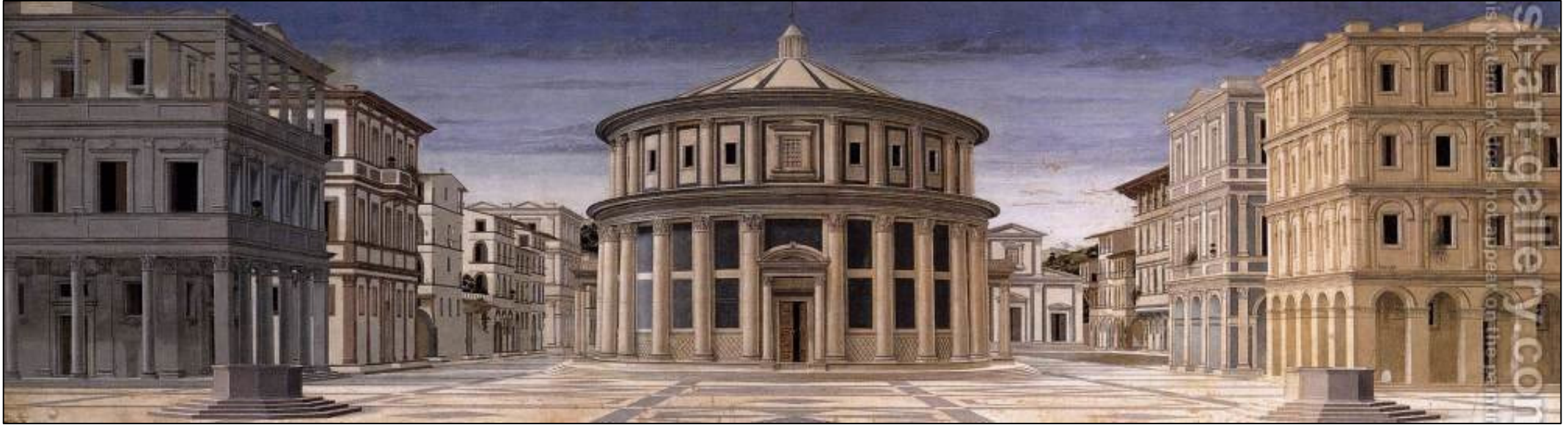


# Sharing Smart Cities (SSC) Symposium – Switzerland



## HEALTHCARE ECOSYSTEMS AND HUMAN WELLBEING

Luis Salvador-Carulla

*[luis.salvador-Carulla@anu.edu.au](mailto:luis.salvador-Carulla@anu.edu.au)*



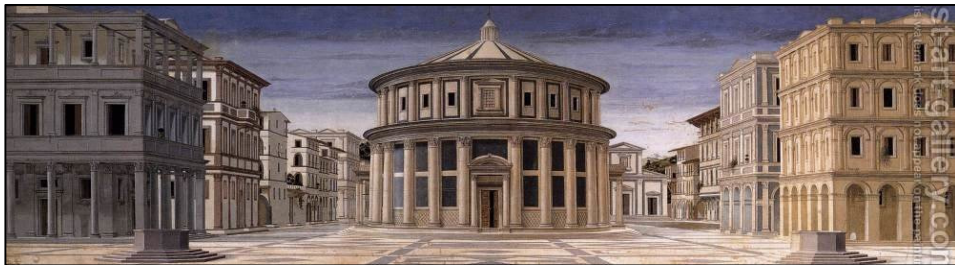






# The Smart City

- **What makes a city smart?**
- **What is Wellbeing?**
- **What is a healthcare ecosystem?**



# The Smart City

- 2007: 1<sup>st</sup> year when more people lived in cities than in the country
- 2019: 1.3 million people move to cities each week –65% of the world's population will live in cities by 2040.
- 600 biggest urban areas already account for 60% of global GDP - up to 80% of future economic growth in developing regions will occur in cities alone.
- As cities become an even more important driver of the global economy and wealth, it's becoming crucial to ensure that they are optimized to maximize efficiency and sustainability, while enhancing the quality of life in each urban conglomeration.
  - How technology can be applied in urban settings to facilitate cities that work better for their citizens?



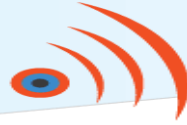
# SMART CITIES

DRIVEN BY:

Sensors



Networks



Engagement

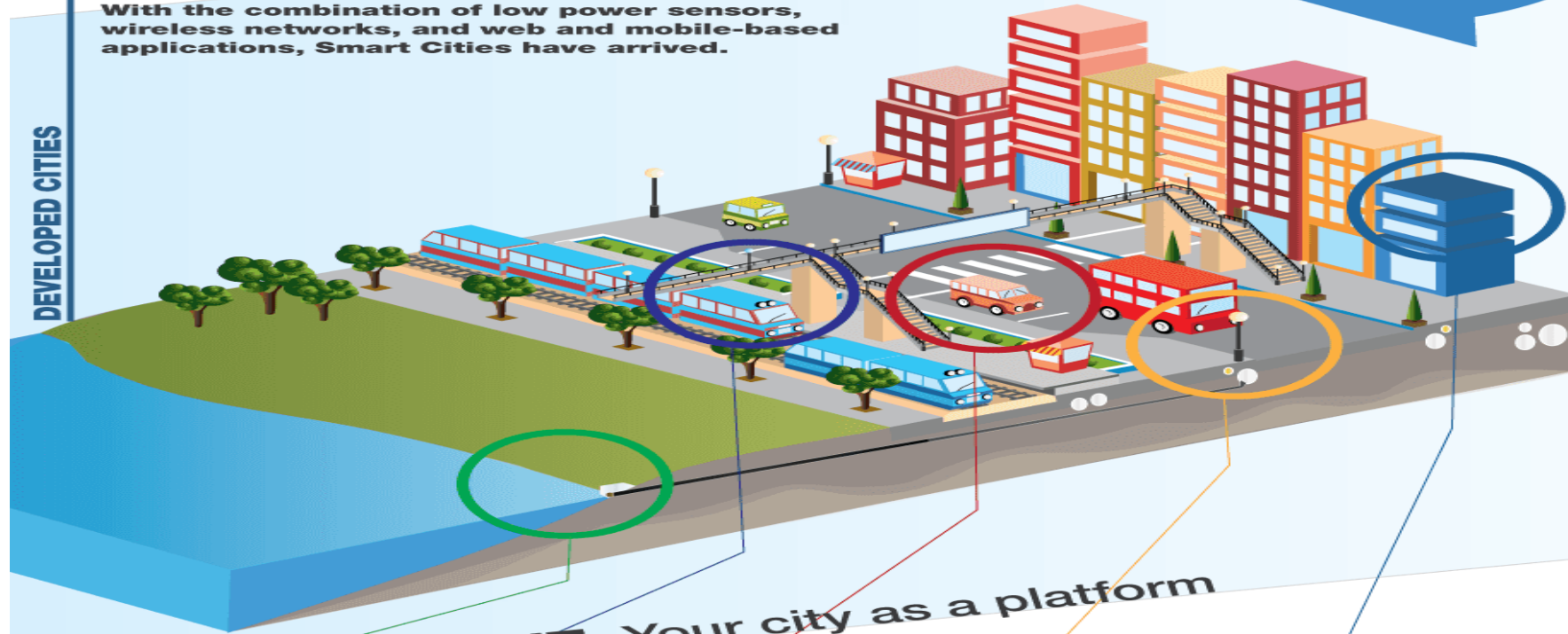


RESULTING IN:

## REAL-TIME URBAN INFORMATICS

With the combination of low power sensors, wireless networks, and web and mobile-based applications, Smart Cities have arrived.

DEVELOPED CITIES



MEASUREMENT: Your city as a platform

ENVIRONMENT

SAFETY

TRANSPORATION

UTILITES

BUILDINGS

# Smart specialisation strategies in the European Union

Place-based approach to regional and urban development, identification of strategic areas for intervention based both on the analysis of the strengths and potential of the economy and on an **Entrepreneurial Discovery Process (EDP)** with wide stakeholder involvement. It is outward-looking and embraces a broad view of innovation including technology-driven approaches, supported by effective monitoring mechanisms.



## ▶ SMART

Identify the region's own strengths and comparative assets



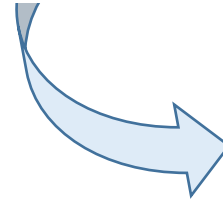
## ▶ SPECIALISED

Prioritise research and innovation investment in competitive area



## ▶ STRATEGIC

Define a shared vision for regional innovation



### Key components:

I. Smart economy

II. **Smart living**

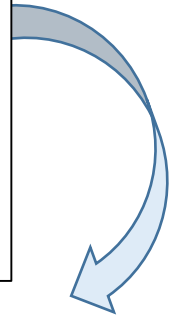
*optimal health & safety*

III. Smart environment

IV. Smart people

V. Smart mobility

VI. Smart Governance



## KEY FIGURES

- ▶ **Over 120 smart specialisation strategies** have been developed
- ▶ **Over EUR 67 billion** available to support these strategies, under the European Structural and Investment Funds and national / regional funding.
- ▶ Expected achievements by 2020: to bring **15.000 new products** to market, create **140.000 new start-ups** and **350.000 new jobs**.

### S3 monitoring system in healthcare:

- I. Output indicators (direct products of the policy interventions),
- II. Result indicators (socio-economic effects in the target groups),
- III. The explicit articulation of indicators by priority areas
- IV. The logical link between indicators and the expected changes and objectives they will contribute to.



# What is Wellbeing?

Eur. J. Psychiat. Vol. 28, N.º 1, (55-70)  
2014

Keywords: Happiness; Quality of Life; Wellbeing;  
Functioning; Health terminology; Nomenclature.

Use of the terms “Wellbeing” and “Quality of Life”  
in health sciences: A conceptual framework

Luis Salvador-Carulla\*,\*\*

## MODELS OF WELLBEING AND QUALITY OF LIFE

- Objective approaches to Wellbeing (HDI, SPI)
- WHO approach to HrWB
- Expanded Subjective approaches to Wellbeing
  - Psychobiological models of QoL/Wellbeing
  - Psychosocial – cultural models of QoL and Wellbeing
  - Person-centered approach to the “Health Experience”
- Economic-expanded models (beyond GDP)

# WORLD HEALTH ORGANISATION

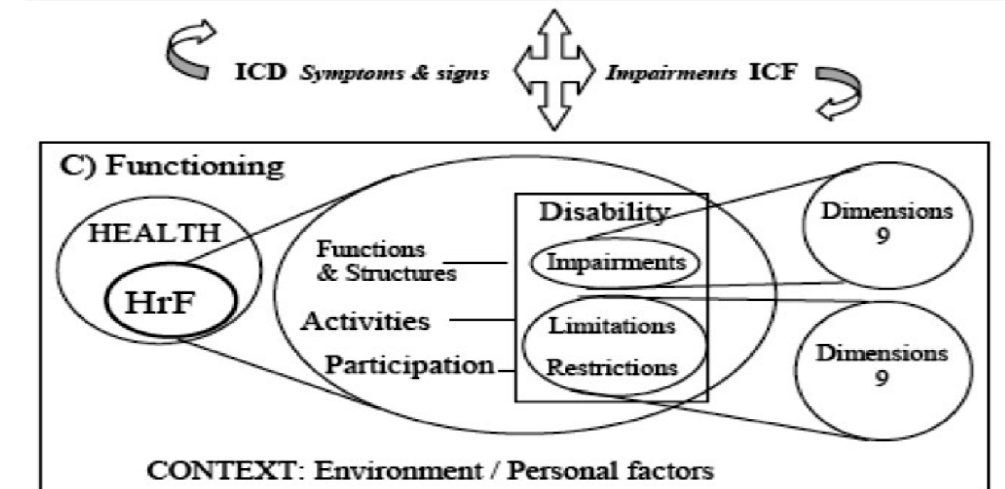
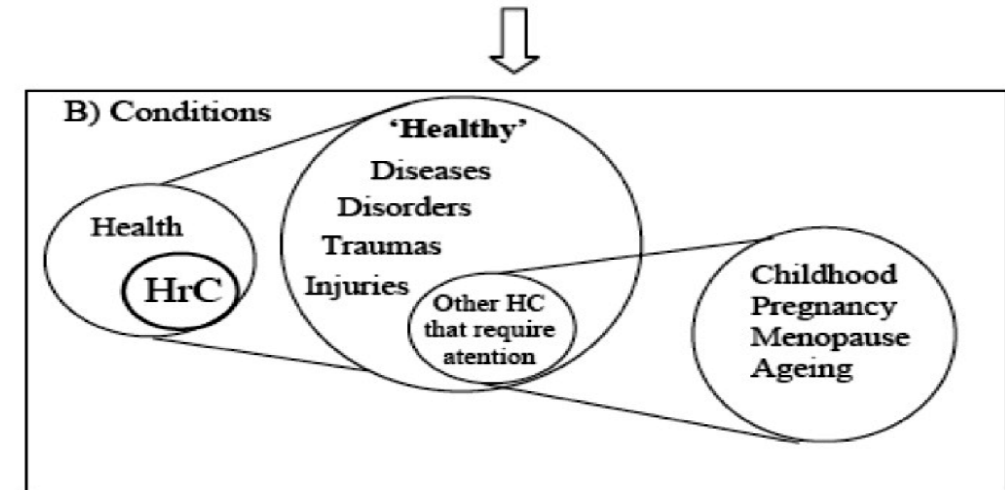
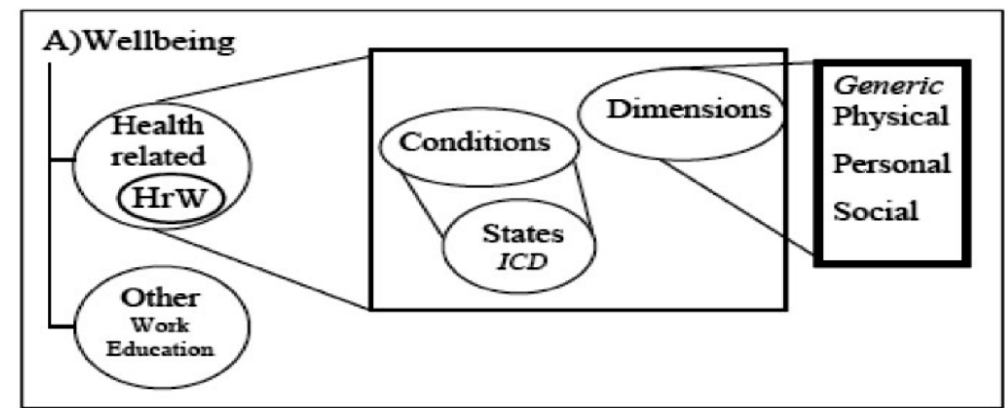
## Conceptual map

**WELLBEING:** Physical, personal, social  
(tangible/objective vs subjective-QoL)

- A) Health related Wellbeing (HrW),
- B) Health related Conditions (HrC) and
- C) Health-related Functioning (HrF) and disability

Includes several perspectives from WHO:

- Health promotion,
- Health-related Quality of Life,
- Health-related functioning





DIMENSIONS

**Long and healthy life**

**Knowledge**

**A decent standard of living**

INDICATORS

Life expectancy at birth

Expected years  
of schooling

Mean years  
of schooling

GNI per capita (PPP \$)

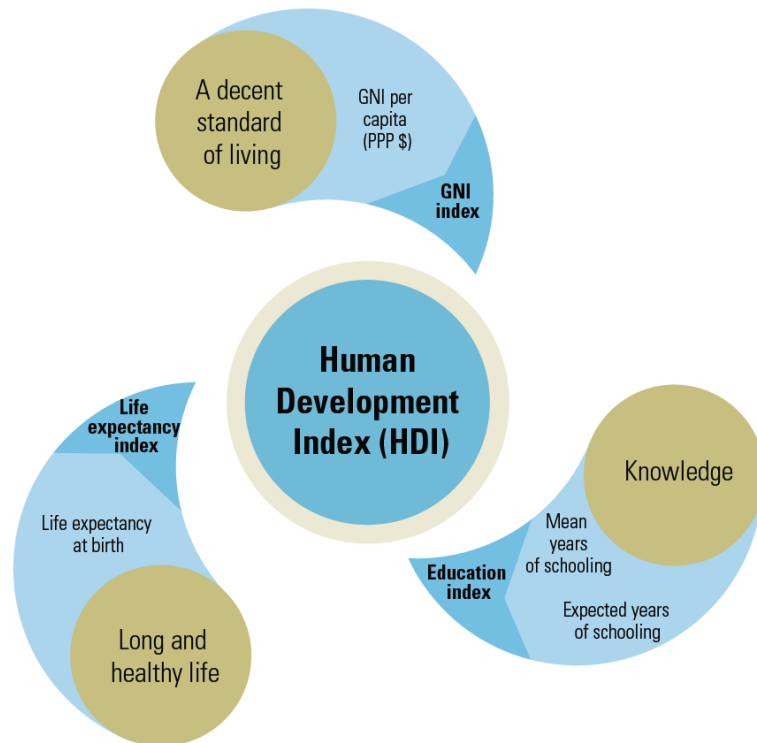
DIMENSION  
INDEX

Life expectancy index

Education index

GNI index

**Human Development Index (HDI)**



**Enhanced  
capabilities**

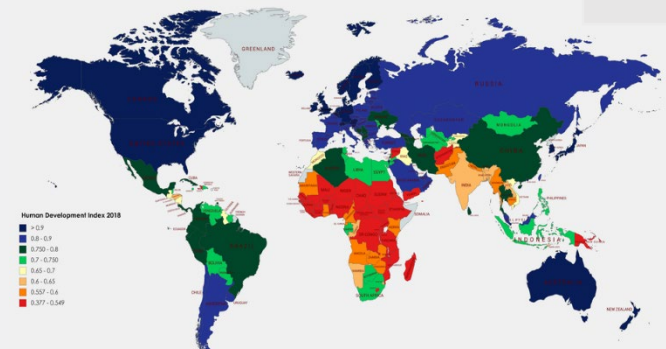
**Examples of achievements**

- Access to quality health at all levels
- High-quality education at all levels
- Effective access to present-day technologies
- Resilience to unknown new shocks

**Basic  
capabilities**

**Examples of achievements**

- Early childhood survival
- Primary education
- Entry-level technology
- Resilience to recurrent shocks



## Social Progress Index Complete Framework

### Basic Human Needs

#### Nutrition and Basic Medical Care

- Undernourishment
- Depth of food deficit
- Maternal mortality rate
- Child mortality rate
- Deaths from infectious diseases

#### Water and Sanitation

- Access to piped water
- Rural access to improved water source
- Access to improved sanitation facilities

#### Shelter

- Availability of affordable housing
- Access to electricity
- Quality of electric supply
- Household air pollution attributable deaths

#### Personal Safety

- Homicide rate
- Level of violent crime
- Perceived criminality
- Political terror
- Traffic deaths

### Foundations of Wellbeing

#### Access to Basic Knowledge

- Adult literacy rate
- Primary school enrollment
- Lower secondary school enrollment
- Upper secondary school enrollment
- Gender parity in secondary enrollment

#### Access to Information and Communications

- Mobile telephone subscriptions
- Internet users
- Press Freedom Index

#### Health and Wellness

- Life expectancy at 60
- Premature deaths from non-communicable diseases
- Obesity rate
- Suicide rate

#### Environmental Quality

- Outdoor air pollution attributable deaths
- Wastewater treatment
- Greenhouse gas emissions
- Biodiversity and habitat

### Opportunity

#### Personal Rights

- Political rights
- Freedom of speech
- Freedom of assembly/association
- Freedom of movement
- Private property rights

#### Personal Freedom and Choice

- Freedom over life choices
- Freedom of religion
- Early marriage
- Satisfied demand for contraception
- Corruption

#### Tolerance and Inclusion

- Tolerance for immigrants
- Tolerance for homosexuals
- Discrimination and violence against minorities
- Religious tolerance
- Community safety net

#### Access to Advanced Education

- Years of tertiary schooling
- Women's average years in school
- Inequality in the attainment of education
- Globally ranked universities
- Percentage of tertiary students enrolled in globally ranked universities



#socialprogre



## Eudaimonic well-being terms

- ✓ Self acceptance
- ✓ Environmental mastery
- ✓ Positive relationships
- ✓ Personal growth
- ✓ Purpose in life
- ✓ Autonomy

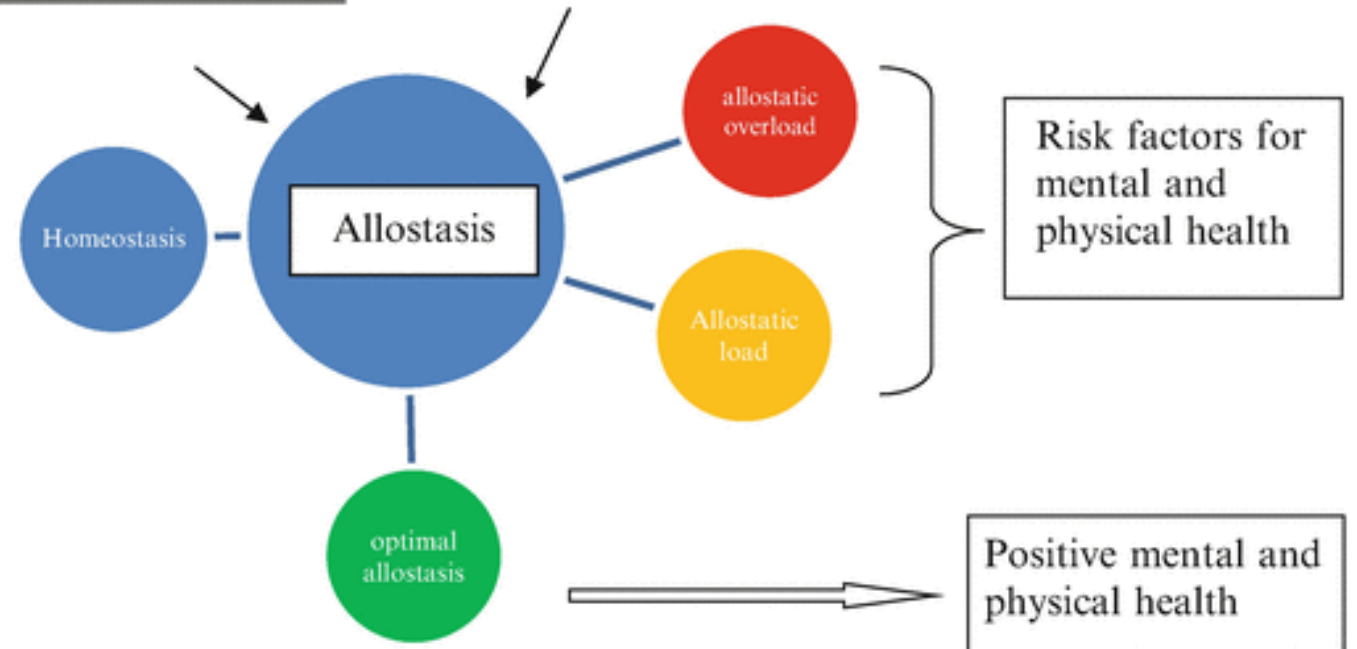
## Hedonic well-being terms

- ✓ Happiness
- ✓ Subjective well-being
- ✓ Positive emotions



Stressors, challenges from  
external world

Individual resources,  
interests, skills



**Expanded Subjective Approaches  
Psychobiology  
QoL and Wellbeing (Ryff, 2014)**

**EXPANDED SUBJECTIVE  
APPROACHES**

**PSYCHOSOCIAL  
QoL Domains**

“A multidimensional phenomenon composed of core domains that constitute personal well-being. These domains are influenced by personal characteristics and environmental factors”

Schalock et al 2016

Domain	Literature-based indicators
Emotional well-being	Contentment, self-concept, and lack of stress
Interpersonal relations	Interactions, relationships, and supports
Material well-being	Financial status, employment, and housing
Personal development	Education, personal competence, and performance
Physical well-being	Health and health care, activities of daily living, and leisure
Self-determination	Autonomy/personal control, goals and personal values, and choices
Social inclusion	Community integrations and participation, community roles, and social supports
Rights	Human (respect, dignity, equality) and legal

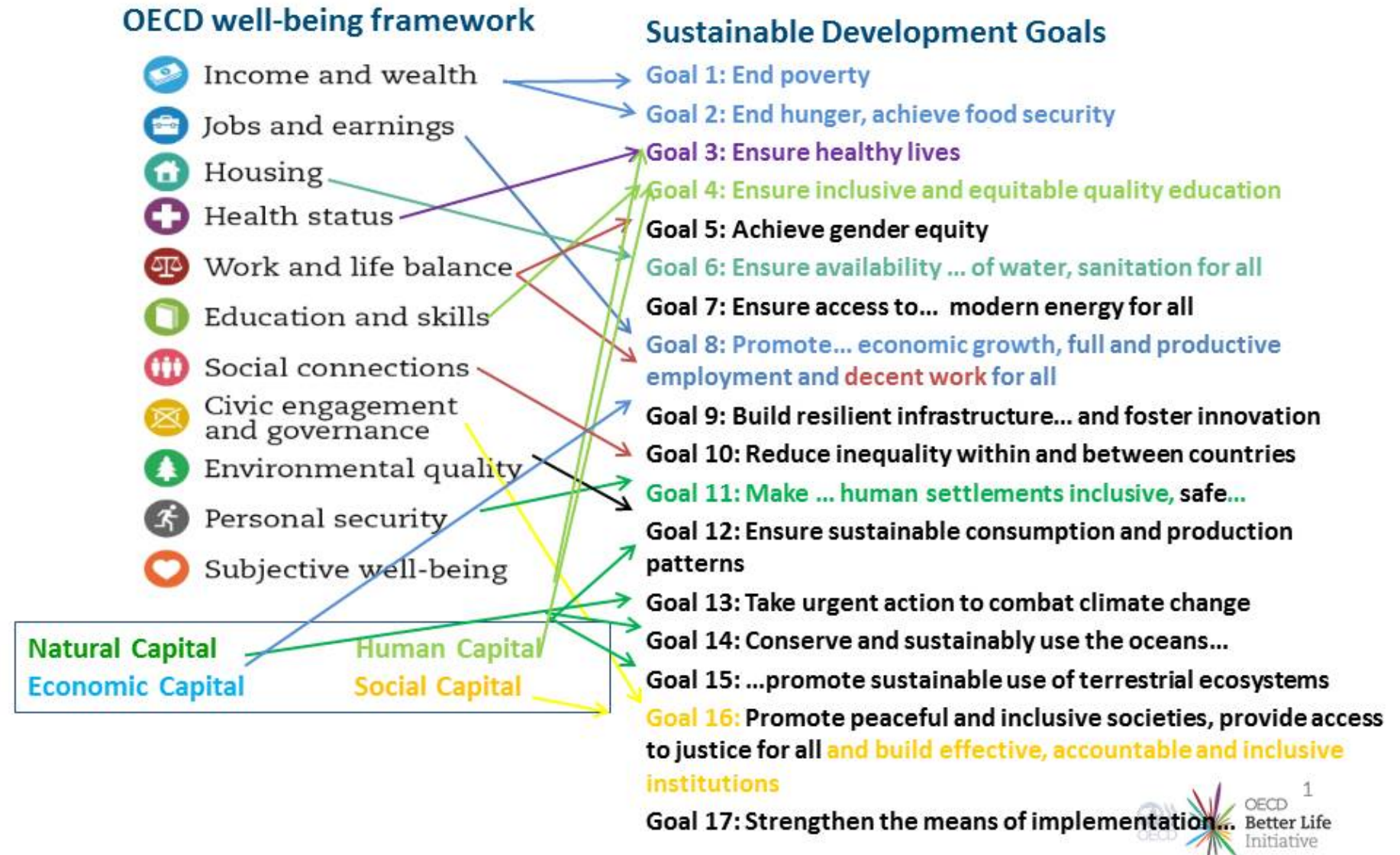
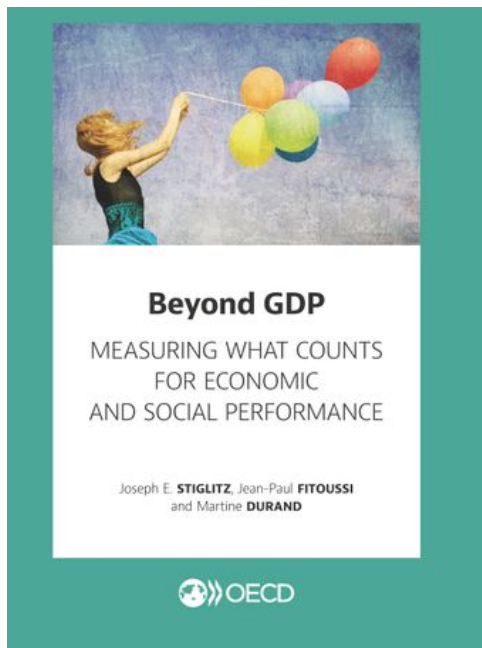


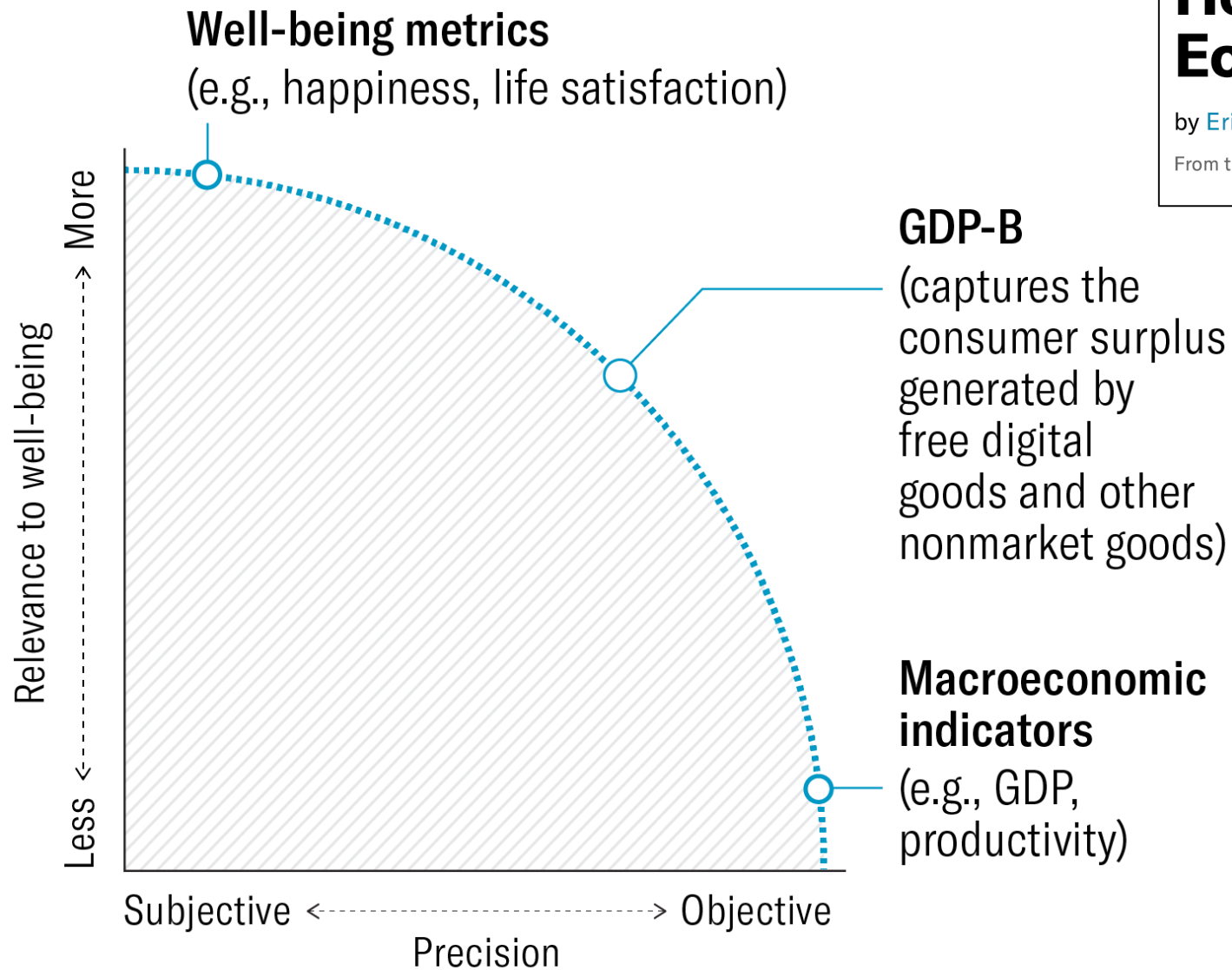
Person-centred  
Integrative  
approach

ILL HEALTH	POSITIVE HEALTH
I. HEALTH STATUS	
Illness & its Burden	Well Being
a. Disorders	Recovery/Wellness
b. Disabilities	Functioning
II. EXPERIENCE OF HEALTH	
Experience of Illness	Experience of Health
(e.g. suffering, values, understanding and meaning of illness)	(e.g. self-awareness, resilience, fulfillment )
III. CONTRIBUTORS TO HEALTH	
Contributors to Illness	Contributors to Health
(intrinsic/extrinsic; biological, psychological, social)	(intrinsic/extrinsic; biological, psychological, social)

# OECD well-being indicators can make a direct contribution to SDG monitoring/assessment

## OECD Better Life Index



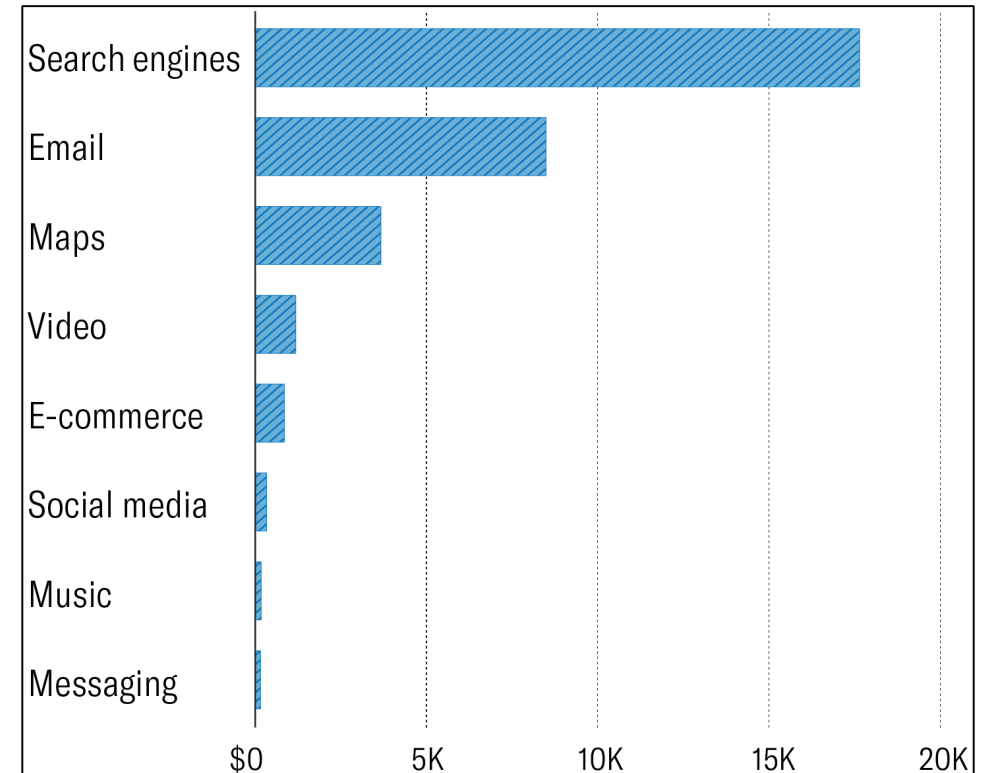


ECONOMY

# How Should We Measure the Digital Economy?

by Erik Brynjolfsson and Avinash Collis

From the November–December 2019 Issue



From: “How Should We Measure the Digital Economy?” by Erik Brynjolfsson and Avinash Collis, November–December 2019



From: “How Should We Measure the Digital Economy?” by Erik Brynjolfsson and Avinash Collis, November–December 2019





# Healthcare Ecosystem Research

- Part of Implementation Sciences that incorporates systems dynamics, context analysis, health economics & knowledge discovery from data.
- Facilitates analysis of environment and context, and its knowledge translation to policy, for decreasing research waste and to guide decision making in complex questions in health care.

## RESEARCH ARTICLE

Open Access

### Healthcare ecosystems research in mental health: a scoping review of methods to describe the context of local care delivery



Mary Anne Furst<sup>1\*</sup>, Coralie Gandré<sup>2,3,4</sup>, Cristina Romero López-Alberca<sup>5</sup> and Luis Salvador-Carulla<sup>1</sup>

BMC Health Services Research

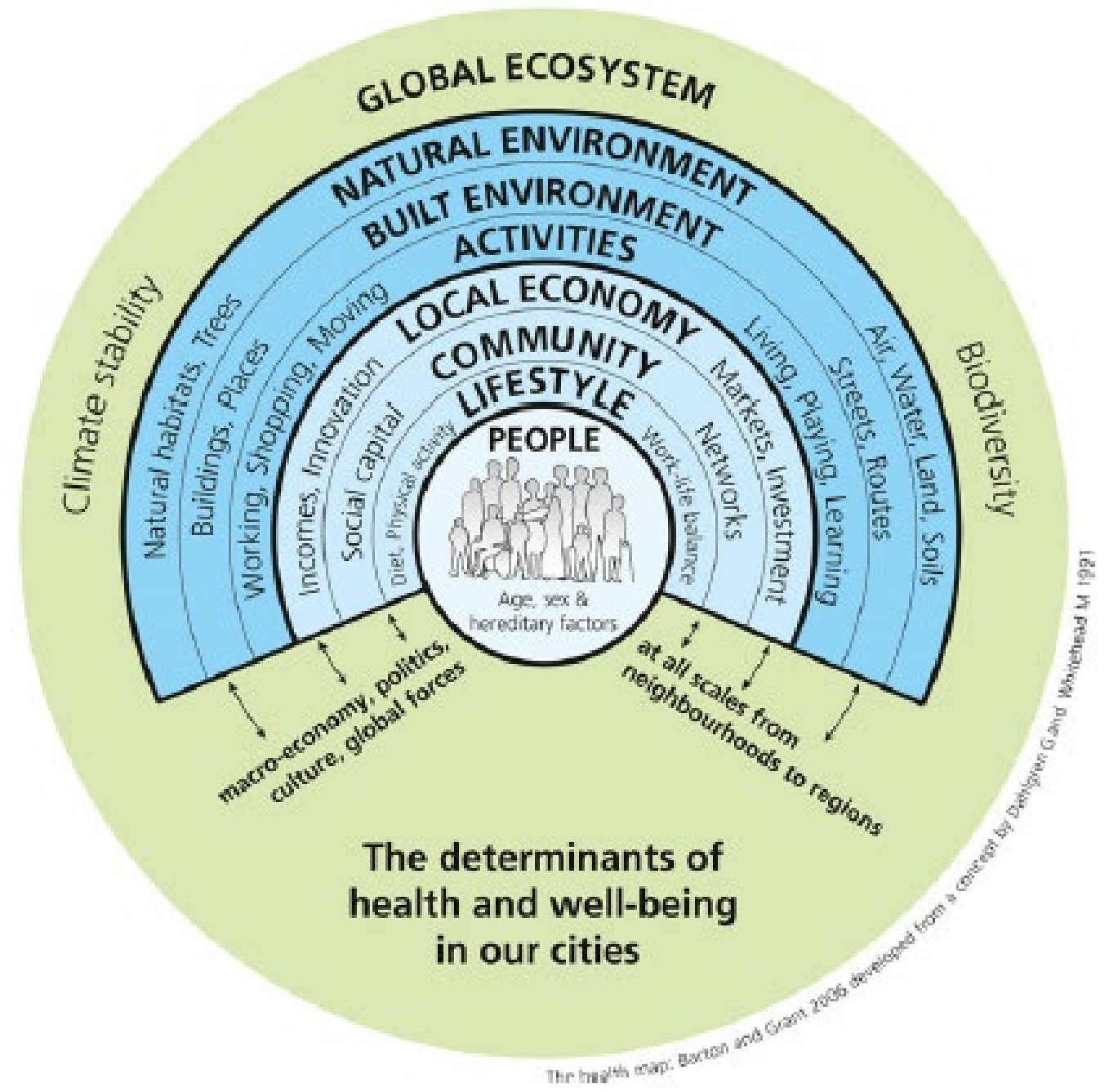
## CONTEXT

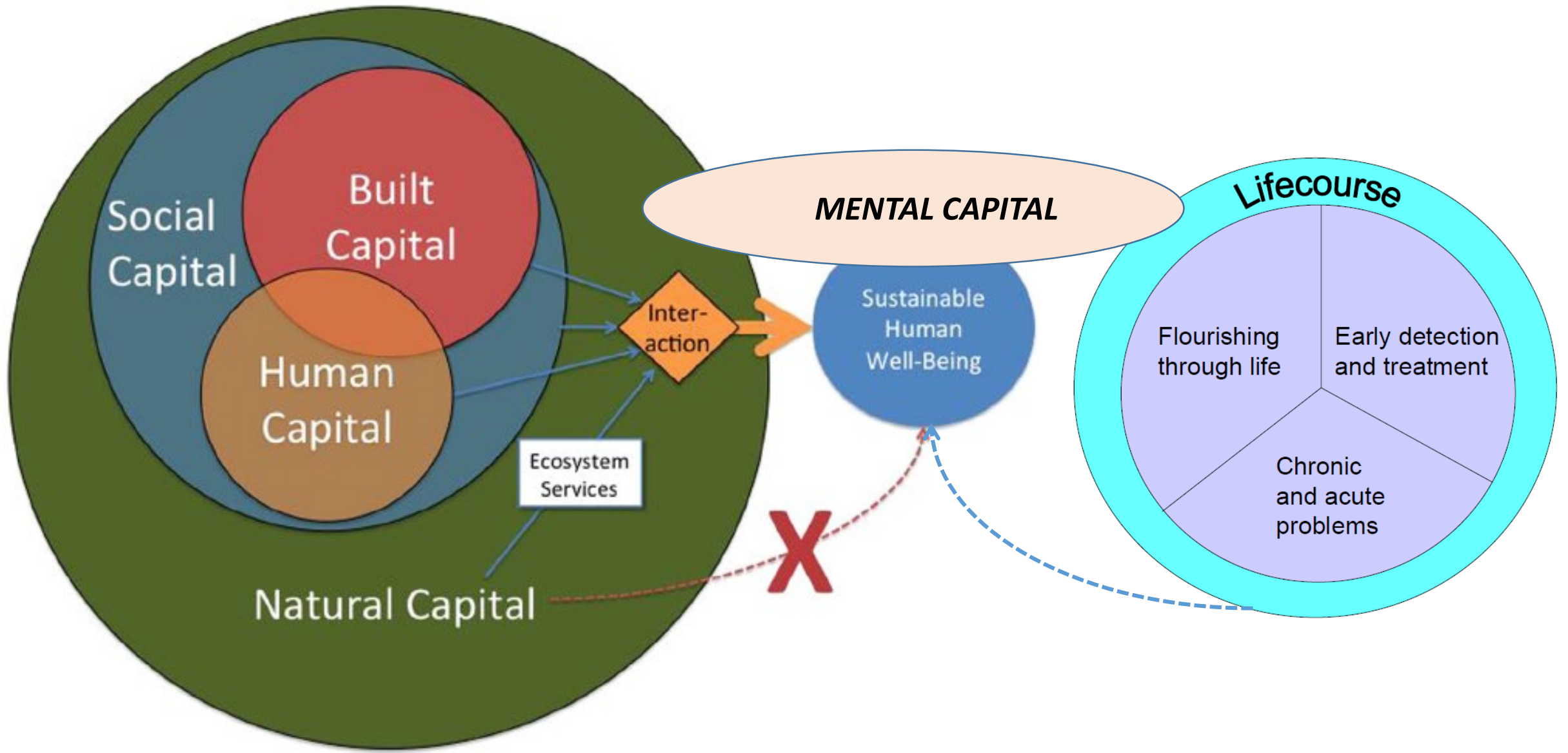
In health care it includes all sources of evidence of the local system: geography, social and demographic factors, other environmental factors, service availability, capacity, use and costs. It also includes legislation and expertise on the milieu (e.g., the historical account current state of the art)

## Urban Planning for Healthy Cities

Hugh Barton and Marcus Grant

- healthy lifestyles (especially regular exercise)
- social cohesion and supportive social networks
- access to good quality housing;
- access to employment opportunities;
- Access to good quality facilities  
(educational, cultural, leisure, retail and health care);
- local food production and outlets for  
healthy food
- safety and a sense of security;
- equity and the development of social capital;
- attractive environment with acceptable  
noise levels and good air quality;
- good water quality and healthy sanitation;
- conservation and quality of land and  
mineral resources; and
- Reducing emissions that threaten climate stability.

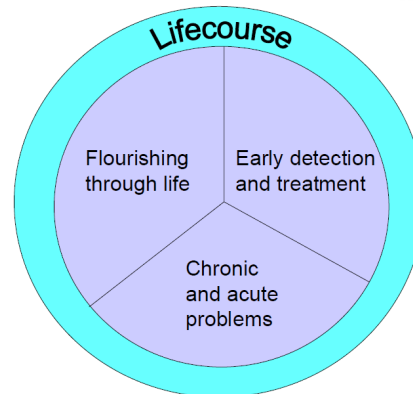
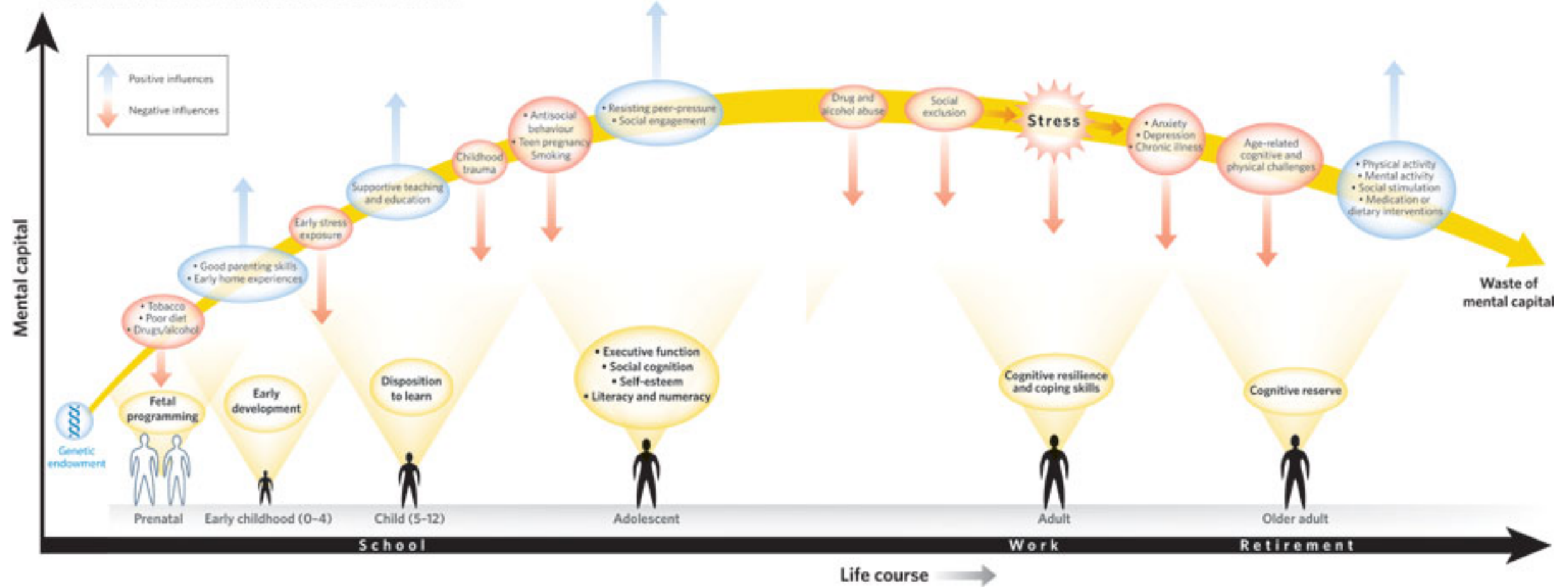




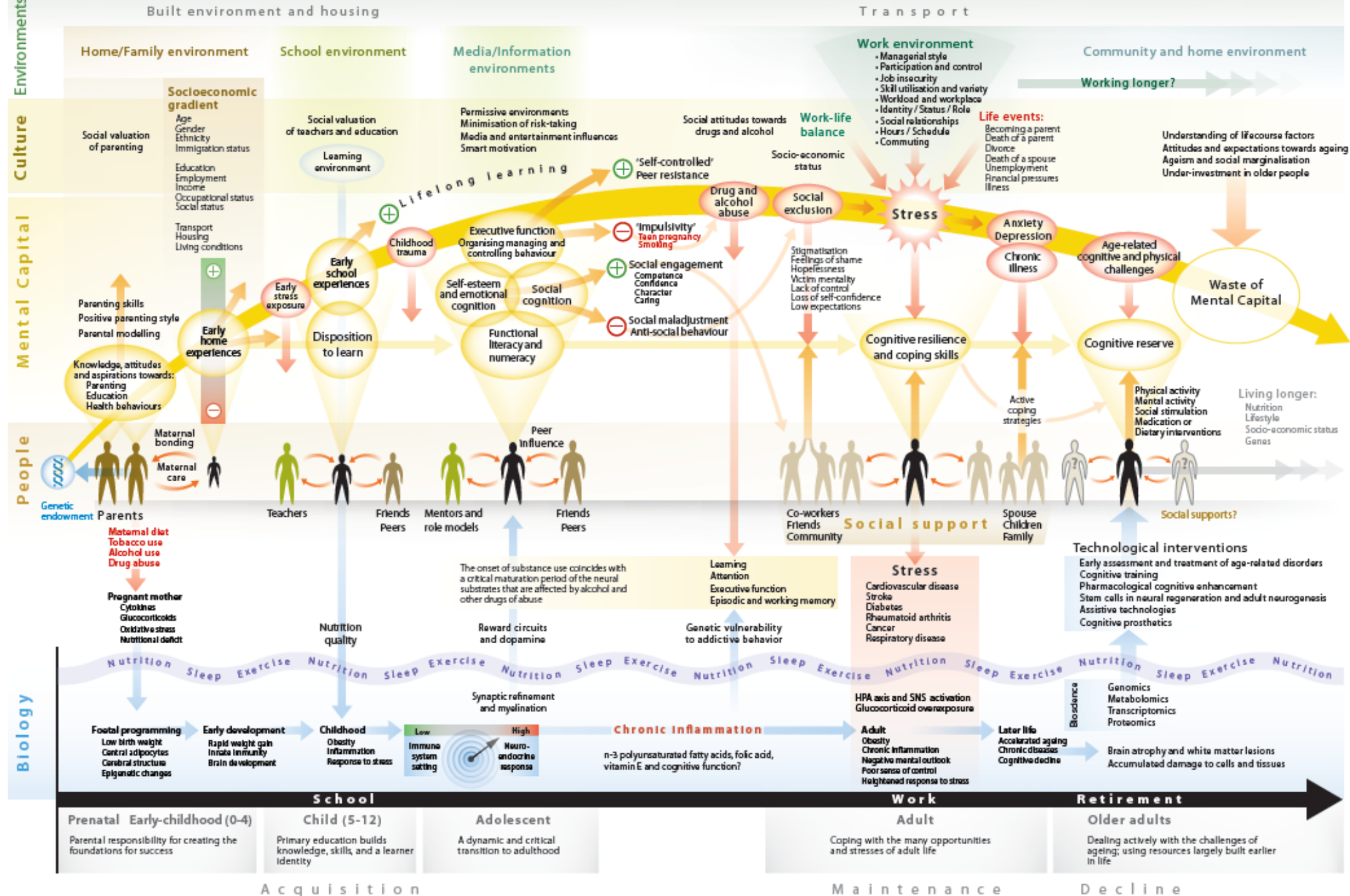
**Fig. 1.** The interaction between built, social, human and natural capital affects human wellbeing (Costanza et al., 2014b) (built capital and human capital (the economy) are embedded in society, which is embedded in the rest of nature. Ecosystem services are the relative contribution of natural capital to human wellbeing, they do not flow directly. It is therefore essential to adopt a broad, transdisciplinary perspective in order to address ecosystem services).



# MENTAL CAPITAL OVER THE COURSE OF LIFE



## Mental Capital



## Needed: Global Collaboration for Comparative Research on Cities and Health

Michael K. Gusmano<sup>1,2,3,4</sup>, Victor G. Rodwin<sup>2,3,4\*</sup>

Mental health and mental illness

A focus on population, not organisations

Prevention and community resilience

Awareness and mental health literacy, everybody's business

Role of employment, housing, leisure, built environment

Effectiveness & outcomes



- IIMHL has championed the issue of mental health in cities and urban areas
- We created the City and urban Regional CoLLaborative (I-CIRCLE) to share and learn about new ways to improve and promote the mental health of cities
- In September 2017, I-CIRCLE members met for a week, first in Philadelphia and then in New York City. We shared experiences, ideas and learning

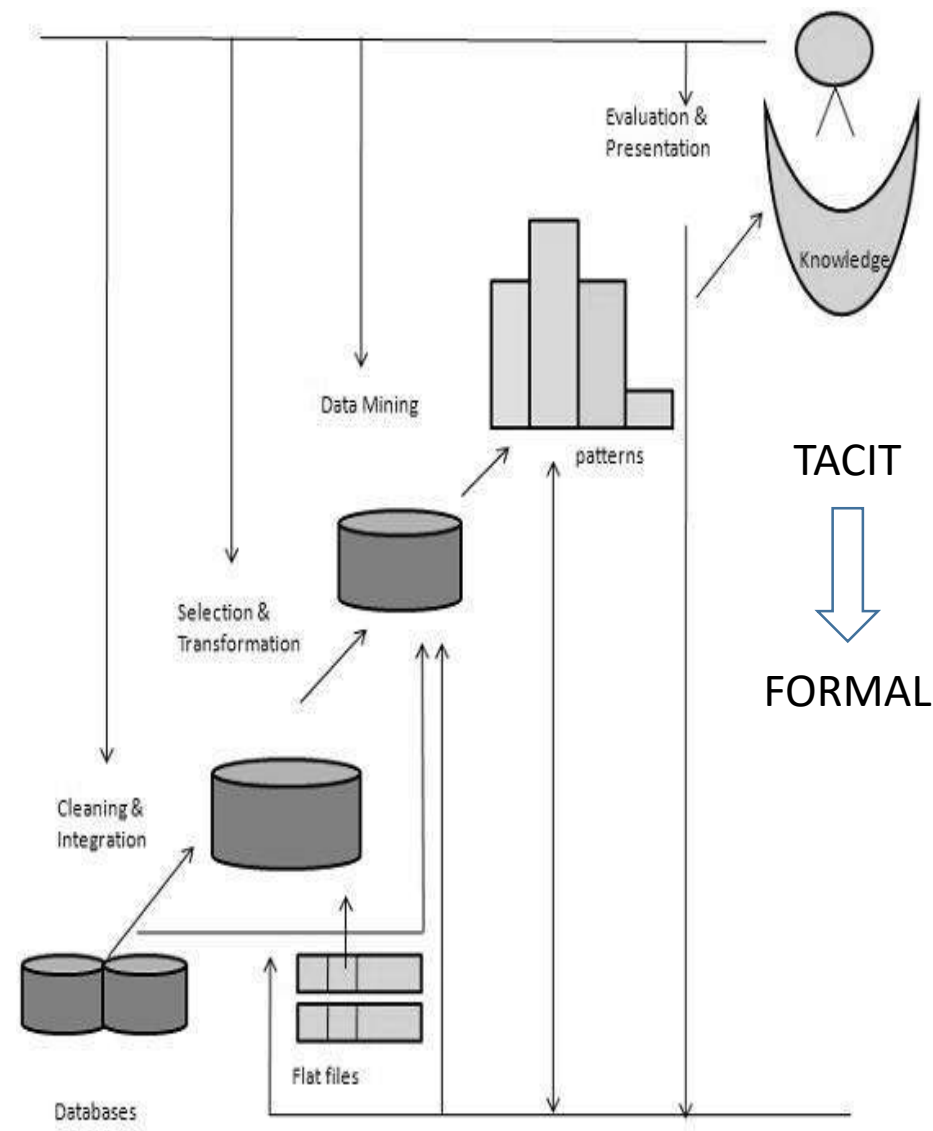
- **Thrive** Philadelphia, NYC, London, West Midlands, Bristol
- **citiesRISE** Chennai, Nairobi, Bogota, Sacramento, and Seattle
- **Mental Health Friendly Cities**



# What is a hospital?

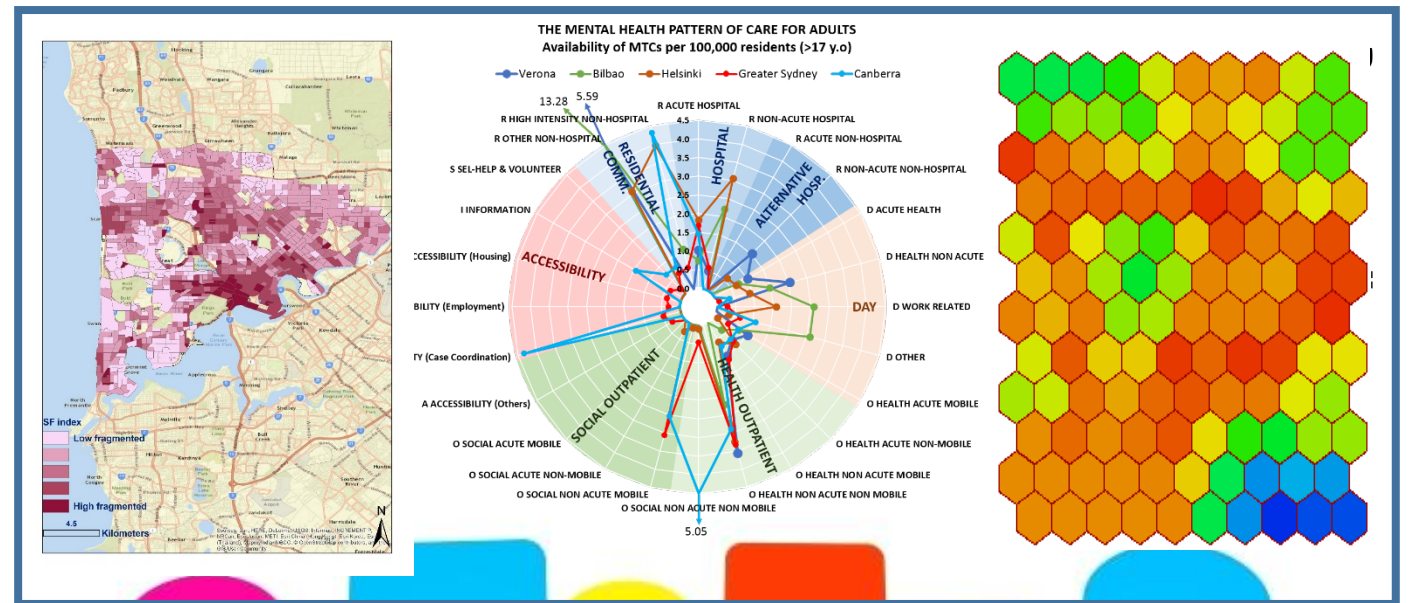






**DATA MINING**

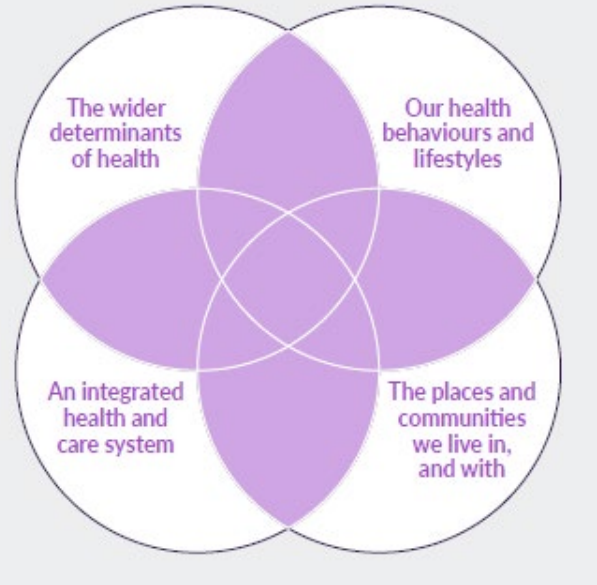
Preprocessing  
Midprocessing  
Postprocessing



**DECISION ANALYTICS**

*Domain  
Experts*

Knowledge discovery  
End-users  
Experiencers



# Complex health systems: TOOLS & ANALYTICAL TECH.

## Health ecosystems

Systems, subsystems,  
nested systems  
Boundaries and  
Population determinants

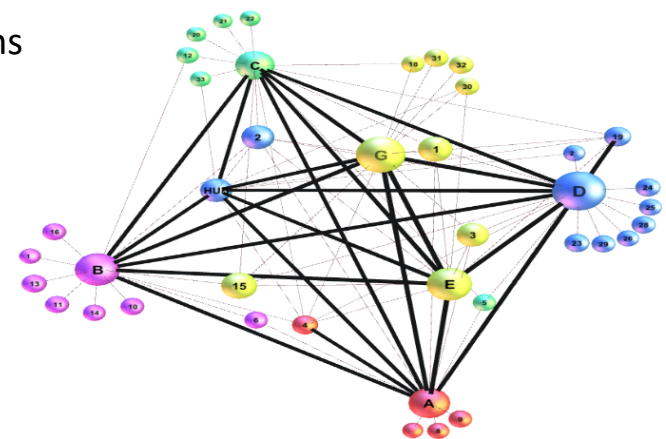
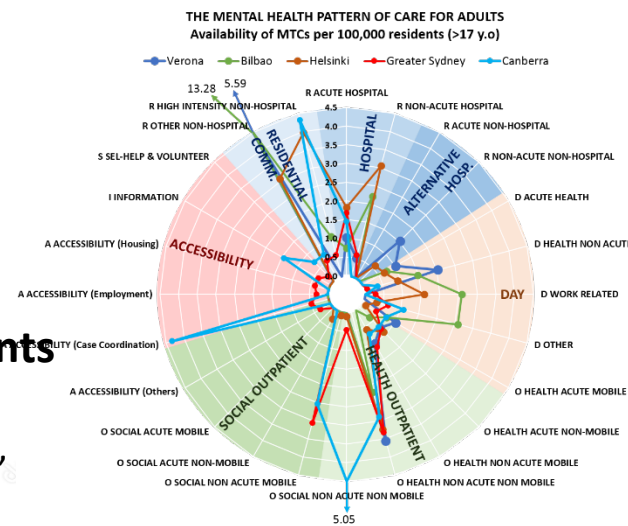
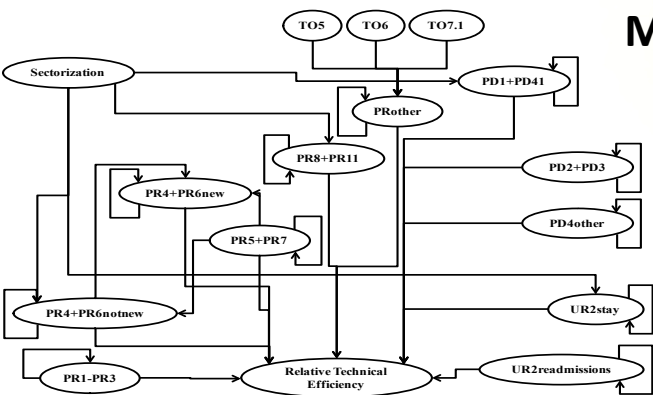
## LOCAL ATLAS OF CARE



## Target Agents

Consumers  
Professionals,  
Teams,  
Organisations

## Frameworks Models & Drivers



# International Use of ESMS/DESDE for coding & mapping MH care

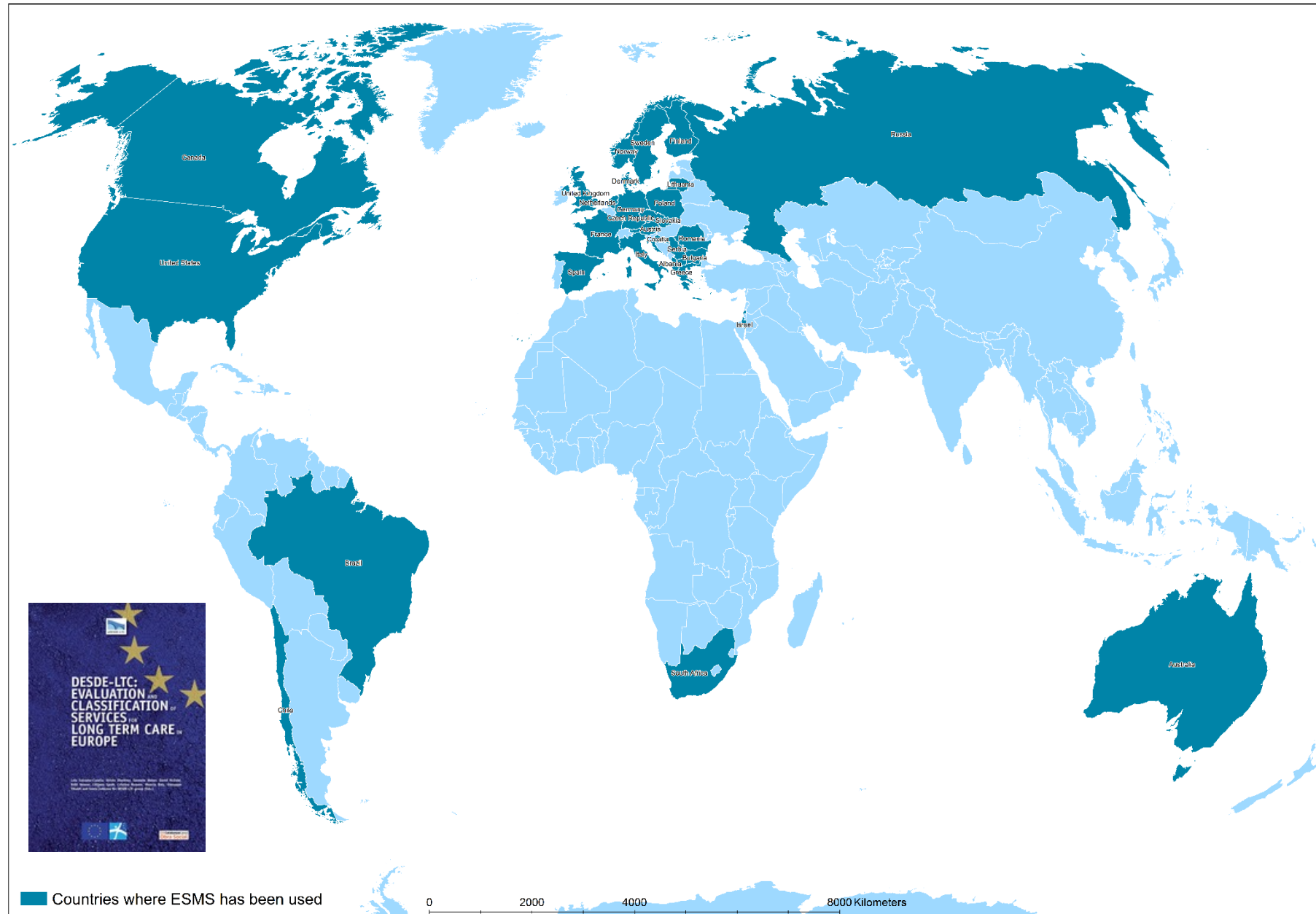
Ref. in 152 scientific papers

71 studies using ESMS/DESDE  
Since 2000

34 Countries

- *Service mapping*  
(Standardised description  
of services)
- *Costs*
- *Context analysis*
- *Models of care*
- *Analysis of  
interventions*
- *Analysis of MH care  
indicators*

Johnson et al, 2000

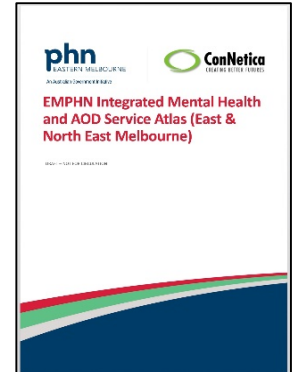
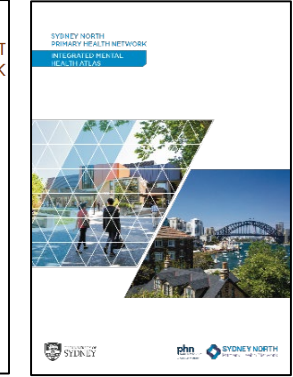
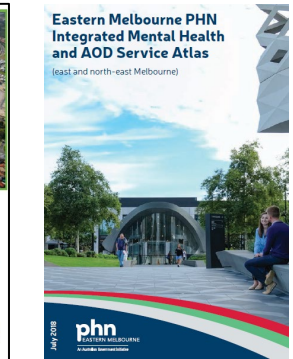
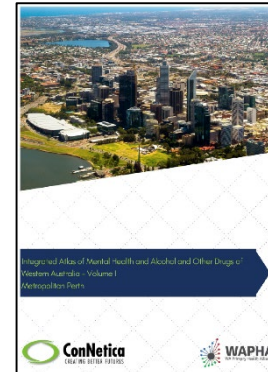
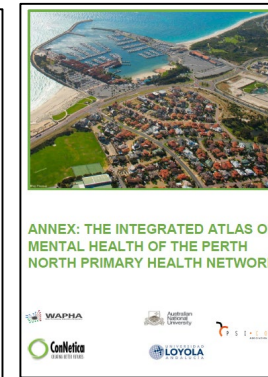
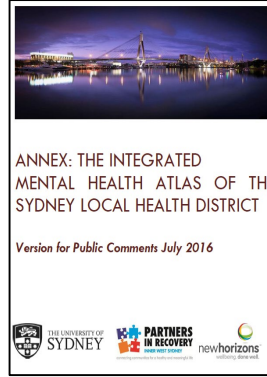
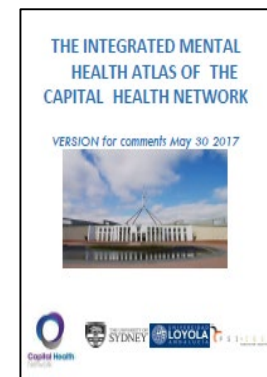
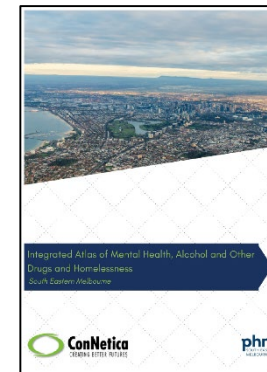
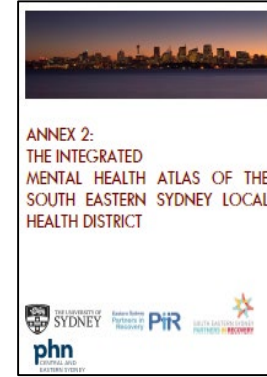
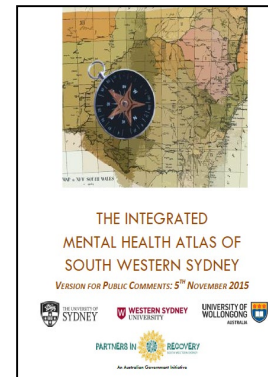
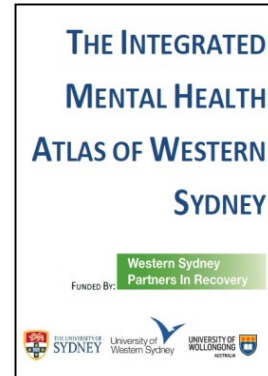
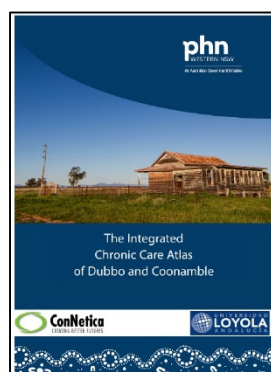
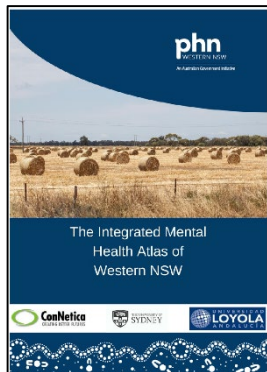
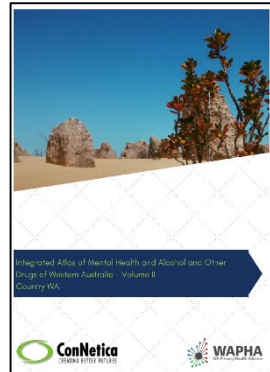
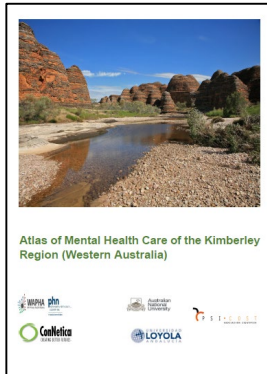
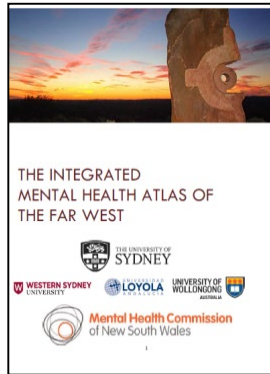




20 Atlases with Standardised description of services, permitting comparisons in 13 PHNs

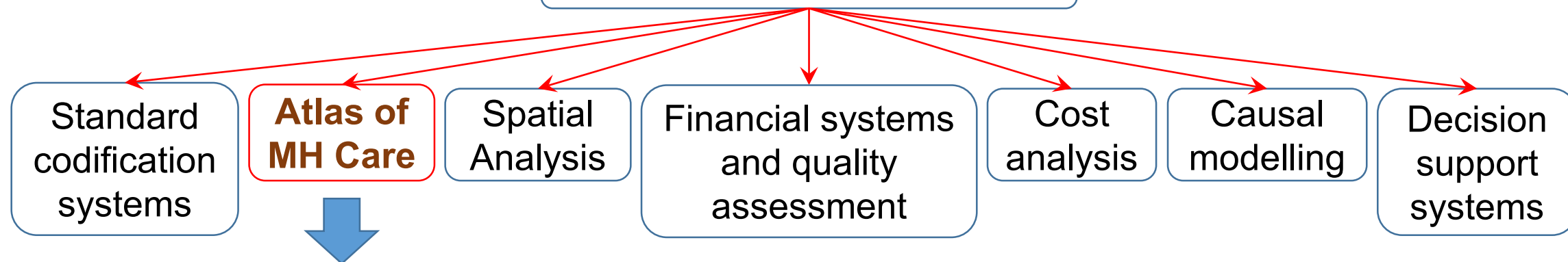
URBAN

RURAL





# Systems and Design Thinking

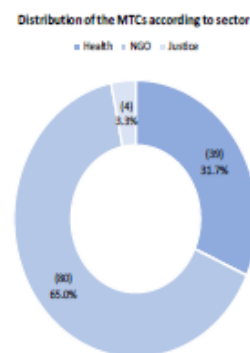
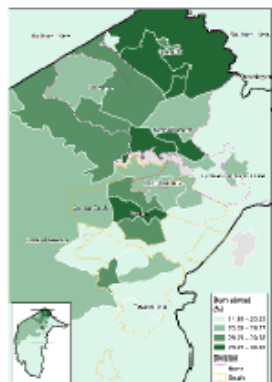
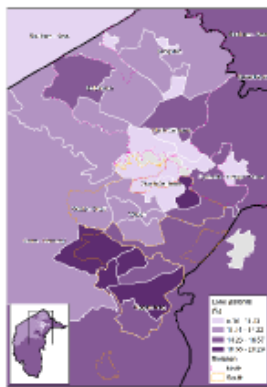


A comprehensive description and visualization of the structure and provision of care in specific geographical areas at national or regional levels.

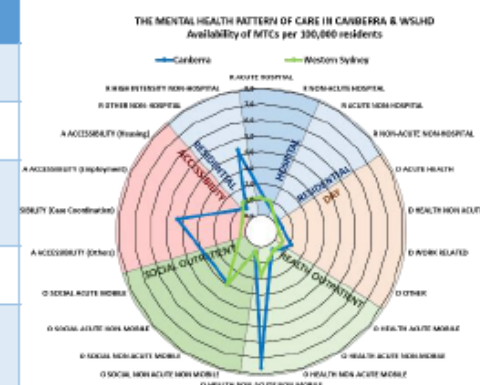
It gathers approximate knowledge on the system's context (its aim is comparative approximation not accuracy under conditions of uncertainty).

It provides a snapshot of the service availability, placement capacity, workforce (FTEs) and care for a define target population in a point of time, following a holistic/integrative approach.

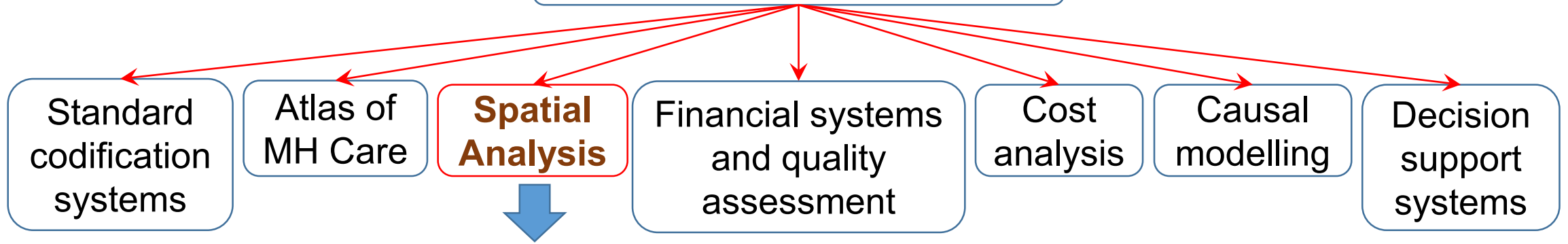
It uses a multilayered approach (eg services with Universal access, Fully private, Generic services)



Provider	Name	Main Desce Code	FT E	Town / Suburb	Area of Coverage
Capital Health Network PIR	PIR-CHN	GX[F00-F99]-A4.2v	12.0	Deakin	0
CatholicCare	PIR	AX[F00-F99]-A4.2.2	3.5	0	0
Northside Community Service	PIR	GX[F00-F99]-A4.2.2v	1.0	Dickson	ACT
Richmond fellowship ACT	PIR	AX[F00-F99]-A4.2v	2.0	Pialligo	ACT
Woden Community Service	PIR	AX[F00-F99]-O6.2v	2.0	Woden	Woden area



# Systems and Design Thinking

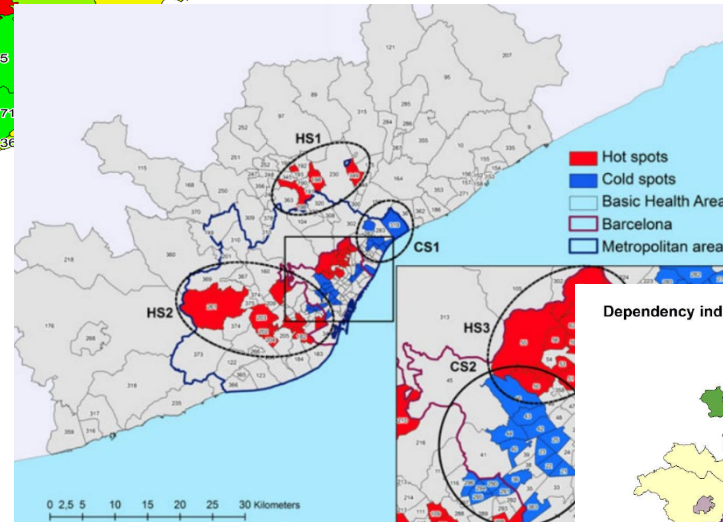
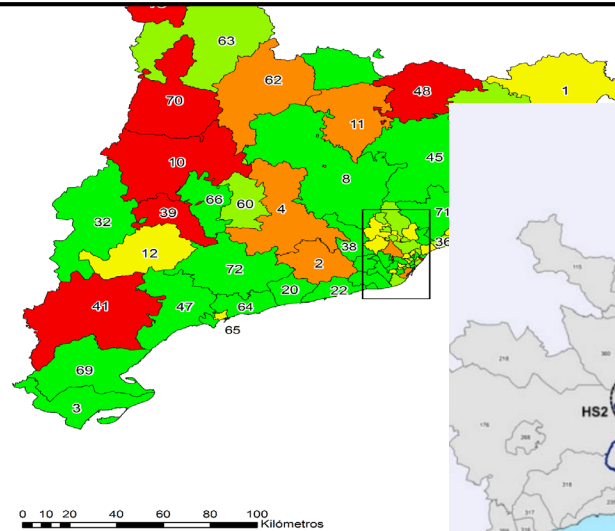


Determine the geographical distribution of Mental Health services, provision, illnesses, etc., hot and cold spots and its relation to socio-economic indicators.

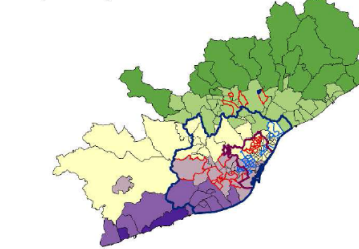
**Macro** (countries, regions, provinces, districts, cities)

**Meso** (small catchment areas)

**Micro** (individual services)

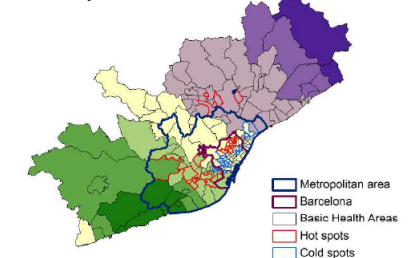


Dependency index



High economic condition rate

University studies rate



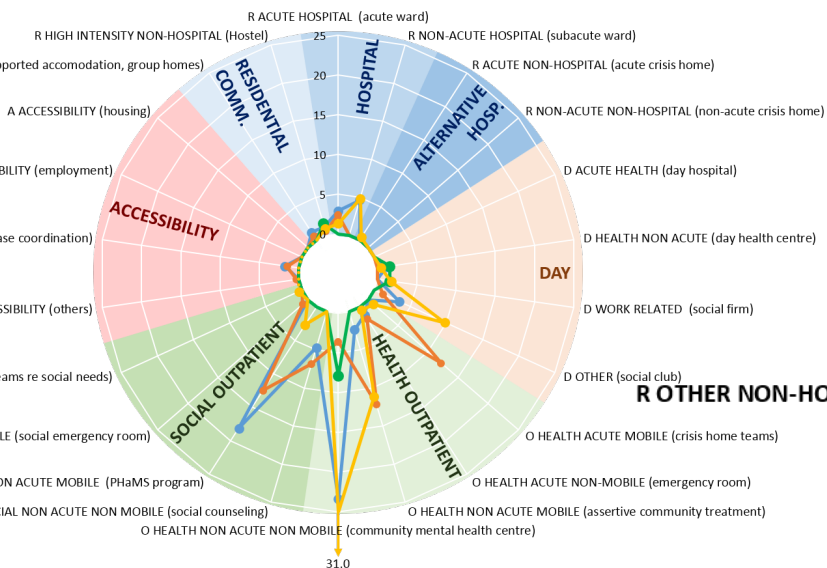
Population density







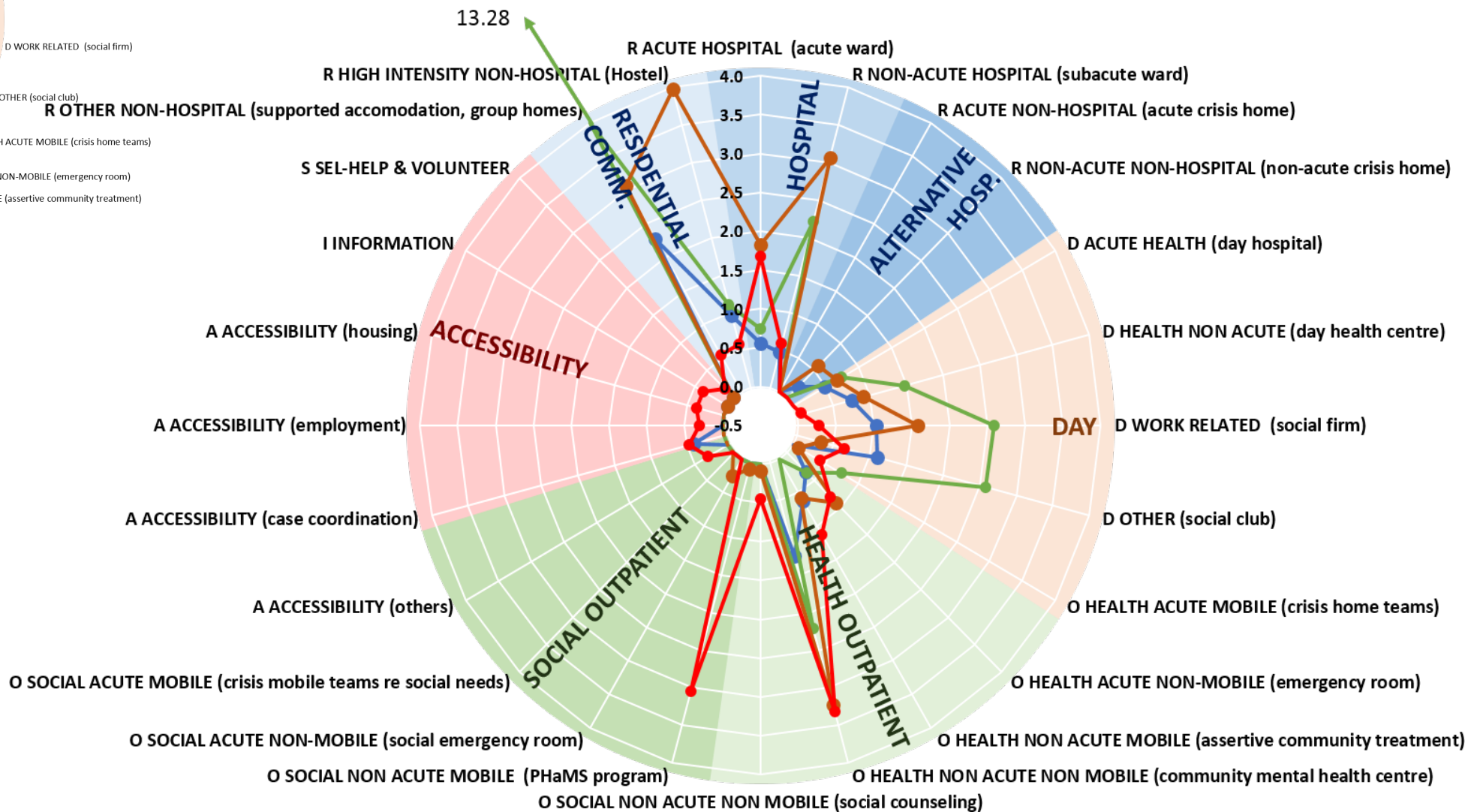
WNSW WA Country MH Vall Aran (Spain) Sør-Trøndelag (Norway)



# RURAL vs URBAN PATTERNS OF MH CARE

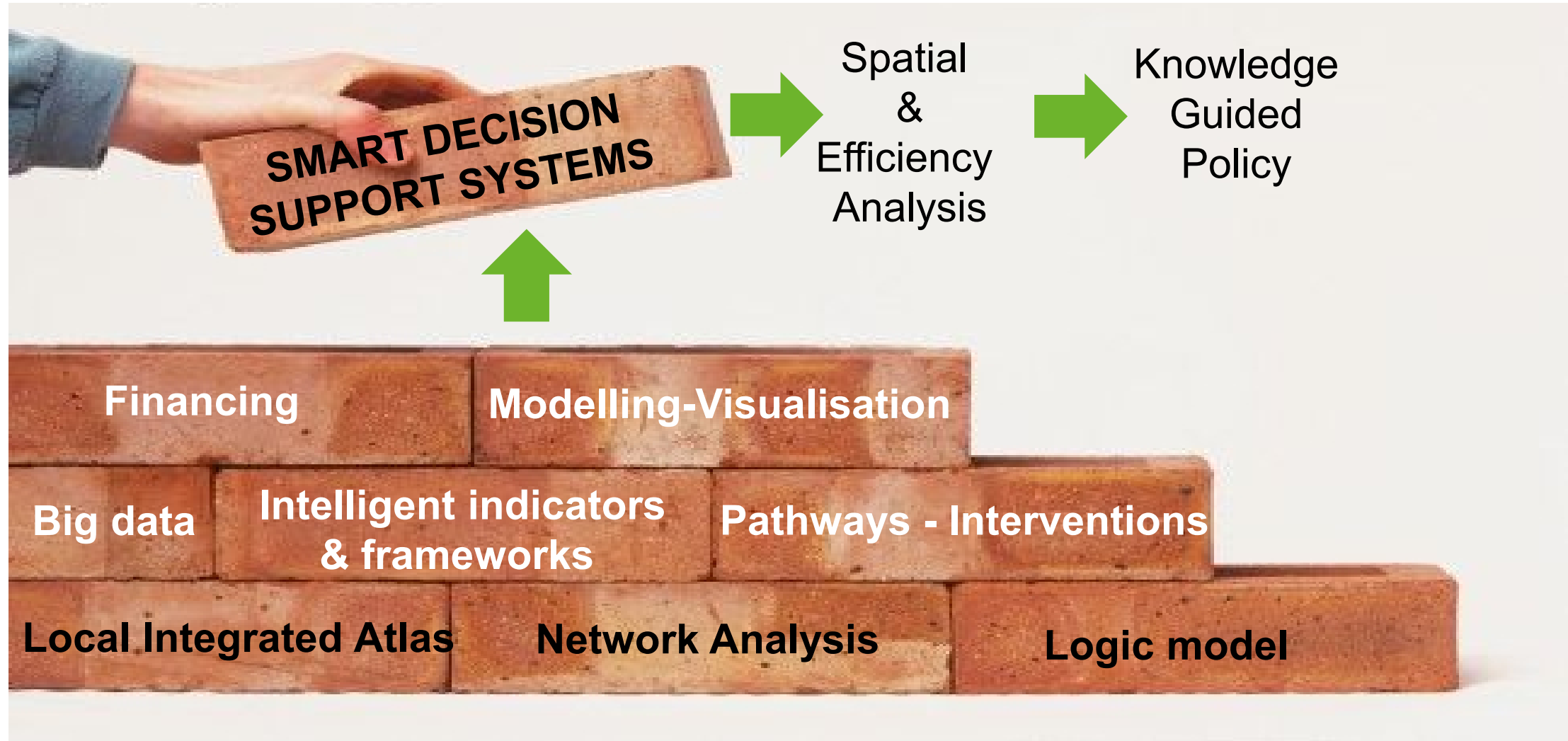
## THE MENTAL HEALTH PATTERN OF CARE FOR ADULTS Availability of MTCs per 100,000 residents (>17 y.o)

Barcelona Bilbao Helsinki Greater Sydney





# Decision Support Systems





### QUALITY AND EFFECTIVENESS OF SUPPORTED TENANCIES FOR PEOPLE WITH MENTAL HEALTH PROBLEMS

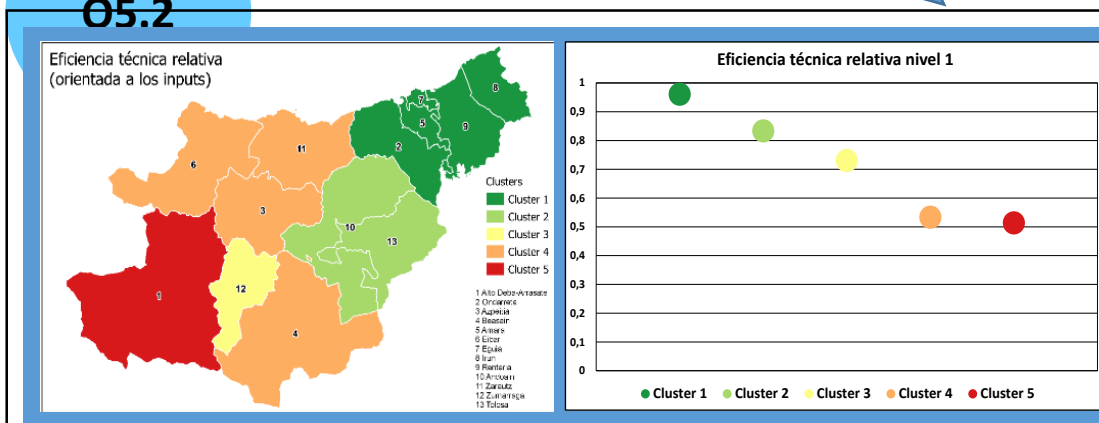


## Floating Outreach

## R8.2

## 05.2

# RTE Basque Country



# Where next?

New interactive visual tools

eHealth Platforms

Accountability and transparency

Automated coding systems & registries

Improved semantic interoperability

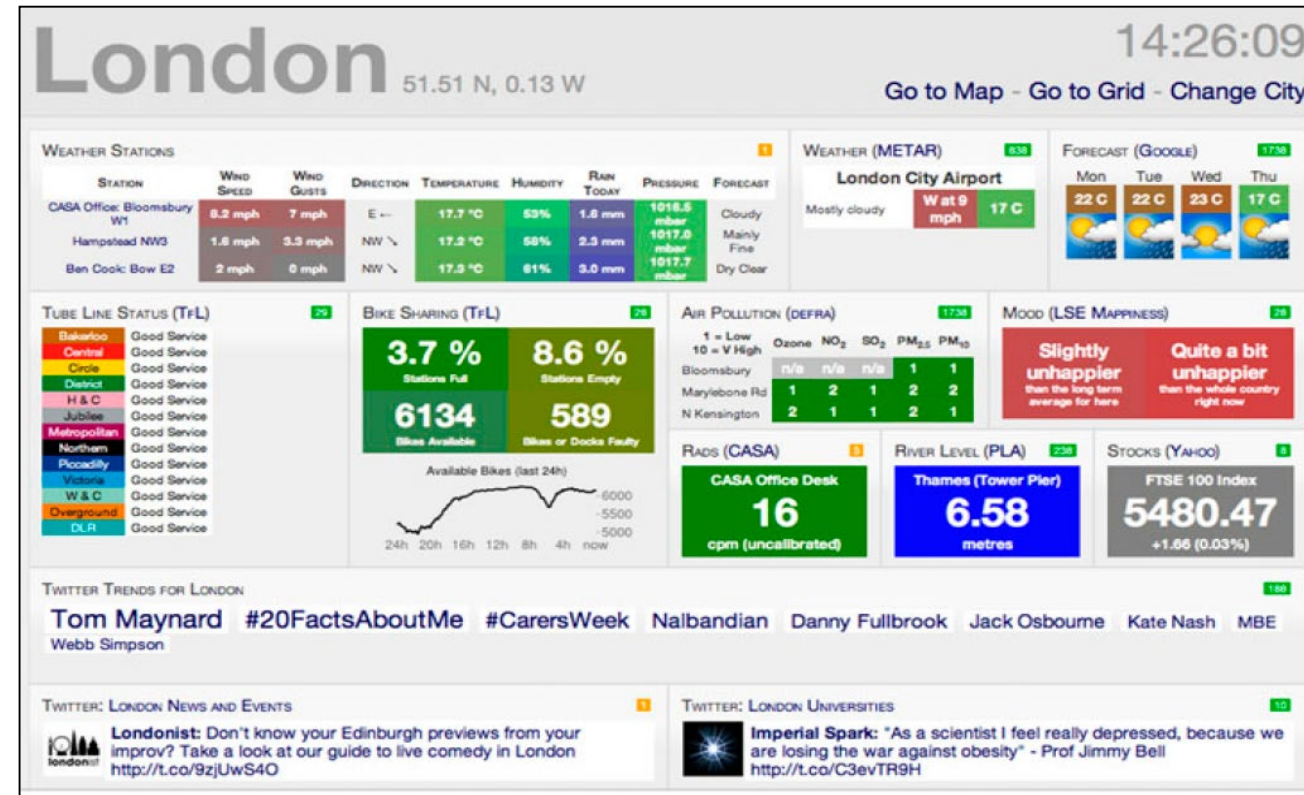
Linking digital to tangible care – eH - IoT

Linking provision, use and financing

Navigation Charts (Mchart)

Real-time dashboards

Smart DSS



Kitchin et al. Knowing & Governing Cities through Urban Indicators . *Regional studies, regional science*, 2: 6-28, 2015

# THE EMPATHIC CIVILIZATION



THE RACE TO  
GLOBAL CONSCIOUSNESS  
IN A WORLD IN CRISIS

JEREMY RIFKIN

bestselling author of *The European Dream*

We can only know ourselves in relationship to others... Our relationships form us and make us who we are... our individual identity and consciousness are formed by our unique experiences with countless others.

Is Technology innovation and improvement what makes a city smart?

- Negative effects of social media
- Privacy and democracy
- Equity
- Social connectedness vs loneliness
- Empathy