

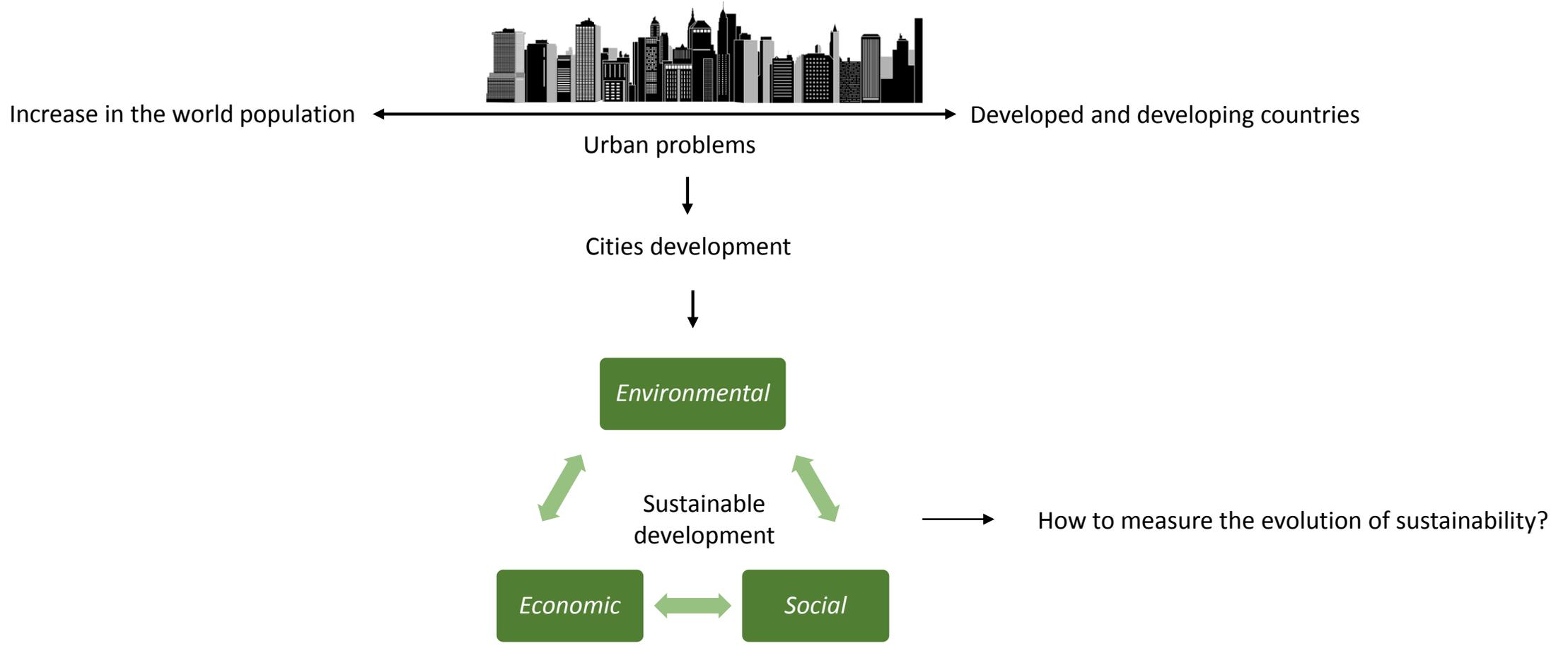
AScUS Unconference
Actionable Science for Urban Sustainability · 1-4 June 2021

Neighborhood Sustainability Assessment (NSA) Tool:
Functionality analysis of a tool developed in Hong
Kong tested in a neighborhood in Brazil

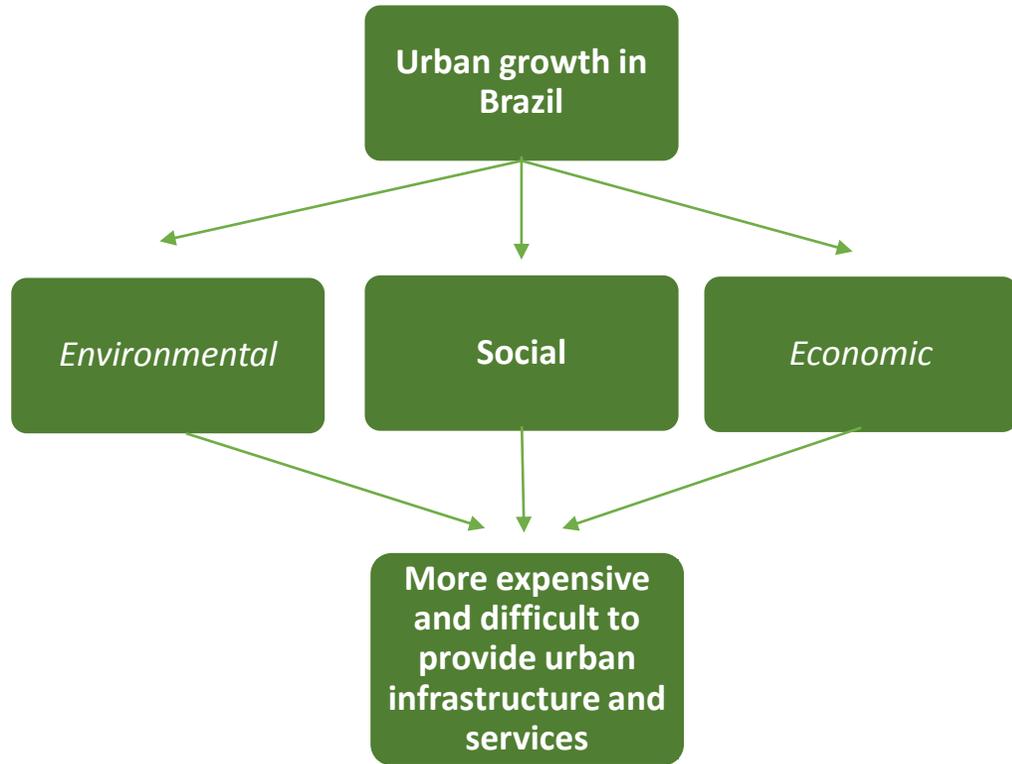


Eng. Roberto Tadeu Chimanski
Prof. Dr. Marcell Mariano Correa Maceno
Prof. Dr. Shauhrat S. Chopra

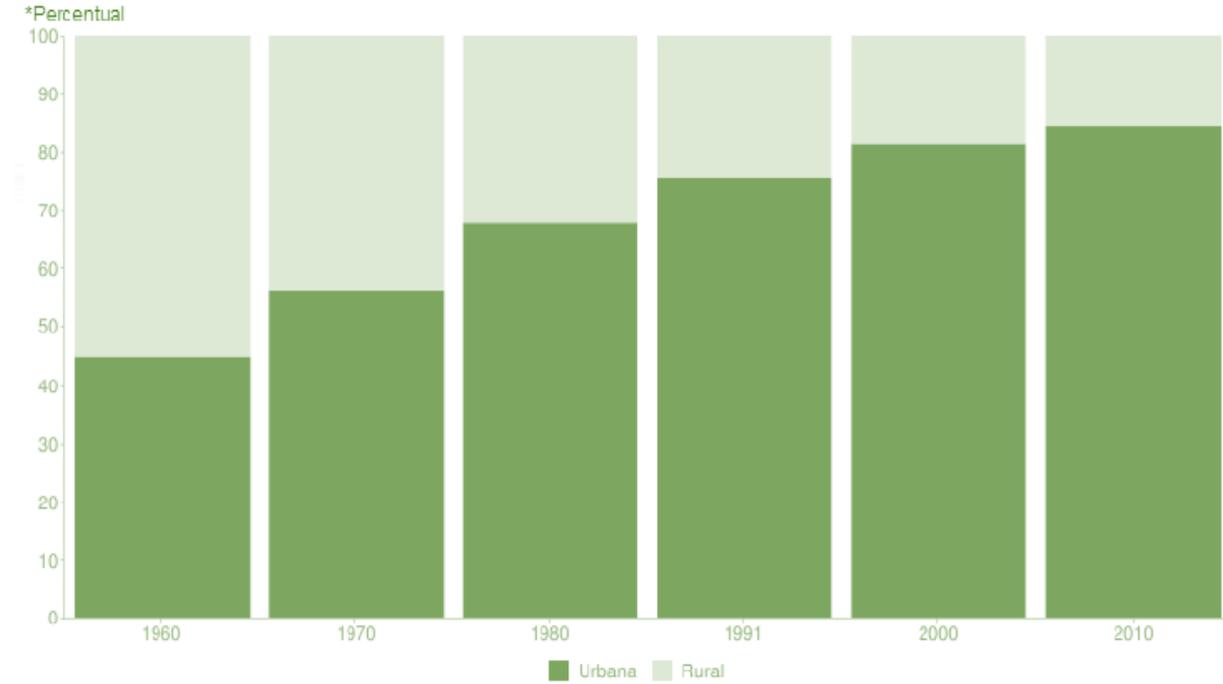
INTRODUCTION



INTRODUCTION



Evolution of Brazil's urban population



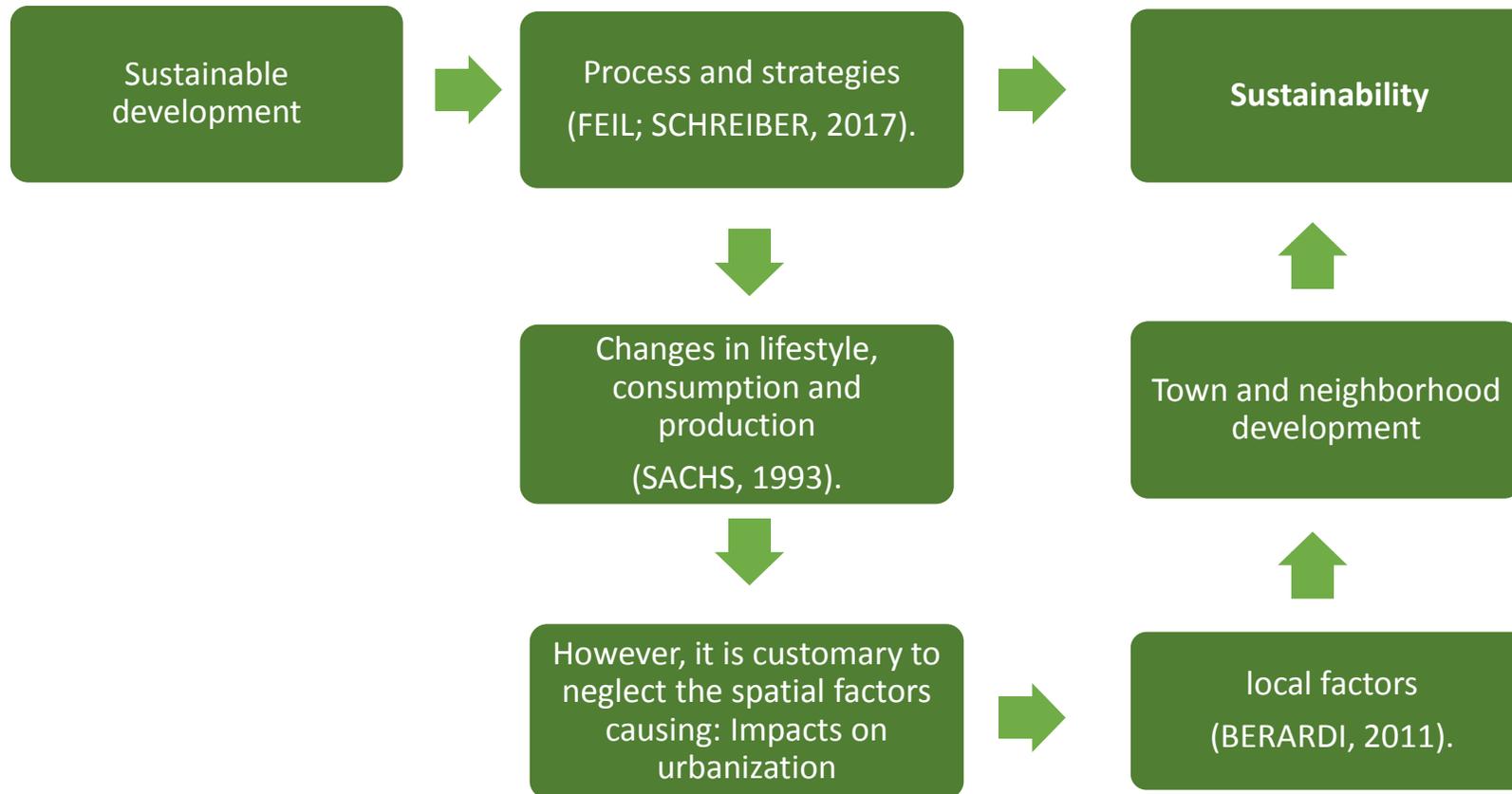
Source: IBGE (2020)



Research objective

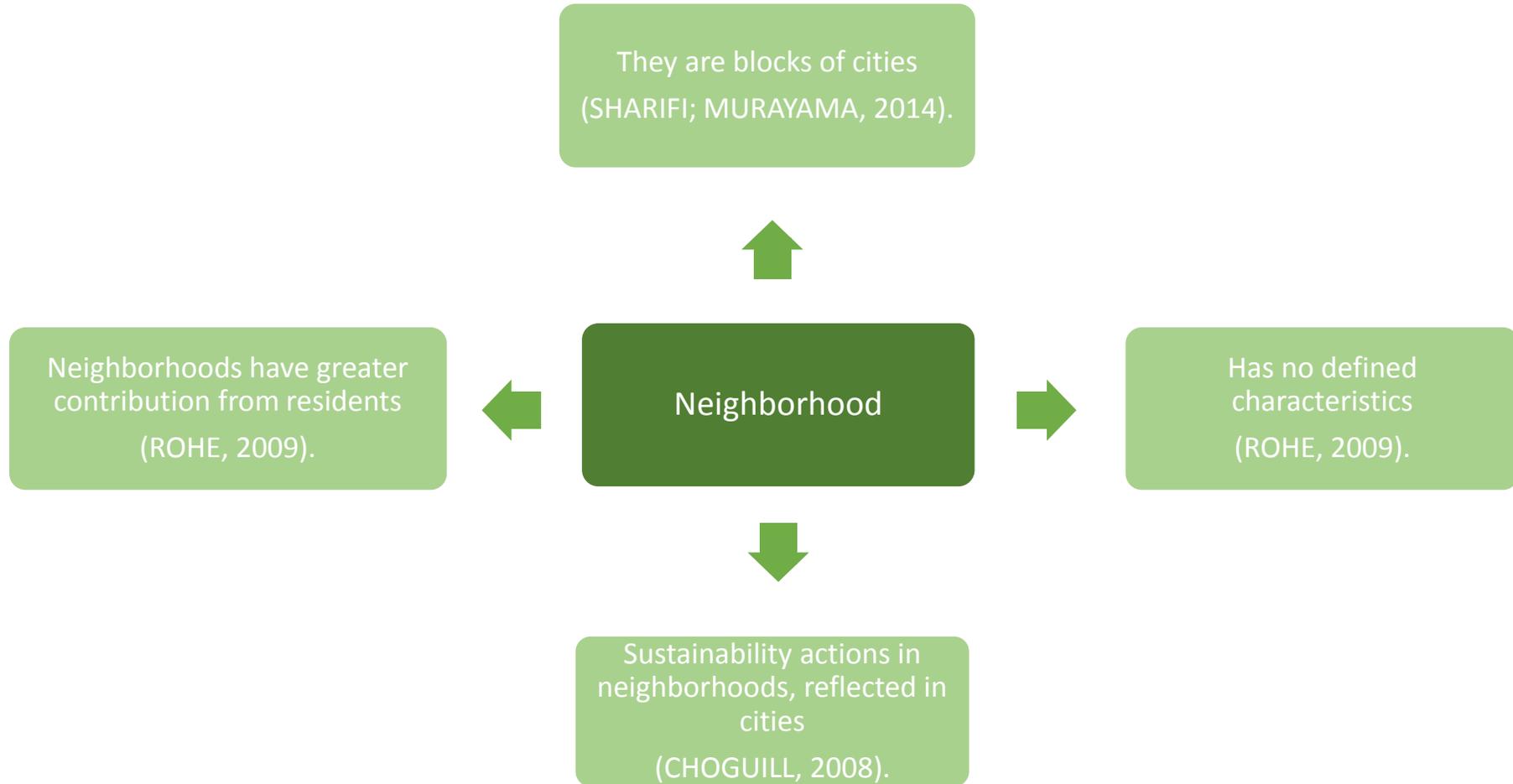
- This research aims to analyze the functionality of an NSA tool developed in Hong Kong, when applied in the context of a city in Brazil.

Background



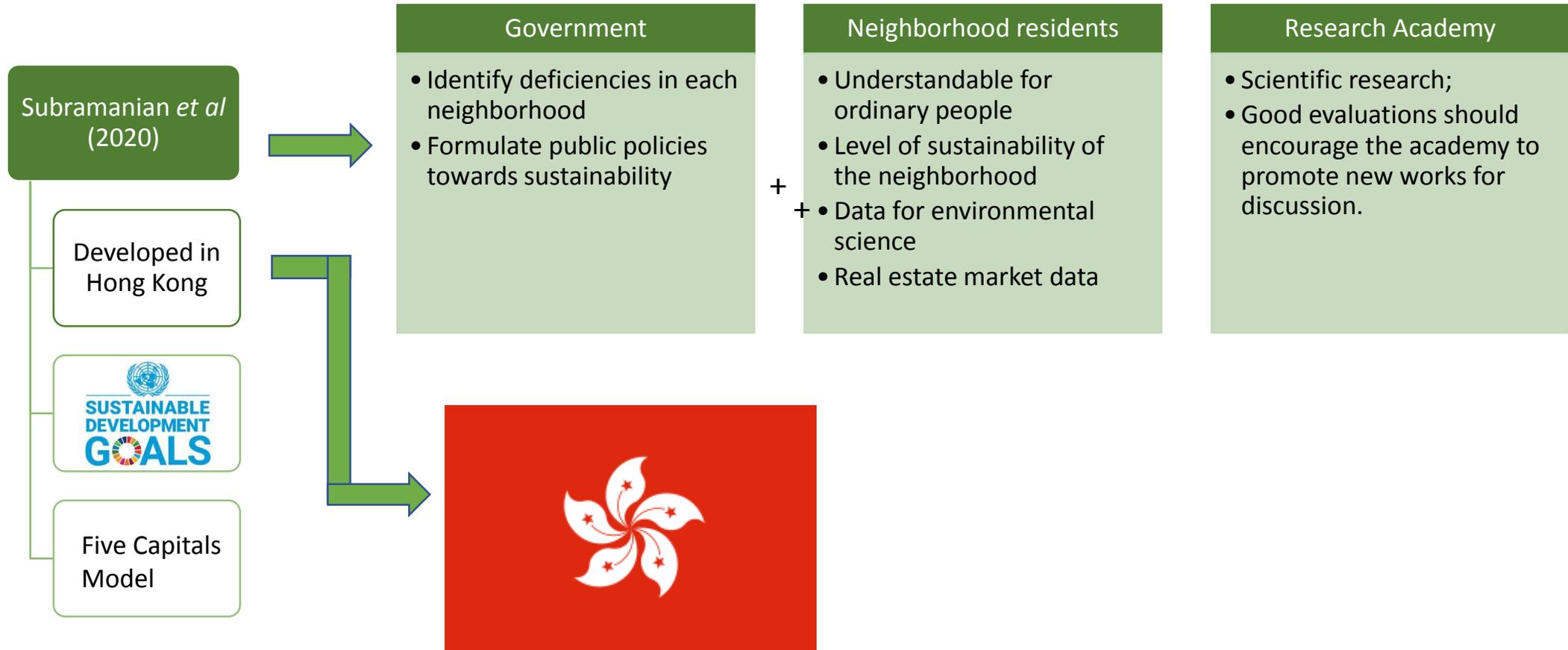
Background

- Neighborhood Sustainability Assessment (NSA)



Neighborhood Sustainability Assessment (NSA)

- NSA model under analysis: Subramanian *et al* (2020).



Neighborhood Sustainability Assessment (NSA)

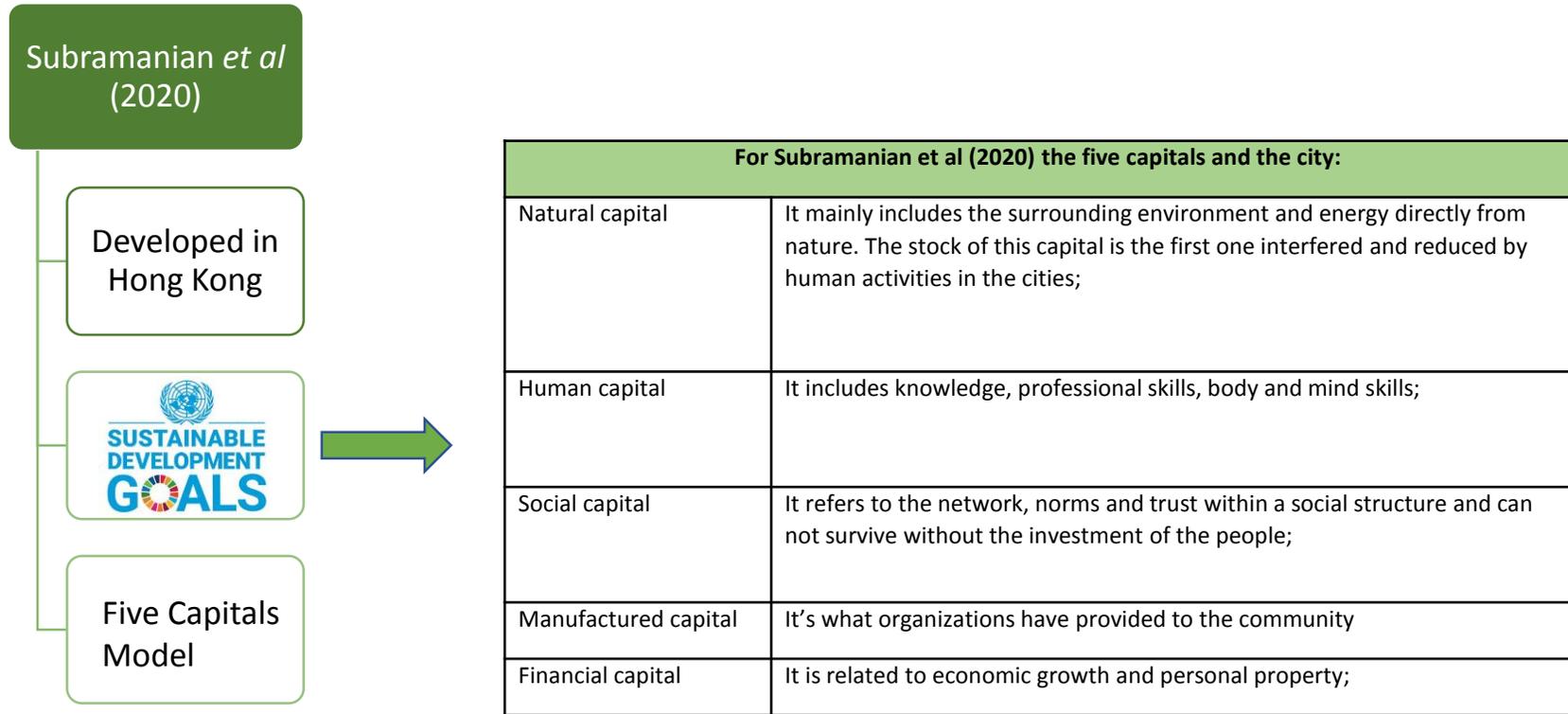
- NSA model under analysis: Subramanian *et al* (2020).



Source: UN (2015)

Neighborhood Sustainability Assessment (NSA)

- NSA model under analysis: Subramanian *et al* (2020).



Source: Forum for the Future (2018)

Neighborhood Sustainability Assessment (NSA)

• How the model works:

Subramanian *et al*
(2020)

Developed in
Hong Kong



Five Capitals
Model

Natural capital
- Goal 6
- Goal 12
- Goal 13
- Goal 14
- Goal 15
Human capital
- Goal 3
- Goal 4
- Goal 8
Social capital
- Goal 5
- Goal 10
- Goal 16
- Goal 17
Financial capital
- Goal 1
- Goal 8
- Goal 17
Manufactured capital
- Goal 2
- Goal 3
- Goal 4
- Goal 7
- Goal 10
- Goal 11
- Goal 12



Indicators
Proximity to the nearest country parks and natural reserves (Biodiversity)
Proximity to the coastline
Motorway density (Air quality)
Proximity to solid waste recycling points
Pipe water quality
Green area ratio
Noise pollution
Water quality of the nearest water monitoring point
Post-secondary education rate
School score involving distance and quality
Health service score involving distance and quality
Ratio of the young and the prime of life
Occupational diversification
Proximity to financial services
Proximity to licensed wet markets and supermarkets
Proximity to public transportation stops/stations
Individual/family median income
Energy consumption by population times income
House ownership rate
Average number of rooms per person
House expenditure/income rate
Immigration states
Female/male employment rate
Unemployment rate
Proximity to crime scene
Proximity to the nearest council member's office



Data collect:

census

Geographic

Monitoring

Neighborhood Sustainability Assessment (NSA)

• How the model works:

Subramanian *et al*
(2020)

Developed in
Hong Kong



Five Capitals
Model

Natural capital
- Goal 6
- Goal 12
- Goal 13
- Goal 14
- Goal 15
Human capital
- Goal 3
- Goal 4
- Goal 8
Social capital
- Goal 5
- Goal 10
- Goal 16
- Goal 17
Financial capital
- Goal 1
- Goal 8
- Goal 17
Manufactured capital
- Goal 2
- Goal 3
- Goal 4
- Goal 7
- Goal 10
- Goal 11
- Goal 12



Indicators
Proximity to the nearest country parks and natural reserves (Biodiversity)
Proximity to the coastline
Motorway density (Air quality)
Proximity to solid waste recycling points
Pipe water quality
Green area ratio
Noise pollution
Water quality of the nearest water monitoring point
Post-secondary education rate
School score involving distance and quality
Health service score involving distance and quality
Ratio of the young and the prime of life
Occupational diversification
Proximity to financial services
Proximity to licensed wet markets and supermarkets
Proximity to public transportation stops/stations
Individual/family median income
Energy consumption by population times income
House ownership rate
Average number of rooms per person
House expenditure/income rate
Immigration states
Female/male employment rate
Unemployment rate
Proximity to crime scene
Proximity to the nearest council member's office



Data collect:



Mathematical
calculations

Normalization

Weights

Software Gis

Neighborhood Sustainability Assessment (NSA)

• How the model works:

Subramanian *et al*
(2020)

Developed in
Hong Kong



Five Capitals
Model

Natural capital
- Goal 6
- Goal 12
- Goal 13
- Goal 14
- Goal 15
Human capital
- Goal 3
- Goal 4
- Goal 8
Social capital
- Goal 5
- Goal 10
- Goal 16
- Goal 17
Financial capital
- Goal 1
- Goal 8
- Goal 17
Manufactured capital
- Goal 2
- Goal 3
- Goal 4
- Goal 7
- Goal 10
- Goal 11
- Goal 12



Indicators
Proximity to the nearest country parks and natural reserves (Biodiversity)
Proximity to the coastline
Motorway density (Air quality)
Proximity to solid waste recycling points
Pipe water quality
Green area ratio
Noise pollution
Water quality of the nearest water monitoring point
Post-secondary education rate
School score involving distance and quality
Health service score involving distance and quality
Ratio of the young and the prime of life
Occupational diversification
Proximity to financial services
Proximity to licensed wet markets and supermarkets
Proximity to public transportation stops/stations
Individual/family median income
Energy consumption by population times income
House ownership rate
Average number of rooms per person
House expenditure/income rate
Immigration states
Female/male employment rate
Unemployment rate
Proximity to crime scene
Proximity to the nearest council member's office



Data collect:



Mathematical
calculations



Graph results

APPROACH USED

- Case study
- Assessment of the Brazilian neighborhood with the Subramanian *et al* (2020) model.
- As the object of the case study: *Jardim das Américas* neighborhood in the city of Curitiba- Brazil.
- The neighborhood under study was divided into 21 zones
- Distances from the centroid of the zones.
- Area of influence up to 2 km from the centroid.



APPROACH USED

DATA SOURCE

- Gil (2007) for research with a case study strategy, it is necessary to obtain data with different procedures, in order to guarantee the validity of the study, avoiding the subjectivity of the researcher analysis.



+



+



OpenStreetMap



Google Maps

+



DATA SOURCE

- 10 Indicators without data available for the Brazilian context

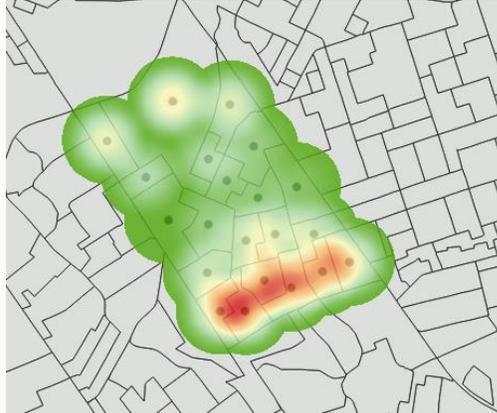
Indicators	Data source
Natural Capital Indicators	
Proximity to the nearest country parks and natural reserves (Biodiversity)	IPPUC (2019a)
Proximity to the coastline	IBGE (2011c)
Motorway density (Air quality)	IPPUC (2019b); IBGE (2011d)
Proximity to solid waste recycling points	SMMA (2019)
Pipe water quality	-
Green area ratio	IPPUC (2019c)
Noise pollution	-
Water quality of the nearest water monitoring point	ANA (2020)
Human Capital Indicators	
Post-secondary education rate	-
School score involving distance and quality	SEP (2020); IPPUC (2019e)
Health service score involving distance and quality	IPPUC (2019e); IPPUC (2019f); IPPUC (2019g)
Ratio of the young and the prime of life	IBGE (2011d)
Occupational diversification	-

Indicators	Data source
Manufactured Capital Indicators	
Proximity to financial services	GOOGLE MAPAS (2020)
Proximity to licensed wet markets and supermarkets	GOOGLE MAPAS (2020)
Proximity to public transportation stops/stations	Open Street Map (2020)
Financial Capital Indicators	
Individual/family median income	-
Energy consumption by population times income	IBGE (2011d)
House ownership rate	IBGE (2011d)
Average number of rooms per person	-
House expenditure/income rate	-
Social Capital Indicators	
Immigration states	-
Female/male employment rate	-
Unemployment rate	-
Proximity to crime scene	IPPUC (2012)
Proximity to the nearest council member's office	IPPUC (2019h)

Results

Natural Capital

Proximity to the nearest country parks and natural reserves (Biodiversity)



Proximity to the coastline



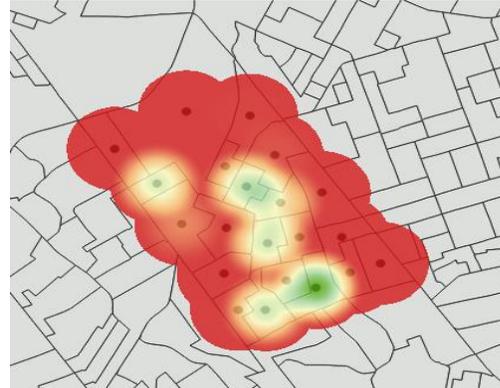
Motorway density (Air quality)



Proximity to solid waste recycling points



Green area ratio



Water quality of the nearest water monitoring point



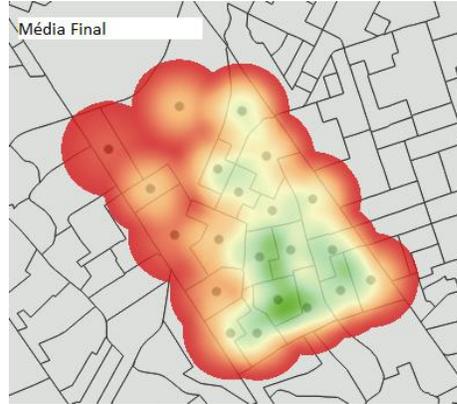
Results

Human Capital

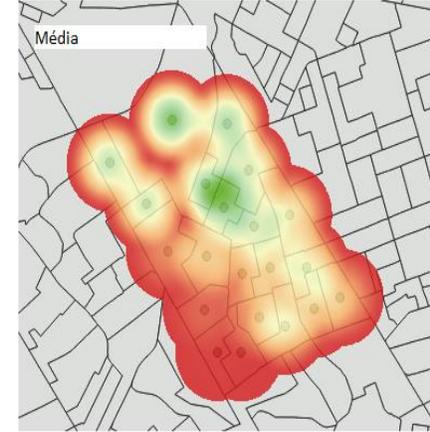
Ratio of the young and the prime of life



School score involving distance and quality

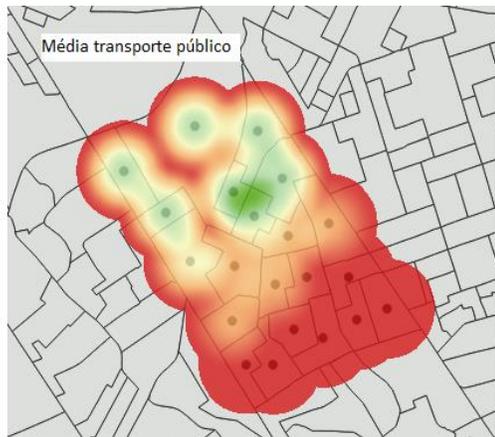


Health service score involving distance and quality



Manufactured Capital Indicators

Proximity to public transportation stops/stations



Proximity to licensed wet markets and supermarkets



Proximity to financial services



Results

Financial Capital

House ownership rate



Energy consumption by population times income



Social Capital

Proximity to the nearest council member's office

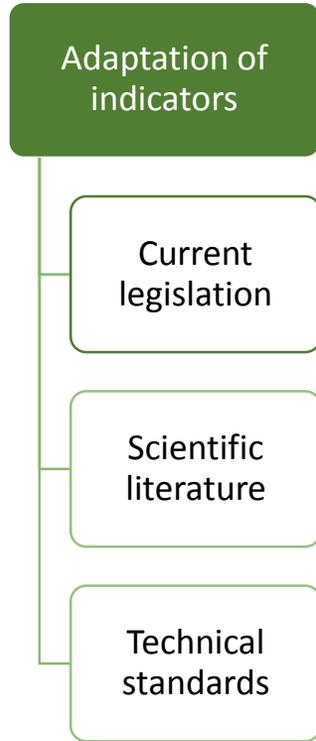


Proximity to crime scene



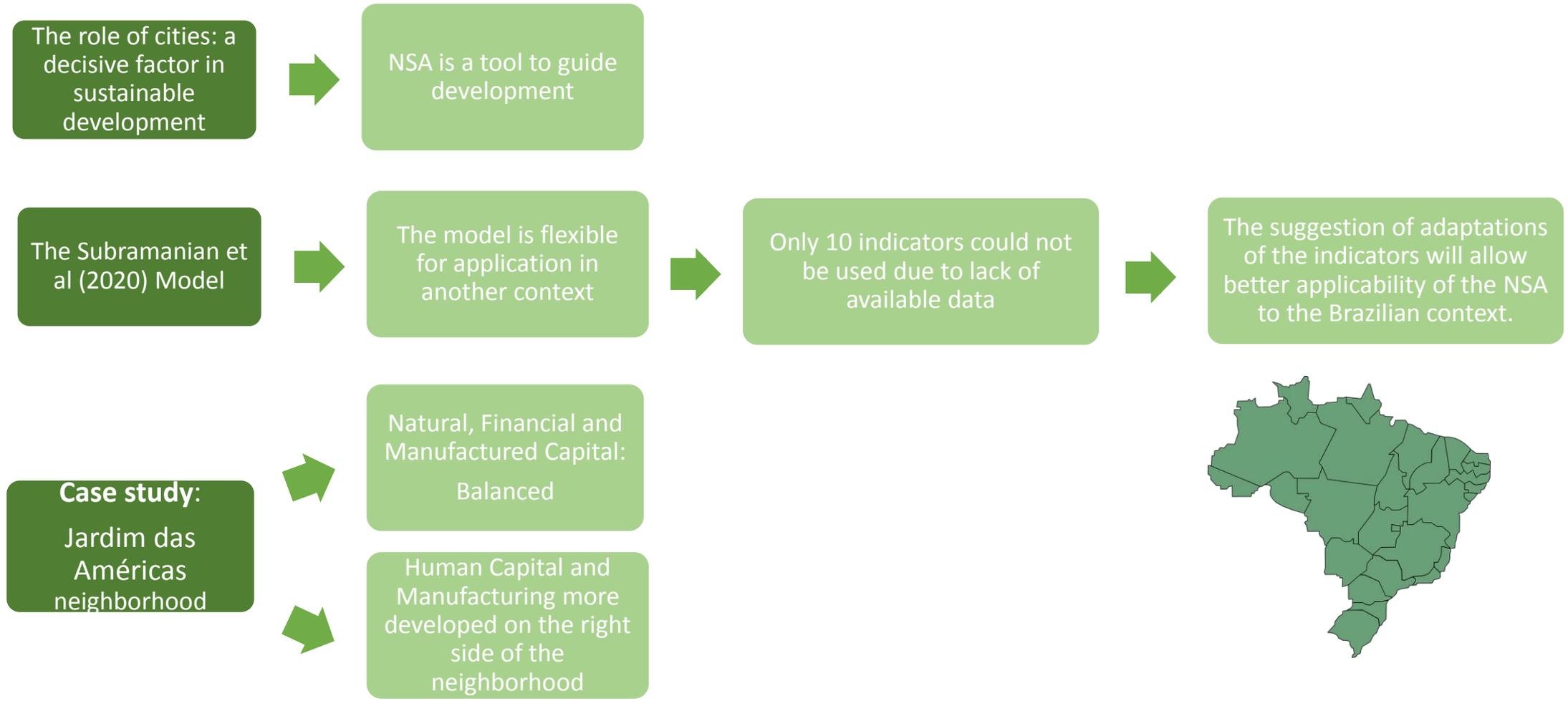
Results

- Indicator adaptation suggestion



Original indicator	New Indicator name	adaptation method
Pipe water quality: Water quality on the contamination with lead.	water supply	2 sub indicators: - Households supplied by the public network. - Households with another form of supply.
Noise pollution: noise pollution map	Noise pollution	Sound pressure levels according to municipal legislation, technical standards and urban zoning.
Post-secondary education rate	Literacy coefficient	Literacy coefficient
Occupational diversification: Standard deviation of the occurrence of work areas of the population divided between four groups of occupations.	Occupational diversification	Standard deviation of the occurrence of income of the population.
Average number of rooms per person	Proportion of adequate housing	Proportion of adequate housing
House expenditure/income rate: expenses with payment of mortgage or loan by family income.	House expenditure/income rate	comparison of people responsible for household income with positive income compared to the sector.

MAIN CONCLUSIONS



References

BERARDI, U. Beyond sustainability assessment systems: Upgrading topics by enlarging the scale of assessment. **International Journal of Sustainable Building Technology and Urban Development**, v. 2, n. 4, p. 276-282, 2011.

CHOGUILL, C. L. Developing sustainable neighbourhoods. **Habitat international**, v. 32, n. 1, p. 41-48, março, 2008.

FEIL, A. A.; SCHREIBER, D. Sustentabilidade e desenvolvimento sustentável: desvendando as sobreposições e alcances de seus significados. **Cadernos EBAPE.BR**, Rio de Janeiro, v. 15, n. 3, p. 667-681, set. 2017.

FORUM FOR THE FUTURE. **The five capitals model**, 2018. Disponível em: <https://www.forumforthe future.org/the-five-capitals>. Acessado em 30 julho 2020.

GIL, C. A. **Como elaborar projetos de pesquisa**; 4. ed. São Paulo: Editora Atlas, 2007.

GOOGLE MAPAS. Bairro Jardim das Américas em Curitiba, 2020. Disponível em: <https://goo.gl/maps/HkqtkDUzYWVU4bcf9>. Acesso em: 15 abril. 2020.

INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATISTICA (IBGE). **Relatório dos indicadores para os objetivos de desenvolvimento sustentável**. 2020. Disponível em: <https://odsbrasil.gov.br/relatorio/sintese>. Acessado em 30 julho 2020.

INSTITUTO DE PESQUISA E PLANEJAMENTO URBANO DE CURITIBA (IPPUC). **Mapa cartográfico Bairro Jardim das Américas**. Curitiba: IPPUC, 2017. 1 mapa. Escala 1:100

ORGANIZAÇÃO DAS NAÇÕES UNIDAS (ONU). **Transformando Nosso Mundo: A Agenda 2030 para o Desenvolvimento Sustentável**. 2015. Disponível em: <https://nacoesunidas.org/wp-content/uploads/2015/10/agenda2030-pt-br.pdf>. Acessado em: 15 junho 2020.

ROHE, W. M. From local to global: One hundred years of neighborhood planning. **Journal of the American Planning Association**, v. 75, n. 2, p. 209-230, 2009.

SACHS, I. Estratégias de transição para o século XXI. **Para pensar o desenvolvimento sustentável**. São Paulo: Brasiliense, p. 29-56, 1993.

SUBRAMANIAN, K.; CHOPRA, S.S.; CAKIN E.; LIU JR.; XU, ZZ., **Advancing Neighbourhood Sustainability Assessment by accounting for Sustainable Development Goals: A case study of Sha Tin neighbourhood in Hong Kong**. Sustainable Cities and Society, 2020. No prelo.

SHARIFI, A.; MURAYAMA, A. Neighborhood sustainability assessment in action: Cross-evaluation of three assessment systems and their cases from the US, the UK, and Japan. **Building and Environment**, v. 72, p. 243-258, 2014.

CONTACT DETAILS OF THE AUTHORS

Roberto T. Chimanski

Federal University of Parana
– Curitiba, Brazil

E-mail:
rtchimanski@gmail.com

Marcell. M. C. Maceno

Federal University of Parana
– Curitiba, Brazil

E-mail:
marcell.maceno@gmail.com;

Shauhrat S. Chopra

City University of Hong Kong
- Hong Kong, China.

E-mail:
sschopra@cityu.edu.hk