, and Nadia Khadivi Golestani: "Investigating strategies for creating healthy cities with sustainable development approach". European Journal of Research (Social Science and Humanities), 2018: 34-44.
- P. J. Irga, M. D. Burchett, F. R. Torpy. "Does urban forestry have a quantitative effect on ambient air quality in an urban environment? ". Atmospheric Environment 120 (2015): 173-181.
- Ragheb, Riham A. "Alexandria's Eastern Entrance: Analysis of Qaitbay Waterfront Development". International conference on Architecture and Urban Design At:Barcelona. Barcelona: World Academy of Science, Engineering and Technology International Journal of Architectural and Environmental Engineering, 2014.
- Rong, Iris Lim Wan. "Architecture of Urban Happiness : Creating A New Positive Typology". Singapore University of Technology and Design (SUTD), 2018.
- Solomon M Hsiang, Marshall Burke, and Edward Miguel. "Quantifying the influence of climate on human conflict" Science, 2013.
- Thomas Astell-Burt, Xiaoqi Feng. "Association of Urban Green Space With Mental Health and General Health Among Adults in Australia" Original Investigation Public Health 2, no. 7 (2019).
- Trethewey, Ken. "Ancient Lighthouses - Part 5: The Pharos". UK: Gravesend Cottage, Torpoint, Cornwall , n.d.
- Veenhoven, Ruut. "Measures of happiness: Which to choose?" In Metrics of Subjective Well-Being: Limits and Improvements. Springer, Dordrecht, 2017.
- Wil Gesler. "Lourdes: healing in a place of pilgrimage" Health & Place 2, no. 2 (1996): 95-105.