Enhancing social well-being and public health in urban environments: insights from Singapore neighbourhoods

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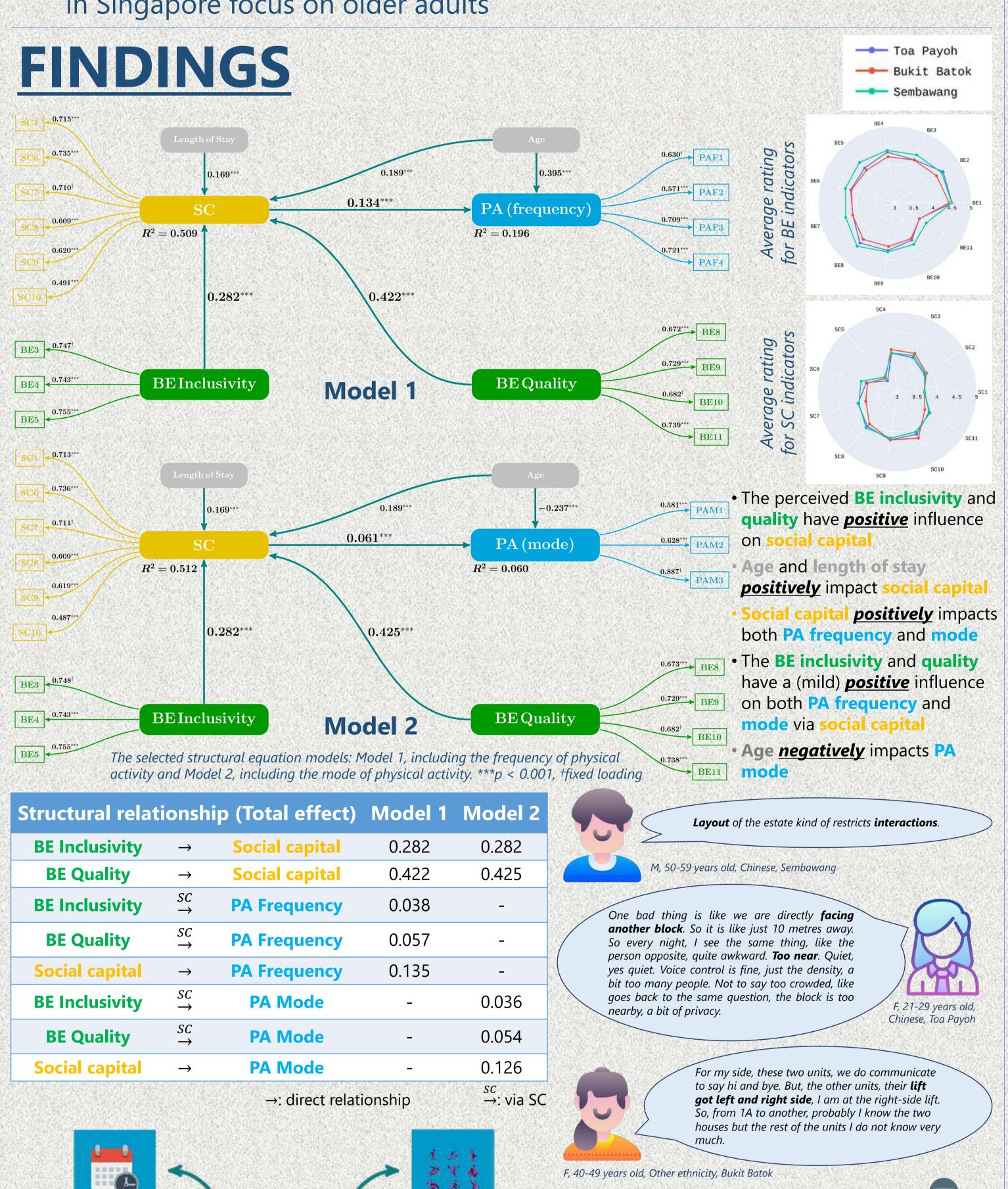**a*** Institute of High Performance Computing
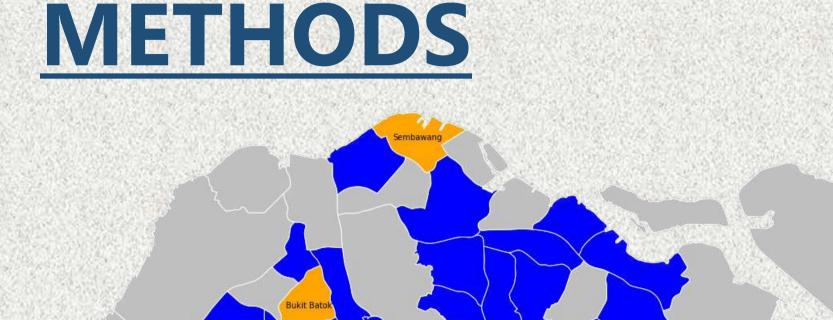IHPC

BACKGROUND

- The design of the built environment plays a pivotal role in shaping social activities, thereby influencing community engagement and social outcomes
- Key among these outcomes are social capital and physical activity levels, both integral to fostering community cohesion and enhancing residents' health, consequently mitigating long-term healthcare costs

RESEARCH GAP

- Few studies on the complex interactions between the built environment (BE), social capital (SC), and physical activity (PA) in highly urbanised and densely populated settings
- Majority of the studies on the influence of the built environment on people in Singapore focus on older adults

AIM

- To understand how people react to spatial planning in Singapore and its influence on their social capital and physical activity levels
- To explore residents' perceptions of various physical elements within the built environment

METHODS

Survey of 1,000 people (generic adult population) in 3 planning areas having distinct characteristics, in terms of their land-use pattern and features of the built environment
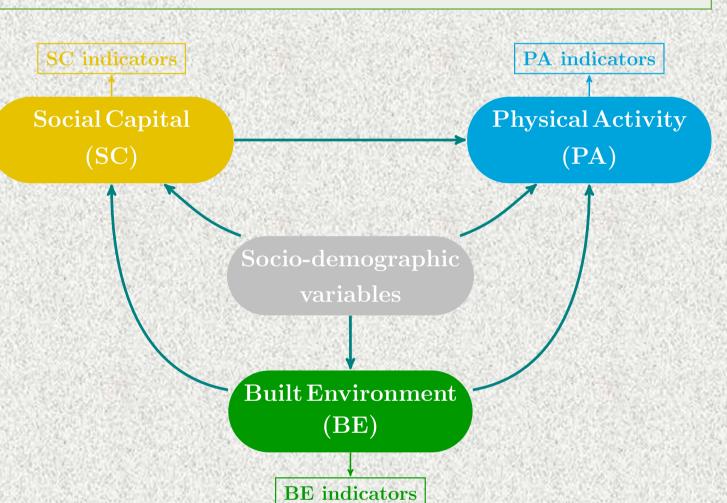
	Land use	Amenities	Public Transport
Bukit Batok	High in **green space**	**Younger** type	Average
Sembawang	**Industrial** land use	**Younger** type	Low
Toa Payoh	Highly **residential**	**Older** type	Good

- We employ both **quantitative** and **qualitative** methodologies

Quantitative analysis – Structural Equation Modelling of relationships

Built environment sub-categories and indicators (rated on 5-point Likert scale – very unhappy to very happy)		Social capital sub-categories and indicators (rated on 5-point Likert scale – completely disagree to completely agree)	
Amenities	BE1: Availability of basic amenities and services	**Social Interaction**	SC1: Knowing neighbours very well
	BE2: Connection to public transport		SC2: Easy to get help from neighbours
Inclusivity	BE3: Family-friendly facilities		SC3: Space and facilities for social interaction
	BE4: Walkability of pedestrian facilities		SC4: Enjoy meeting neighbours in public areas
	BE5: Wheelchairs / strollers accessibility		SC5: A lot of activities and events
Visual Beauty	BE6: Availability of greenspace	**Social Trust**	SC6: Residents can be trusted
	BE7: Visual beauty of surroundings		SC7: Residents share the same values
	BE8: Overall safety and security level		SC8: Residents get along with each other
Quality	BE9: Air quality	**Neighbourhood Attachment**	SC9: Feeling attached to the neighbourhood
	BE10: Cleanliness of public space		SC10: Intention to stay for long term
	BE11: Noise level		SC11: Unique identity of the neighbourhood
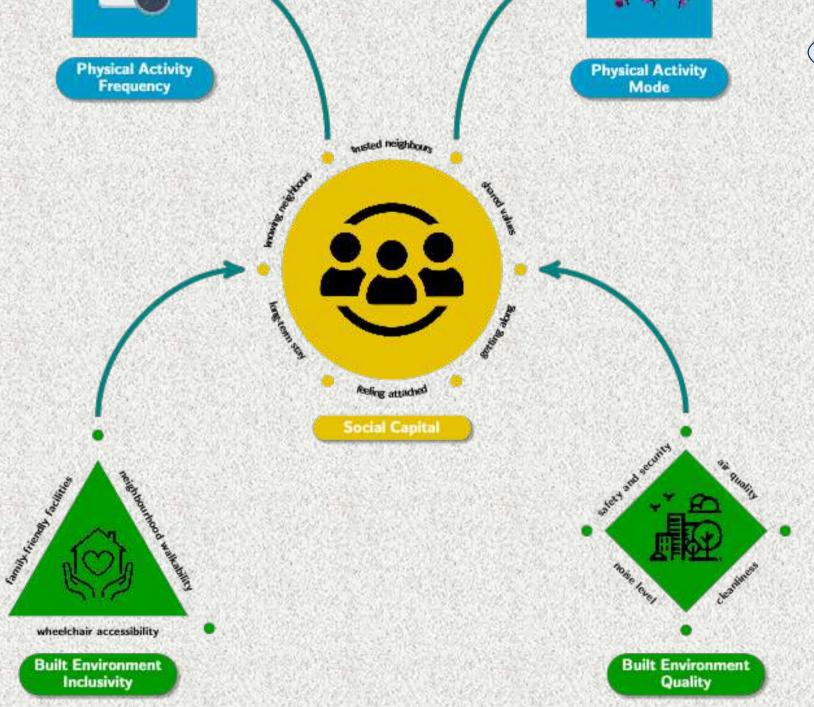
Physical activity sub-categories and indicators	
PA Frequency (5 tiers: everyday, a few times per week, once/twice per month, once in a while, never)	PAF1: Typical frequency of playing sports (e.g. football, basketball, tennis)
	PAF2: Typical frequency of working out in gym
	PAF3: Typical frequency of swimming
	PAF4: Typical frequency of jogging
PA Mode (Use of specific facilities and total number of facilities used in the last month)	PAM1: Used swimming pool in the last month.
	PAM2: Used Gym in the last month.
	PAM3: Total number of facilities (e.g. neighbourhood fitness corner, gym, walking / jogging paths, Bike paths, swimming pools) used for physical activities in the last month.

Qualitative analysis – Content Analysis of in-depth interviews

		Bukit Batok	Sembawang	Toa Payoh
(10 for each area)				
Age	21-39	3	3	3
	40-59	4	4	4
	60 and above	3	3	3
Gender	Male	5	5	5
	Female	5	5	5
Ethnicity	Chinese	7	7	7
	Others	3	3	3
Housing type	HDB	7	7	7
	Private	3	3	3

Content analysis of interview data to unveil multifaceted barriers to social interaction, ranging from physical layout and personal lifestyles to privacy concerns, cultural disparities and communication challenges

FINDINGS

Average rating for BE indicators

Average rating for SC indicators

Model 1

Model 2

*The selected structural equation models: Model 1, including the frequency of physical activity and Model 2, including the mode of physical activity; ***p < 0.001, †fixed loading*

Structural relationship (Total effect)			Model 1	Model 2
BE Inclusivity	→	Social capital	0.282	0.282
BE Quality	→	Social capital	0.422	0.425
BE Inclusivity	SC→	PA Frequency	0.038	-
BE Quality	SC→	PA Frequency	0.057	-
Social capital	→	PA Frequency	0.135	-
BE Inclusivity	SC→	PA Mode	-	0.036
BE Quality	SC→	PA Mode	-	0.054
Social capital	→	PA Mode	-	0.126

→: direct relationship SC→: via SC

- The perceived **BE inclusivity** and **quality** have **positive** influence on **social capital**
- **Age** and length of stay **positively** impact **social capital**
- **Social capital** **positively** impacts both **PA frequency** and **mode**
- The **BE inclusivity** and **quality** have a (mild) **positive** influence on both **PA frequency** and **mode** via **social capital**
- **Age negatively** impacts **PA mode**

Layout of the estate kind of restricts **interactions**.
M, 50-59 years old, Chinese, Sembawang

One bad thing is like we are directly **facing another block**. So it is like just 10 metres away. So every night, I see the same thing, like the person opposite, quite awkward. **Too near**. Quiet, yes quiet. Voice control is fine, just the density, a bit too many people. Not to say too crowded, like goes back to the same question, the block is too nearby, a bit of privacy.
F, 21-29 years old, Chinese, Toa Payoh

For my side, these two units, we do communicate to say hi and bye. But, the other units, their **lift got left and right side**. I am at the right-side lift. So, from 1A to another, probably I know the two houses but the rest of the units I do not know very much.
F, 40-49 years old, Other ethnicity, Bukit Batok

I've seen significant **positive changes** over my 25 years here. Upgrading initiatives have **transformed** Sembawang, and I'm pleased with the improvements.
F, 80+ years old, Indian, Sembawang

Physical Activity Frequency

Physical Activity Mode

Social Capital

Built Environment Inclusivity

Built Environment Quality

	Positive	Negative
Bukit Batok	• Serenity and greenness of the area • Proximity to nature reserves and parks • Access to outdoor activities like hiking and jogging trails • Availability of amenities such as shopping malls, food options, and schools	• Perceived as being slightly secluded or lacking certain conveniences
Sembawang	• Tranquillity and peacefulness of the neighbourhood • Presence of nature parks, beaches, and recreational areas • The sense of community and neighbourliness • Proximity to amenities	• Limited options for entertainment and leisure activities compared to other areas
Toa Payoh	• Convenience and accessibility of the neighbourhood • Presence of amenities such as shopping malls, hawker centres, and sports facilities • Availability of public transportation, green spaces and parks • Proximity to the city centre	• Congestion and crowdedness

CONCLUSIONS

- Understanding of the **intricate relationship** between the built environment (BE) and social outcomes in Singapore
- Quantitative assessment of BE's **diverse physical features**
- Support for **evidence-based urban planning** for adaptive and resilient communities

Future applications

- Assessment of **relevant features** of current urban designs in Singapore related to health outcomes and social capital
- **Effective strategies** for promoting health and well-being

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