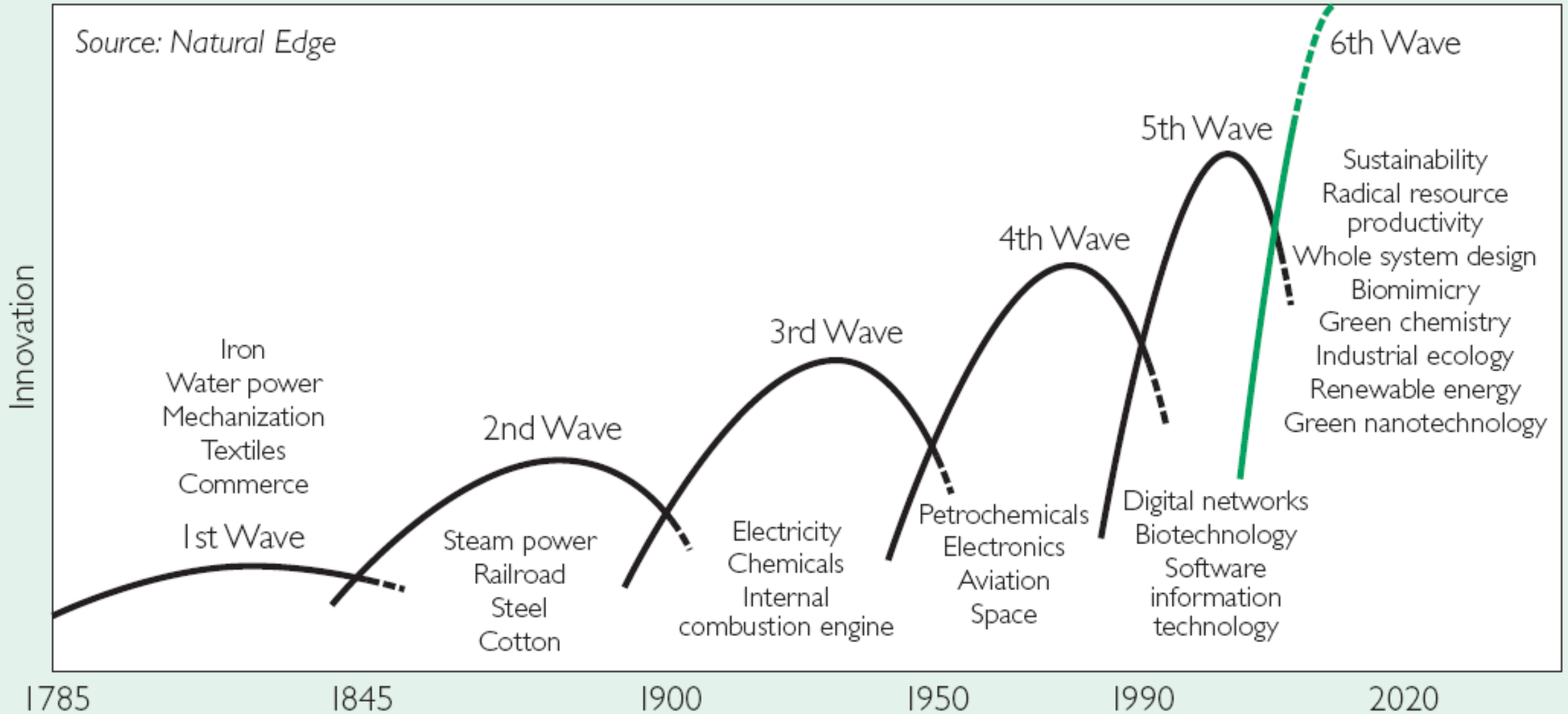


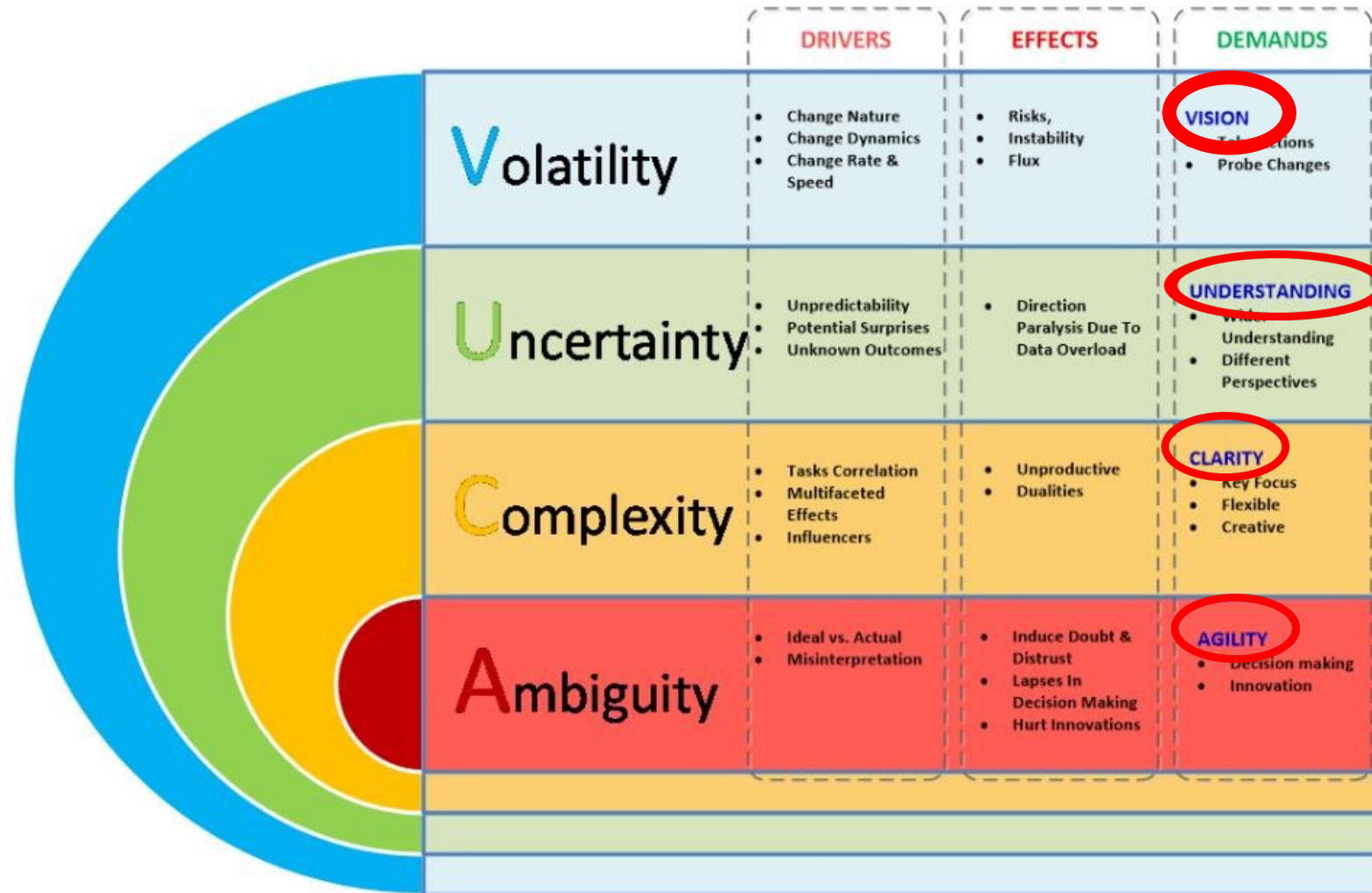
Een ingenieursblik op innoverende gezondheidszorg

Prof. Pascal Verdonck, MSc CivEng, MScBME, MBA, PhD

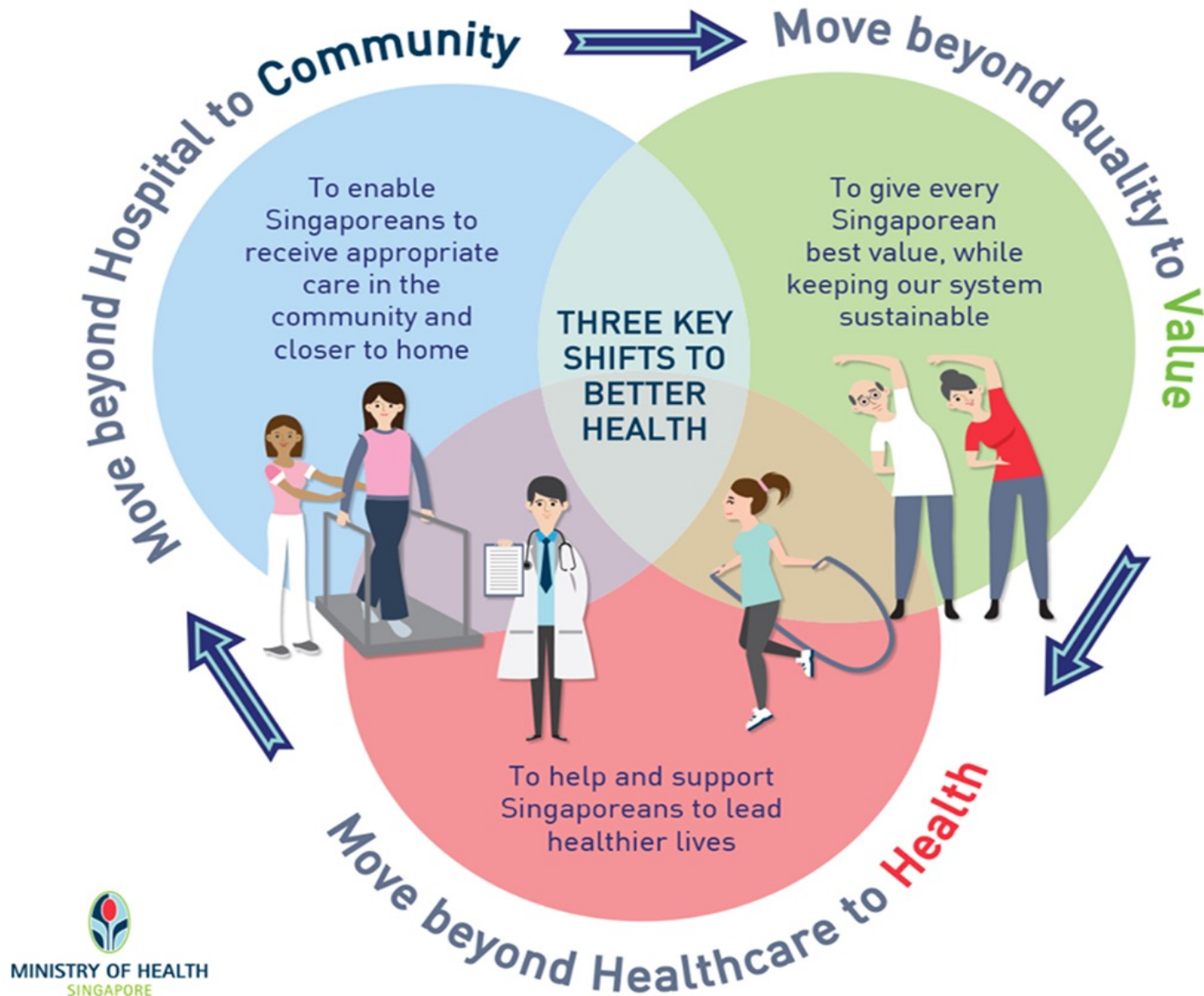
Impact of innovation waves



We are living in a “VUCA”- world



Leading to a GLOBAL Mind shift



From “HoF” to “FoH”

Hospital of the future

THE FUTURE OF HOSPITALS

LEUVENS INSTITUUT VOOR GEZONDHEIDSZORGBELEID

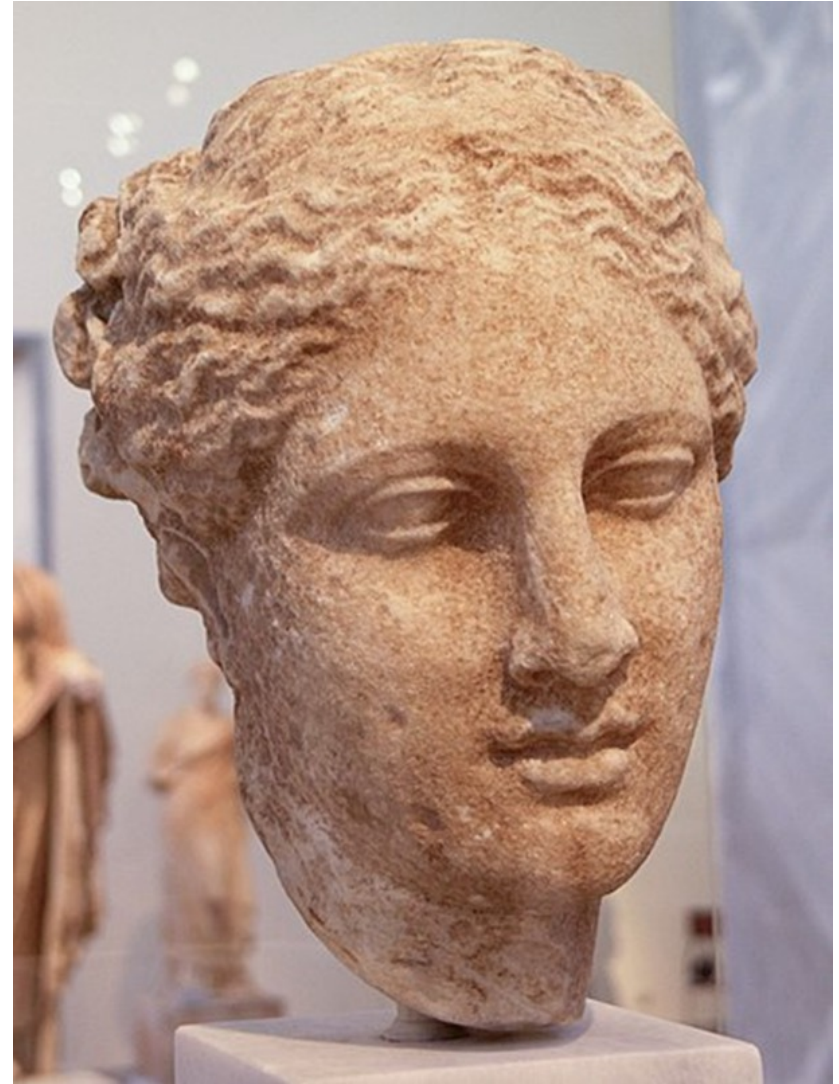
VLERICK BUSINESS SCHOOL

IN OPDRACHT VAN DE VLAAMSE OVERHEID



Definition of health

“Health is a state of complete physical, mental and social well-being”



6

Hygieia, goddess of health, daughter of Asklepios
(god of medicine and healing) °Wikipedia

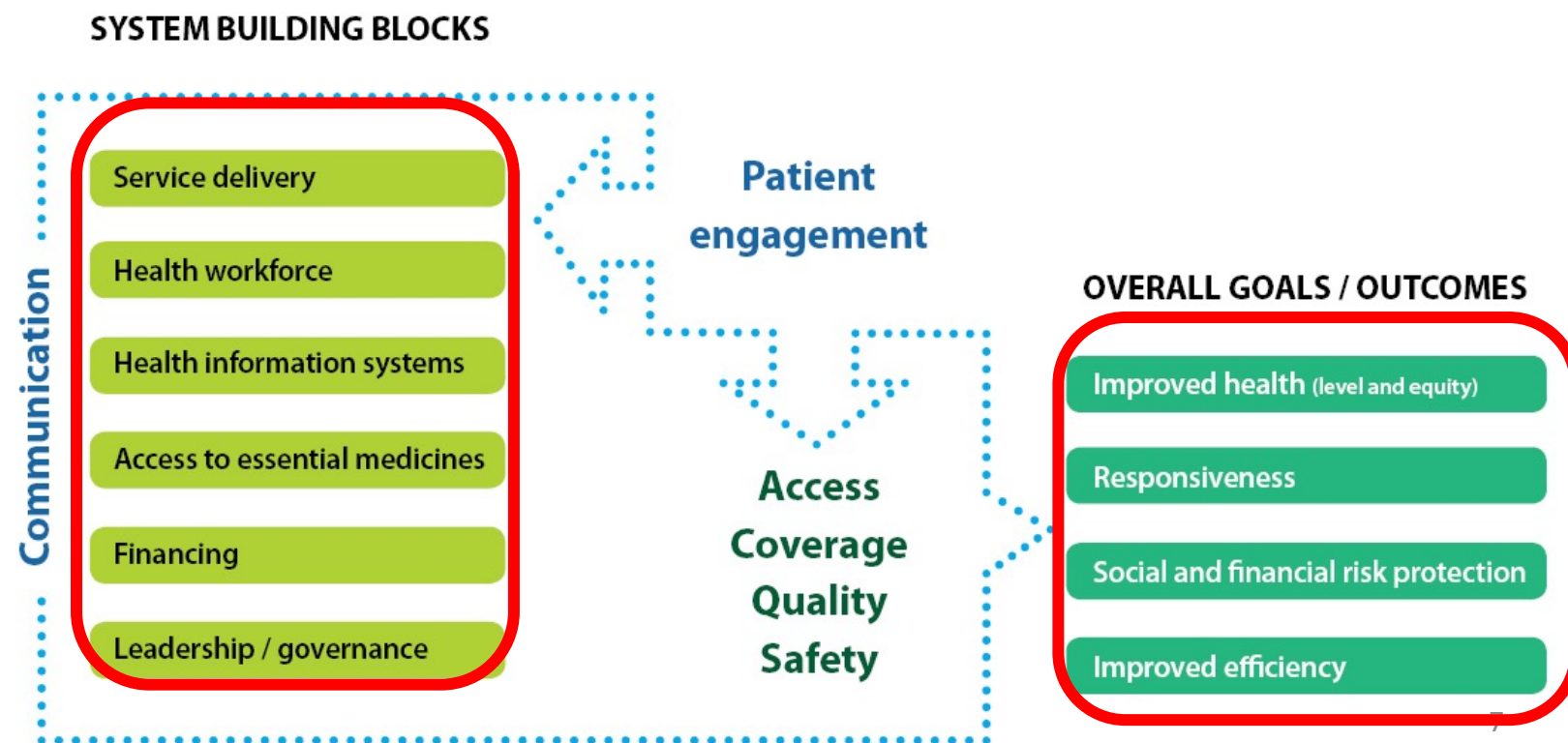
WHO Definition of Health

“Health is the state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”

Source: United Nations World Health Organization⁵

Health System Framework

Figure 2. Proposed modified WHO Health Systems Framework



Determinants of health



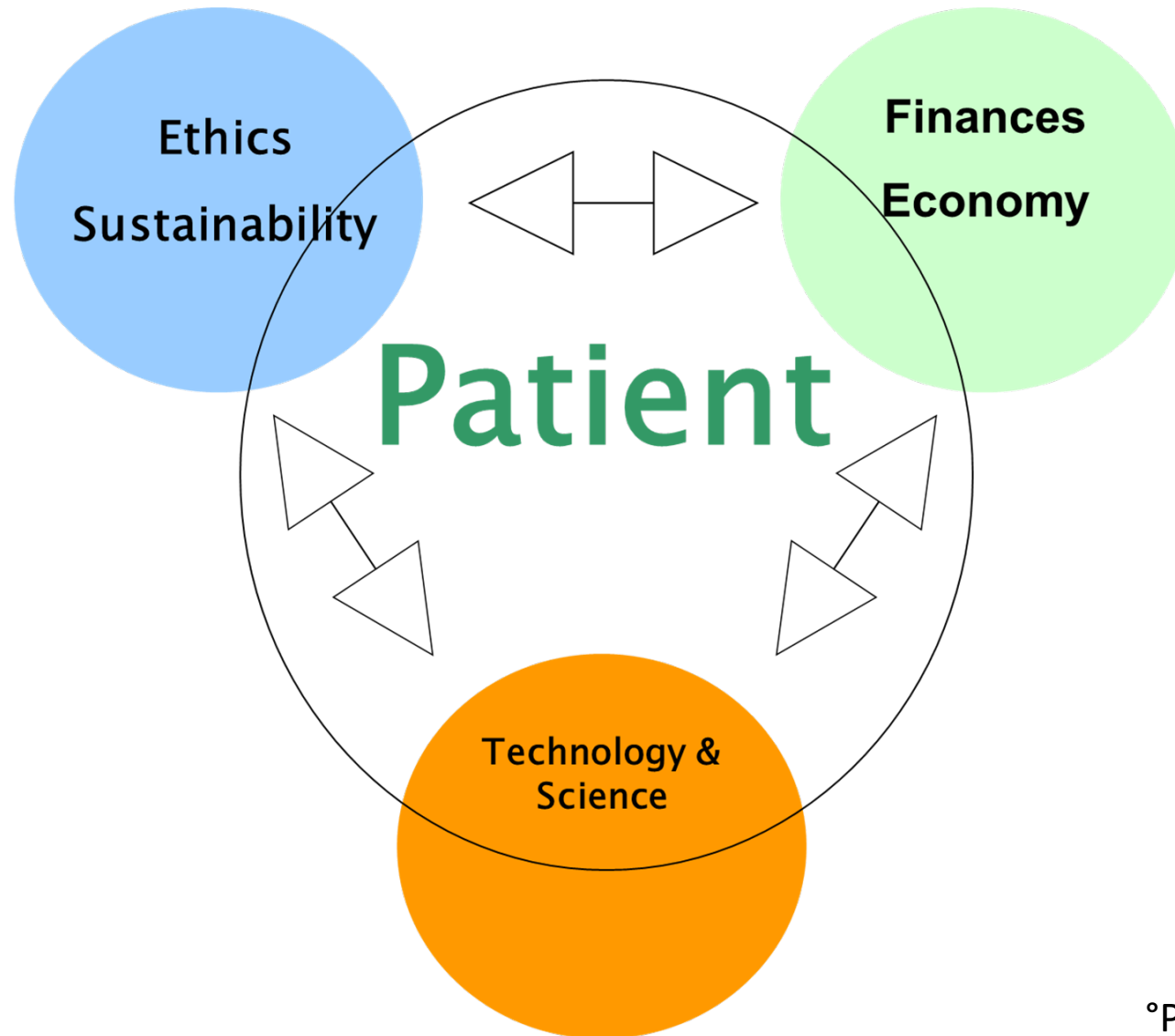
Definition of healthcare

“The primary goal of health care is to maximize the health of the population within the limits of available resources, and within an ethical framework built on “justice and solidarity principles”



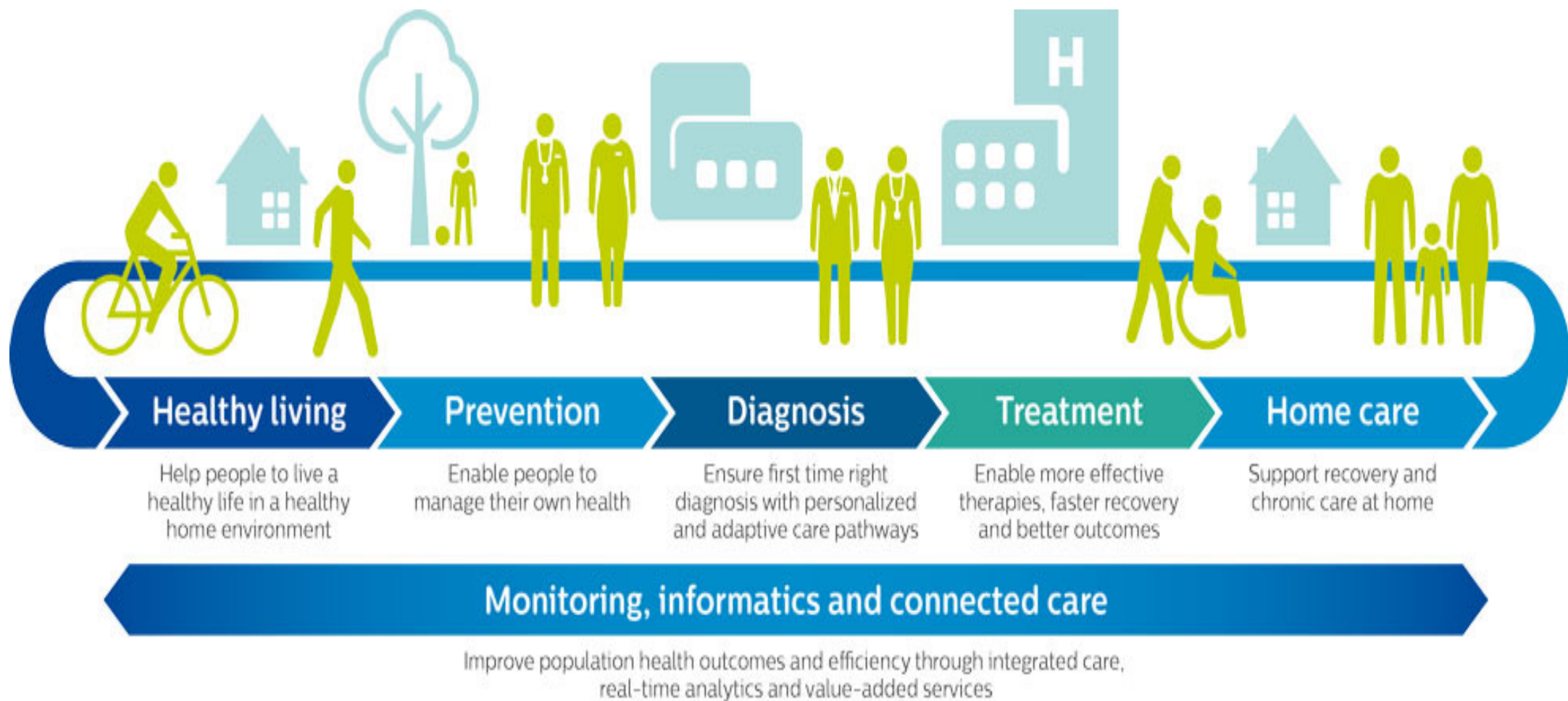
Report of the Belgian EU Presidency, adopted by the EU Council of Ministers of Health in Dec 2010

“The patient first”

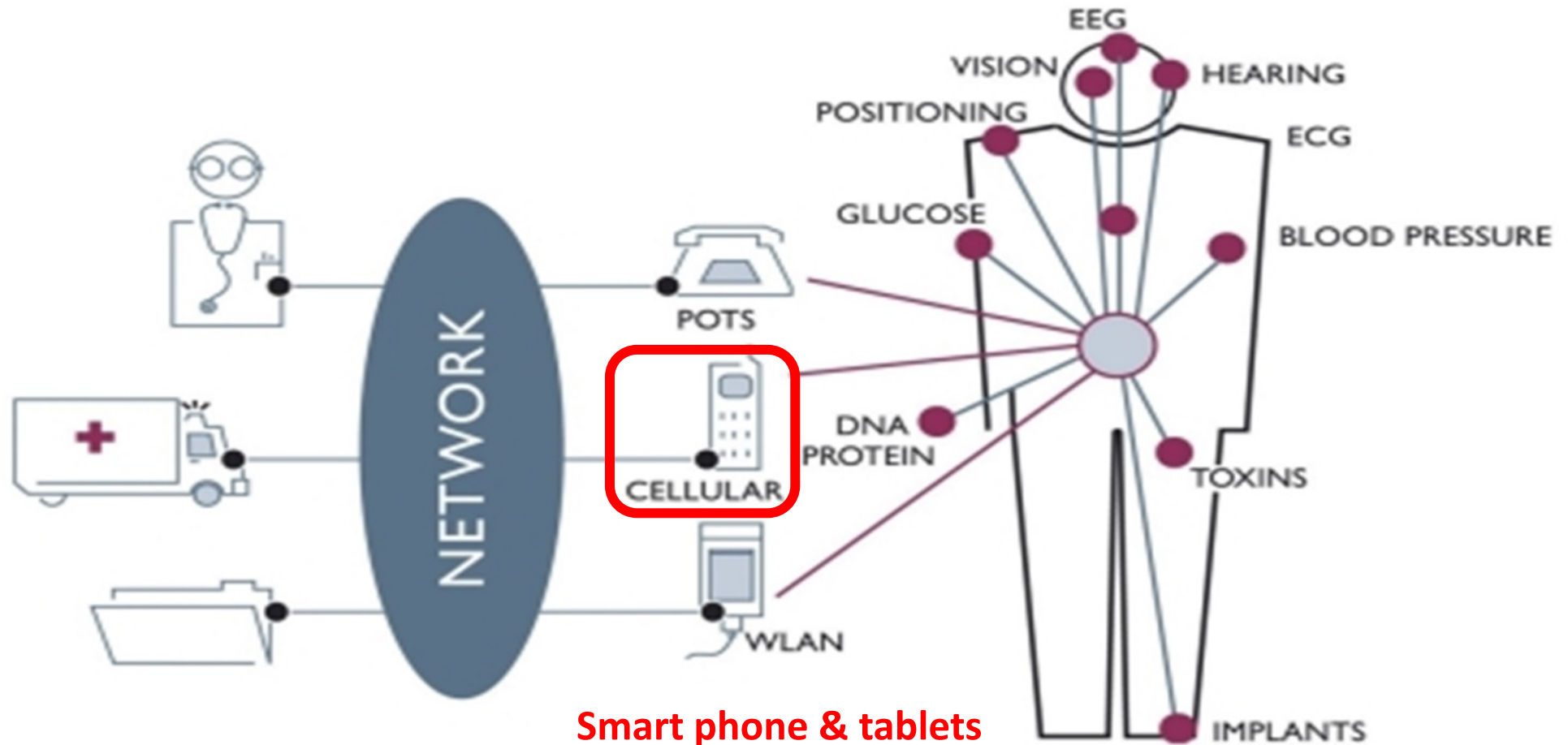


°Pascal Verdonck, 2007

The health continuum

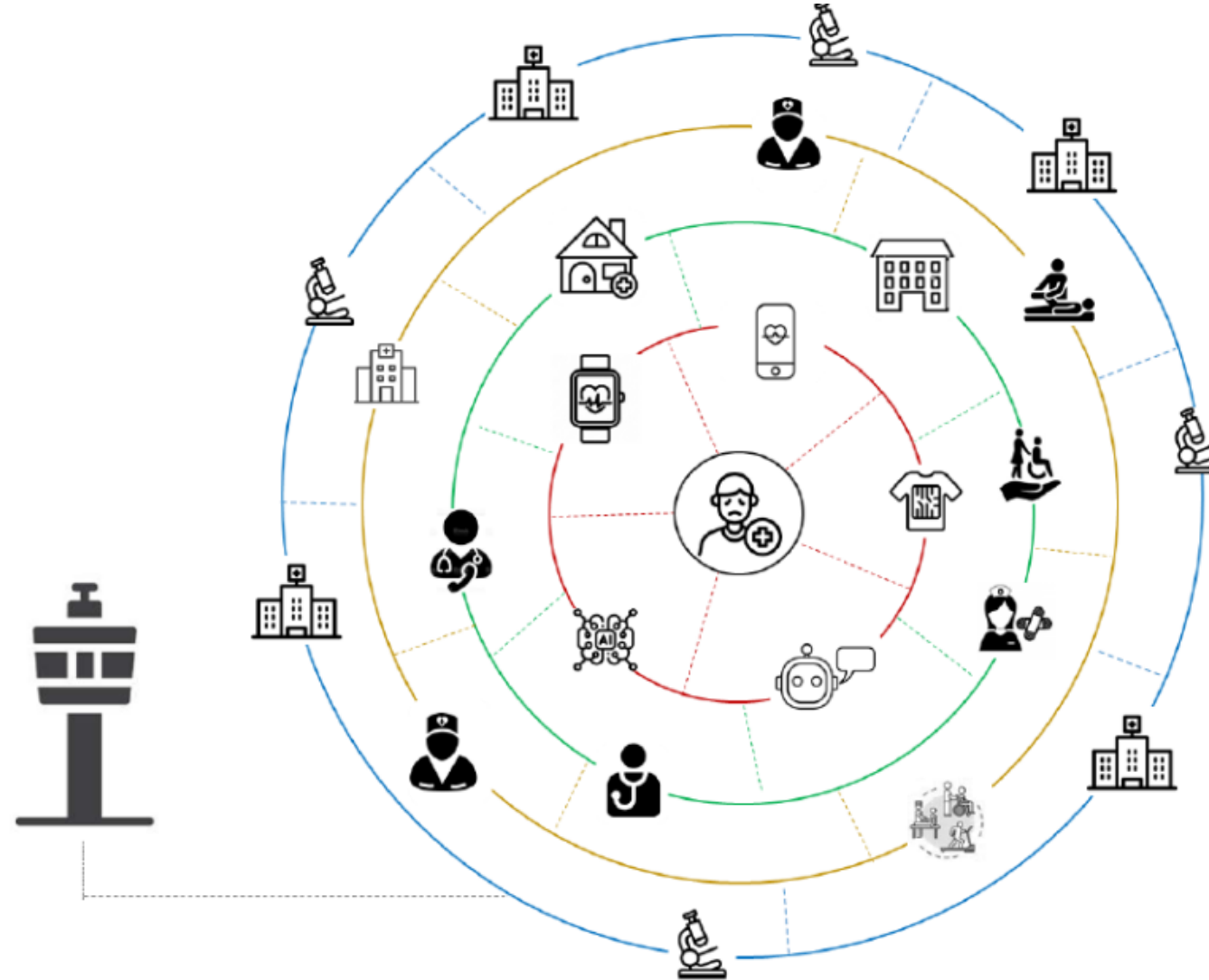


Our body becomes a network – “zero line”



Zero line is a game changer

0^{de} lijns zorg
1^{ste} lijns zorg
2^{de} lijns zorg
3^{de} lijns zorg



Connected healthcare

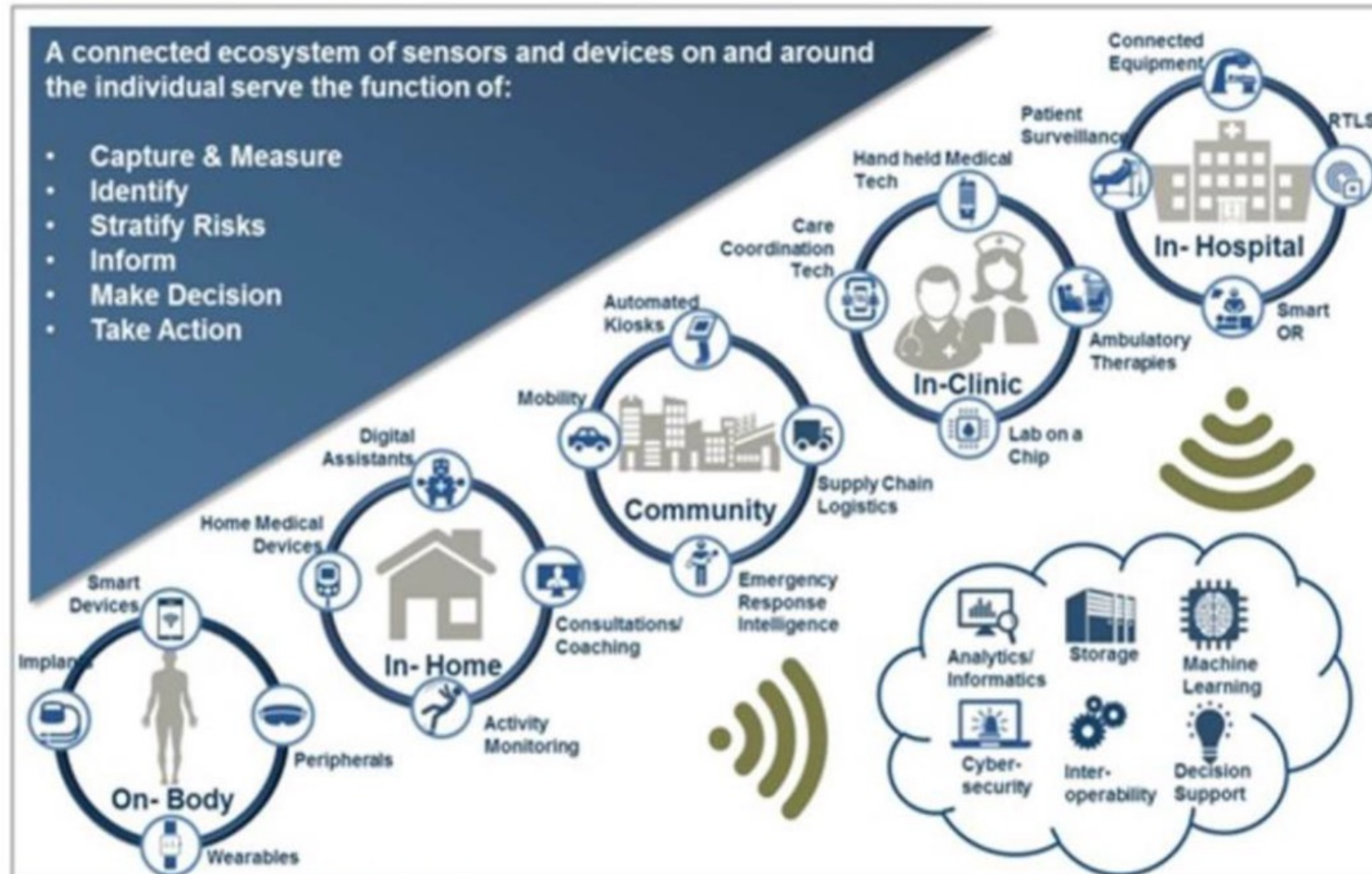


Figure 1: Healthcare World in 2025

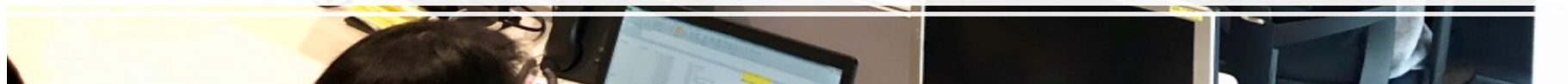
Source: Frost & Sullivan

A future proof hospital

An intervention center with a command tower:
*patient flow management for efficient and safe
access and care for patients intra & extra muros*



TTSH C3 Operations Command Centre



Patient-centric care



Value based healthcare

- The fundamental **goal and purpose** of health care is **to improve value for patients**

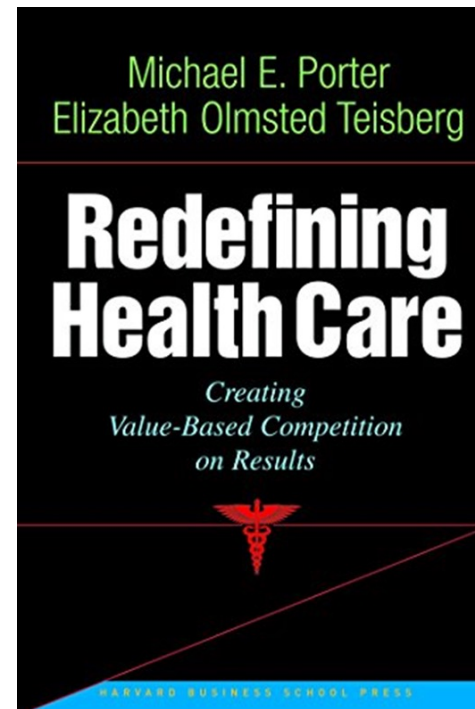
$$\text{Value} = \frac{\text{Health outcomes that matter to patients}}{\text{Costs of delivering these outcomes}}$$

- Value is the only goal that can **unite the interests** of all system participants
- Value is created in caring for a patient's **medical condition** over the **full cycle of care**



The most powerful single lever for reducing cost and improving value is improving outcomes

Source: ICHOM 2019

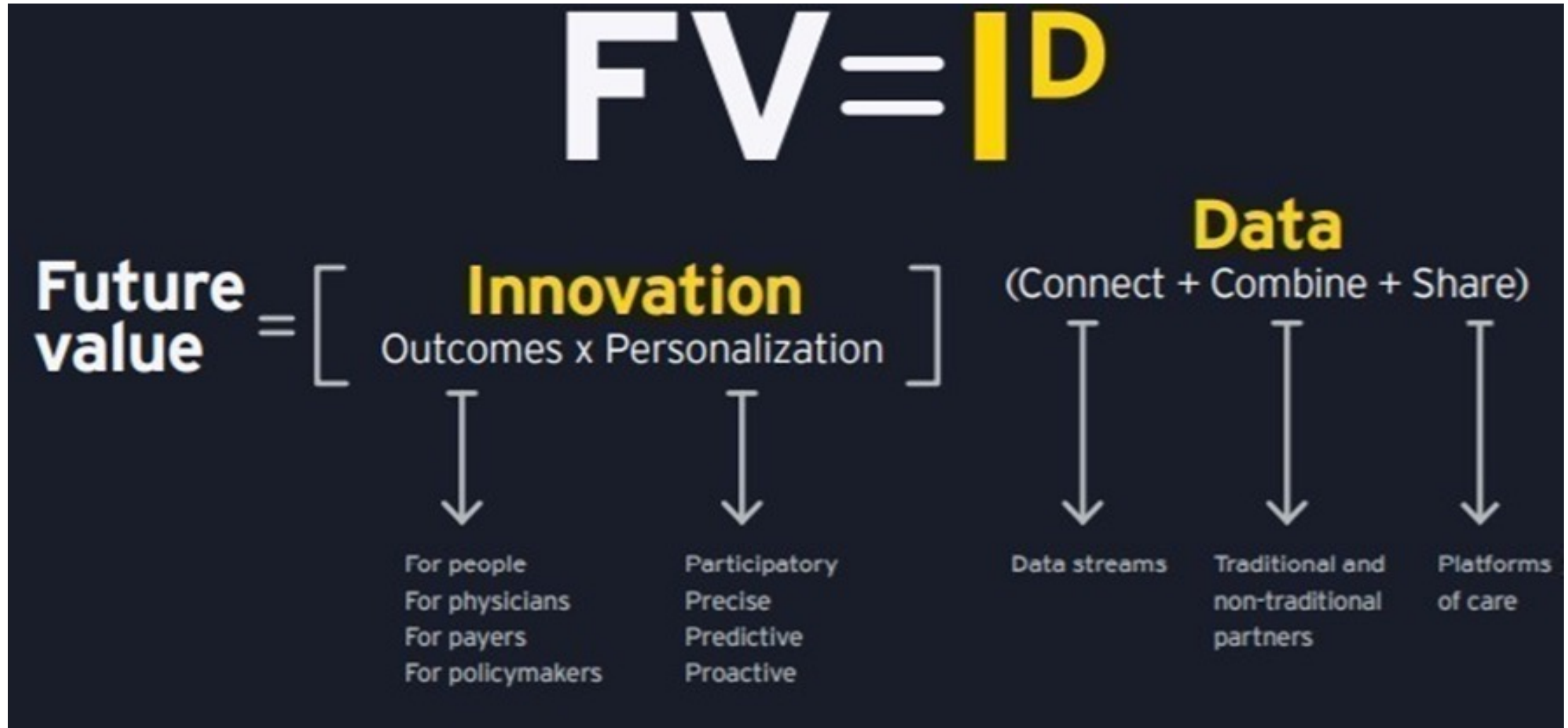


°°Perspectives in Healthcare in a joint publication
Global Center for Health Innovation in Cleveland, 17

Future value

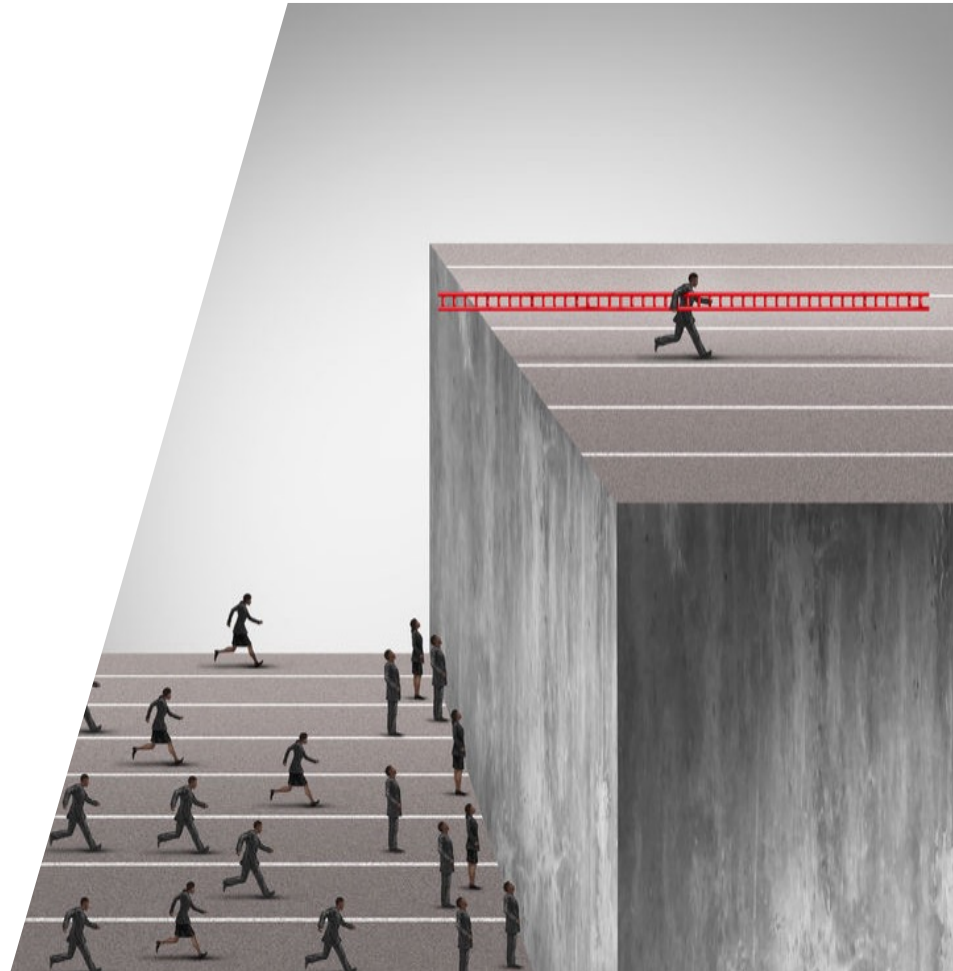
Prof. Pascal Verdonck

Future value



Innovation

*Execution of a new idea
as an answer
to a challenge
with an added value
for the society,
the organisation
and the patient*



STANDPUNT 25 VAN KVAB - 2014

MEDISCHE TECHNOLOGIE ALS MOTOR VOOR INNOVATIEVE GEZONDHEIDSZORG

In januari 2004 publiceerde CAWET, het Comité van de Academie voor Wetenschappen en Techniek, voorloper van de Klasse Technische Wetenschappen, zijn rapport nr. 45 met als titel 'Biomedische ingenieurswetenschappen: speerpunttechnologie van een moderne gezondheidszorg'. Dit nieuwe Standpunt over 'Medische Technologie als motor voor innovatieve gezondheidszorg' is een vervolg op het intussen 10 jaar oude CAWET-rapport.

Dit Standpunt werd voorbereid door een werkgroep die werd voorgezeten door Pascal Verdonck, bestuurder van het AZ Maria Middelares in Gent. Werkgroepleden waren Yvan Bruynseraede, departement fysica en sterrenkunde KU Leuven, Bart De Moor, departement ESAT KU Leuven, Bart Swaelens, CEO van Materialise, Erik Tambuyzer, voorzitter van het Centrum voor Medische Innovatie, Erick Vandamme, departement biochemische en microbiële technologie UGent, Jos Vander Sloten, departement biomechanica KU Leuven, Ewout Vansteenkiste, Technology Developer HyCT UGent, en Ivo Van Vaerenbergh, voorzitter Agoria Metaal en Materialen.

"Health technology" is voor de World Health Organization (WHO) van het hoogste belang voor het tot stand komen van stabiele en duurzame mondiale gezondheidssystemen. Medische Technologie omvat de toepassing van wetenschappelijke kennis en technieken in het brede domein van de gezondheidszorg. In dit Standpunt echter werd de focus bewust beperkt tot 'medical devices', zoals bv. medische beeldvorming, implantaten, sensoren, etc. Medical devices hebben tot doel behandelingen te optimaliseren, de patiënt meer comfort te geven en finaal uiteraard levens te redden.

Omdat Belgische bedrijven en start-ups een leidende rol zouden kunnen spelen in deze sector, pleiten de auteurs van dit Standpunt voor de oprichting van een uniek platform, (MedTechplatform Flanders en MedTech.be innovatieconsortium) waar overheid, industrie, onderzoekswereld en ziekenhuissector met elkaar in overleg kunnen treden. Een geïntegreerde aanpak en een efficiënte dialoog tussen deze stakeholders, waarbij het belang van de patiënt centraal wordt gesteld, zijn immers basisvoorwaarden voor succes.

Met steun van de
Vlaamse overheid



Vlaanderen
in Actie
Pact 2020



MEDISCHE TECHNOLOGIE ALS MOTOR VOOR INNOVATIEVE GEZONDHEIDSZORG Pascal Verdonck



Koninklijke Vlaamse Academie van België voor Wetenschappen
en Kunsten, Klasse Technische Wetenschappen, 2014
Standpunten 25

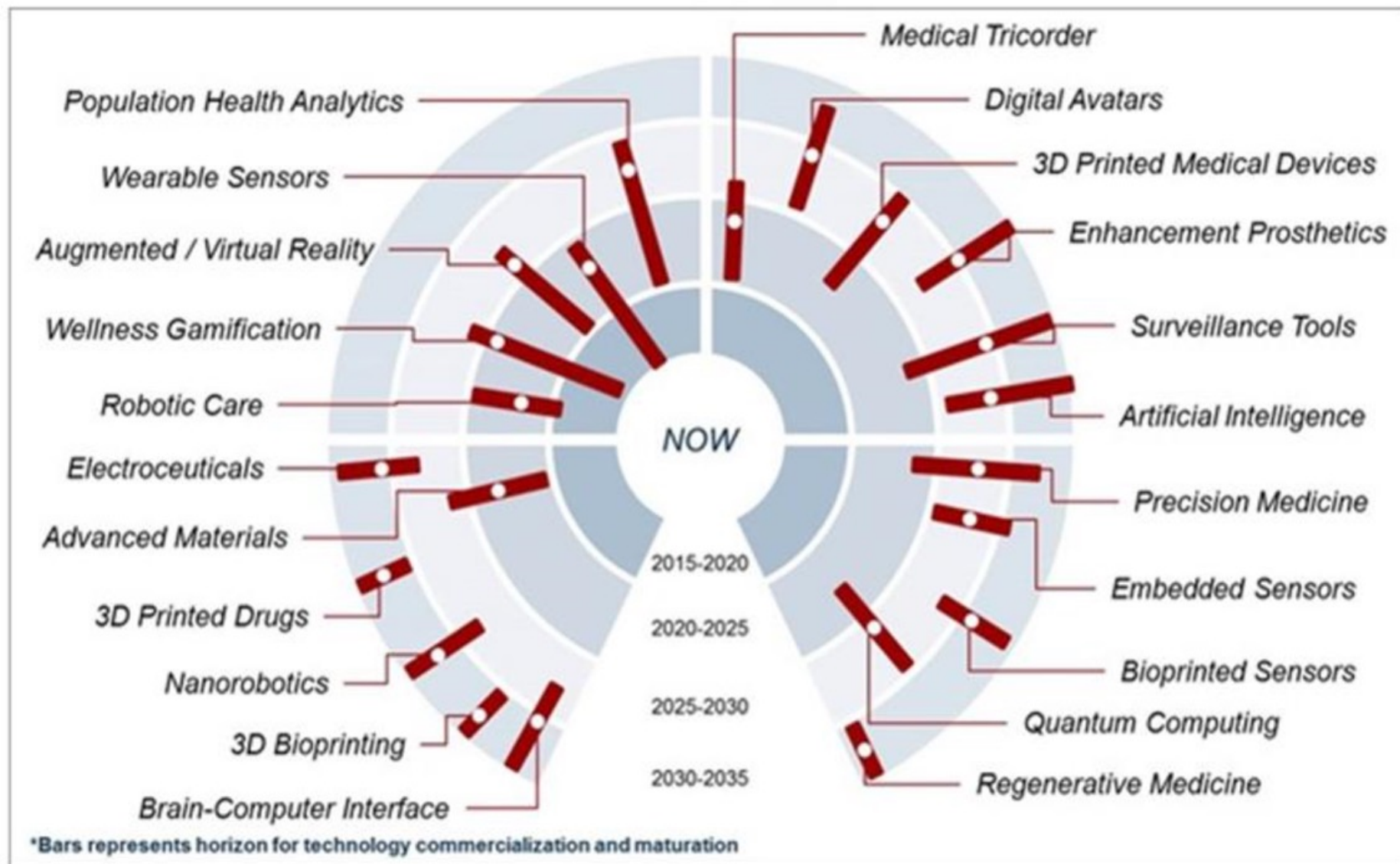
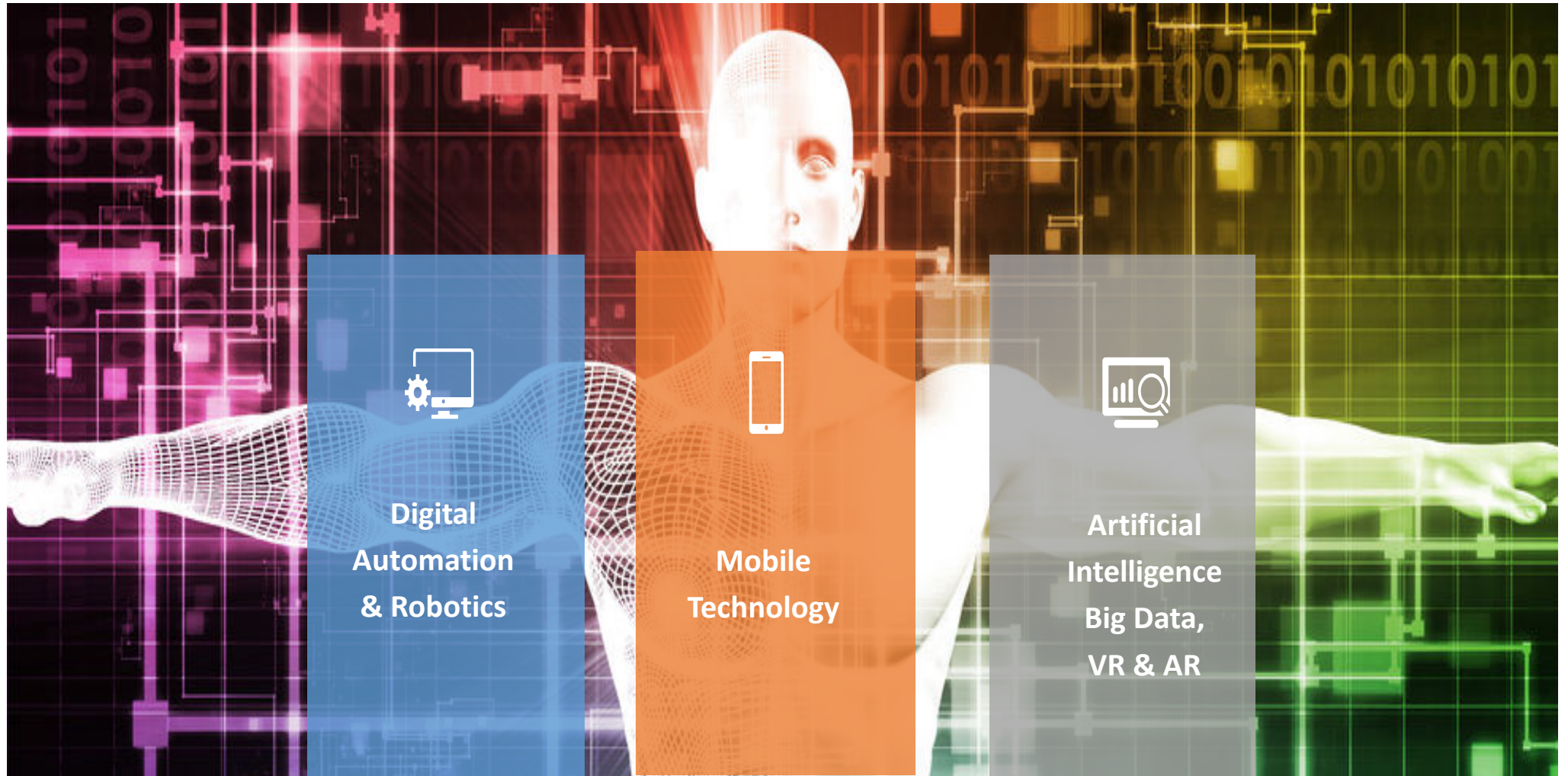


Figure 2: Timeframe for Commercialization and Maturation of Top 2025 Technologies

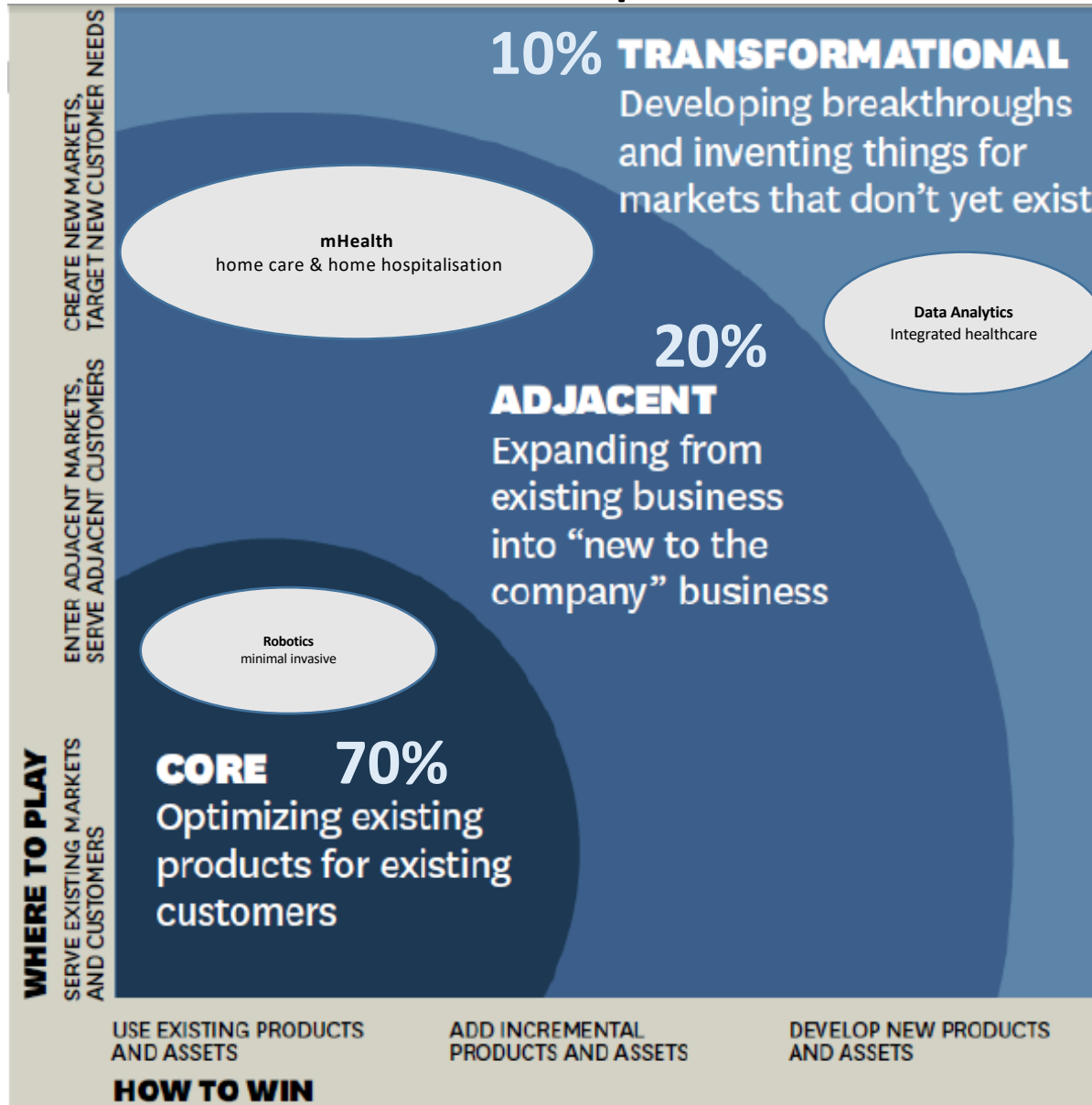
Types of medical technology



Medical technology is the “driver”



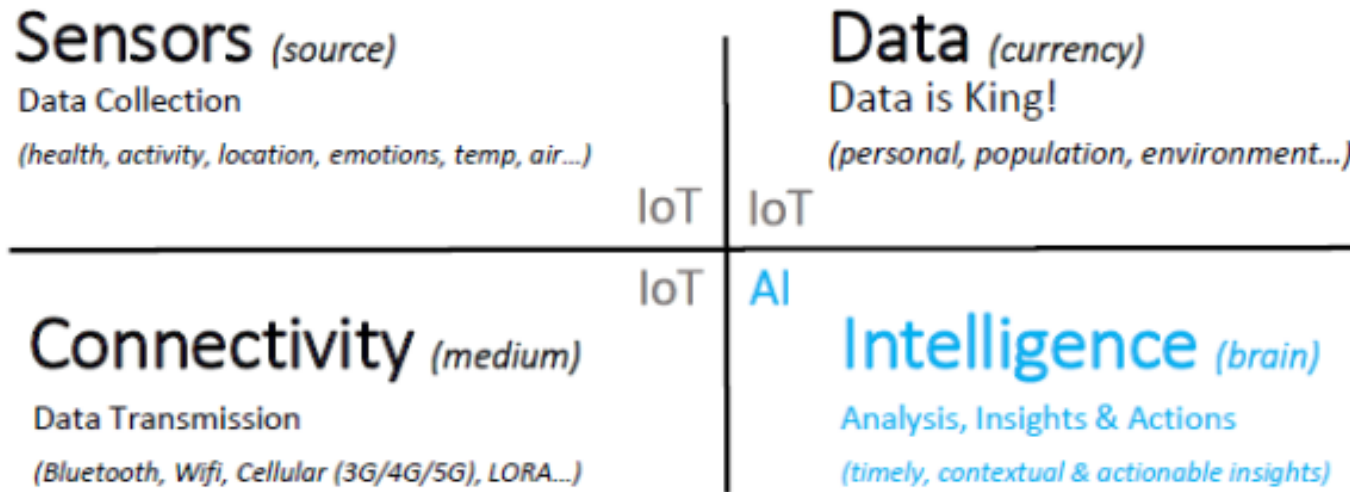
Innovation roadmap & ambition



°source:Nagji & Tuff (2012)

The importance of connection

AI enables IoT to connect the dots & deliver value



5G networks

- **Superior:** speed, bandwidth, latency, power, reliability, ect.
- **Intelligent:** network slicing (separate custom network per application)

Data-driven healthcare

MIT Technology Review
BUSINESS REPORT

Data-Driven Health Care

New technologies promise a flood of molecular, environmental, and behavioral patient information. Will all that data make medicine better?

CONTENTS

The Big Question
More Phones, Fewer Doctors
IBM Aims to Make Medical Expertise a Commodity
23andMe Tries to Woo the FDA
Mobile Health Monitoring Devices
Mobile Health's Growing Pains
Plus: C8's Crash, Data in Action at Mayo, Pharma's new transparency, and more

The Big Question

Can Technology Fix Medicine?

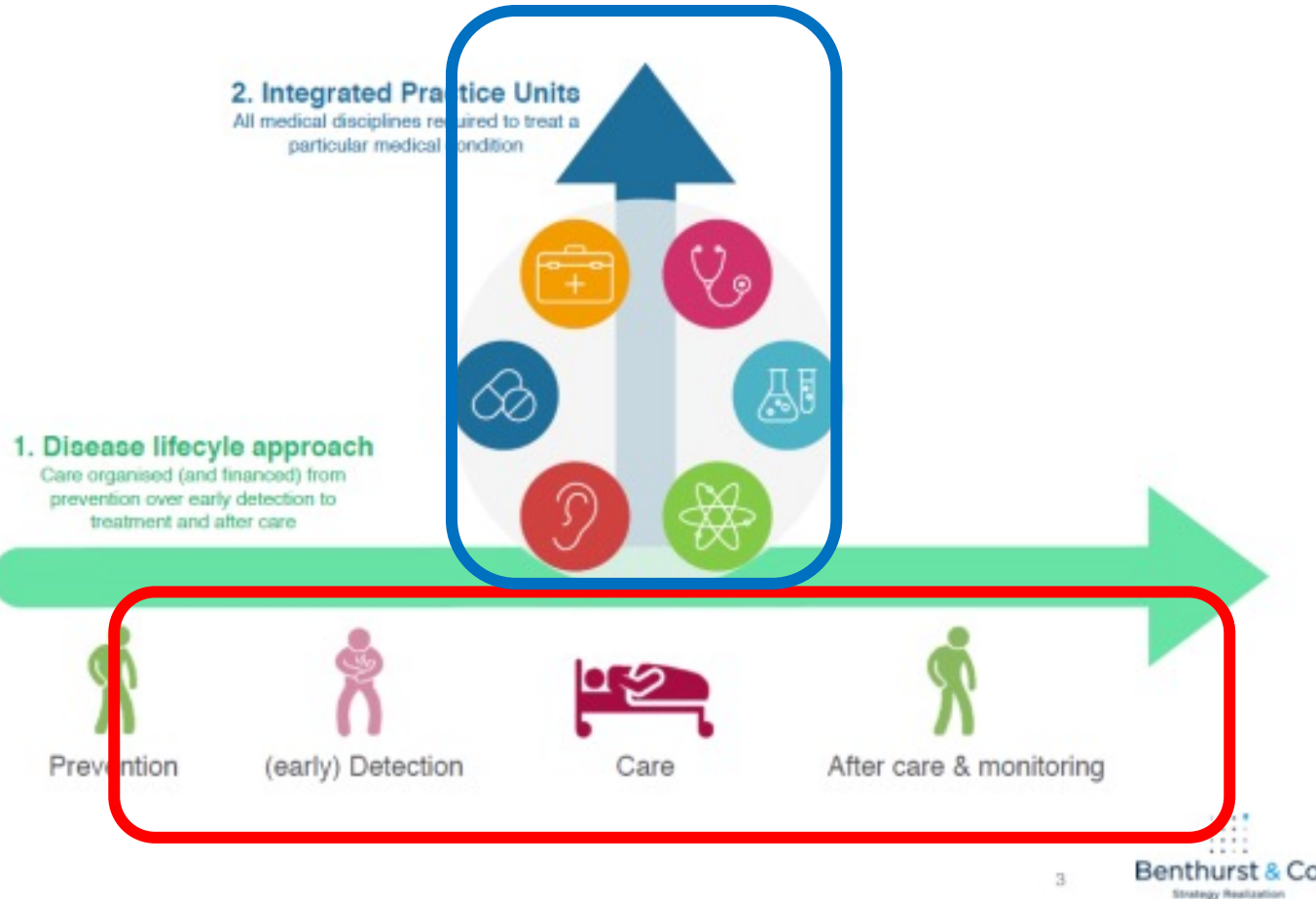
Medical data is a hot spot for venture investing and product innovation. The goal: better care.

● After decades as a technological laggard, medicine has entered its data age. Mobile technologies, sensors, genome sequencing, and advances in analytic software now make it possible to capture vast amounts of information about our individual makeup and the environment around us. The sum of this information could transform medicine, turning a field aimed at treating the average patient into one that's customized to each person and shifting more control and responsibility from doctors to patients.

The question is: can big data make health care better?

"There is a lot of data being gathered. That's not enough," says Ed Martin, interim director of the Information Services Unit at the University of California, San Francisco, School of Medicine. "It's really about coming up with applications that make data actionable."

1



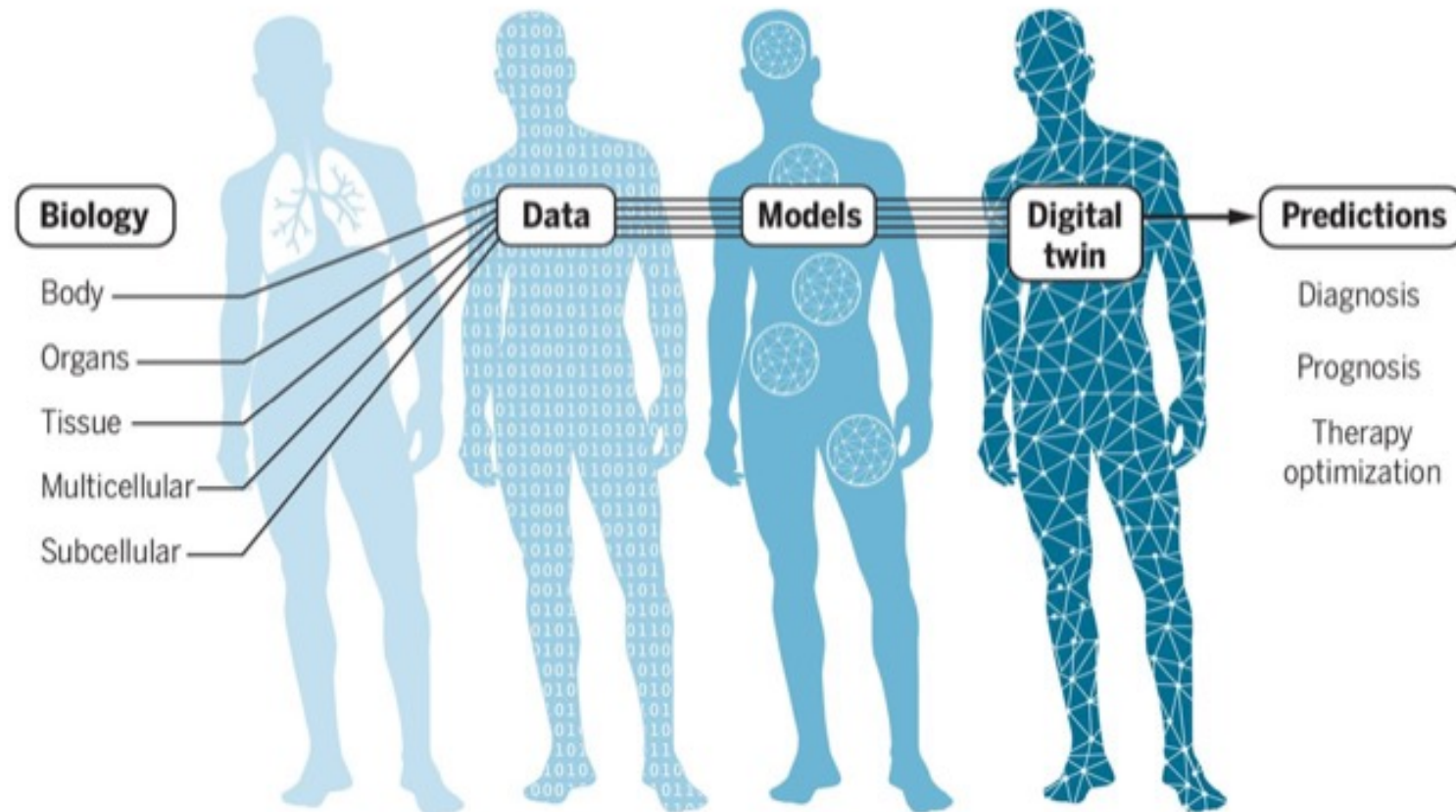
3

Benthurst & Co
Strategy Realization

Towards a “digital twin”

Building a personalized digital twin

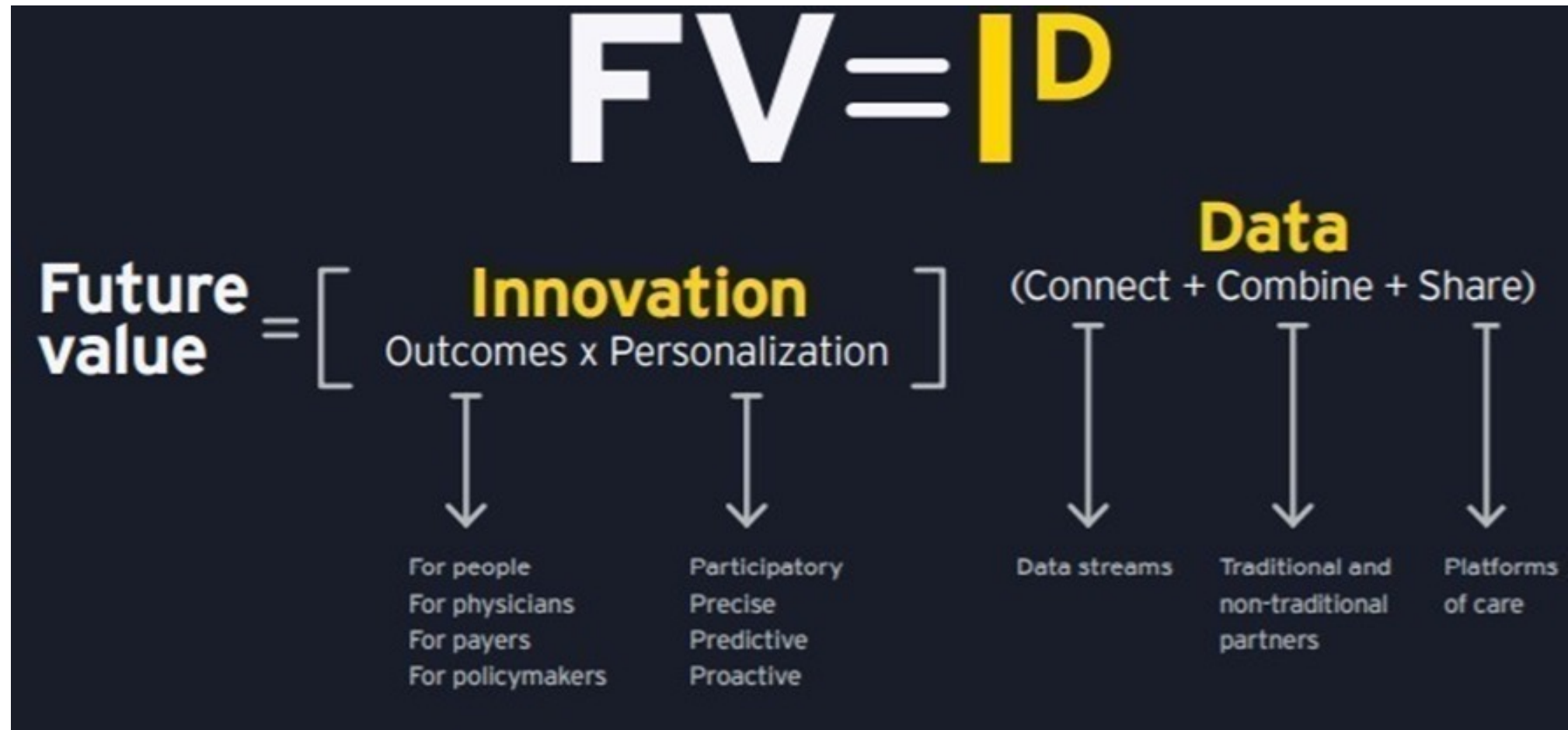
Data from multiple scales are needed to build computational representations of biological processes and body systems that are affected by viral infection. These submodels are integrated and personalized with clinical data from individual patients. The digital twin can then be used to derive predictions about diagnosis, prognosis, and efficacy and optimization of therapeutic interventions.



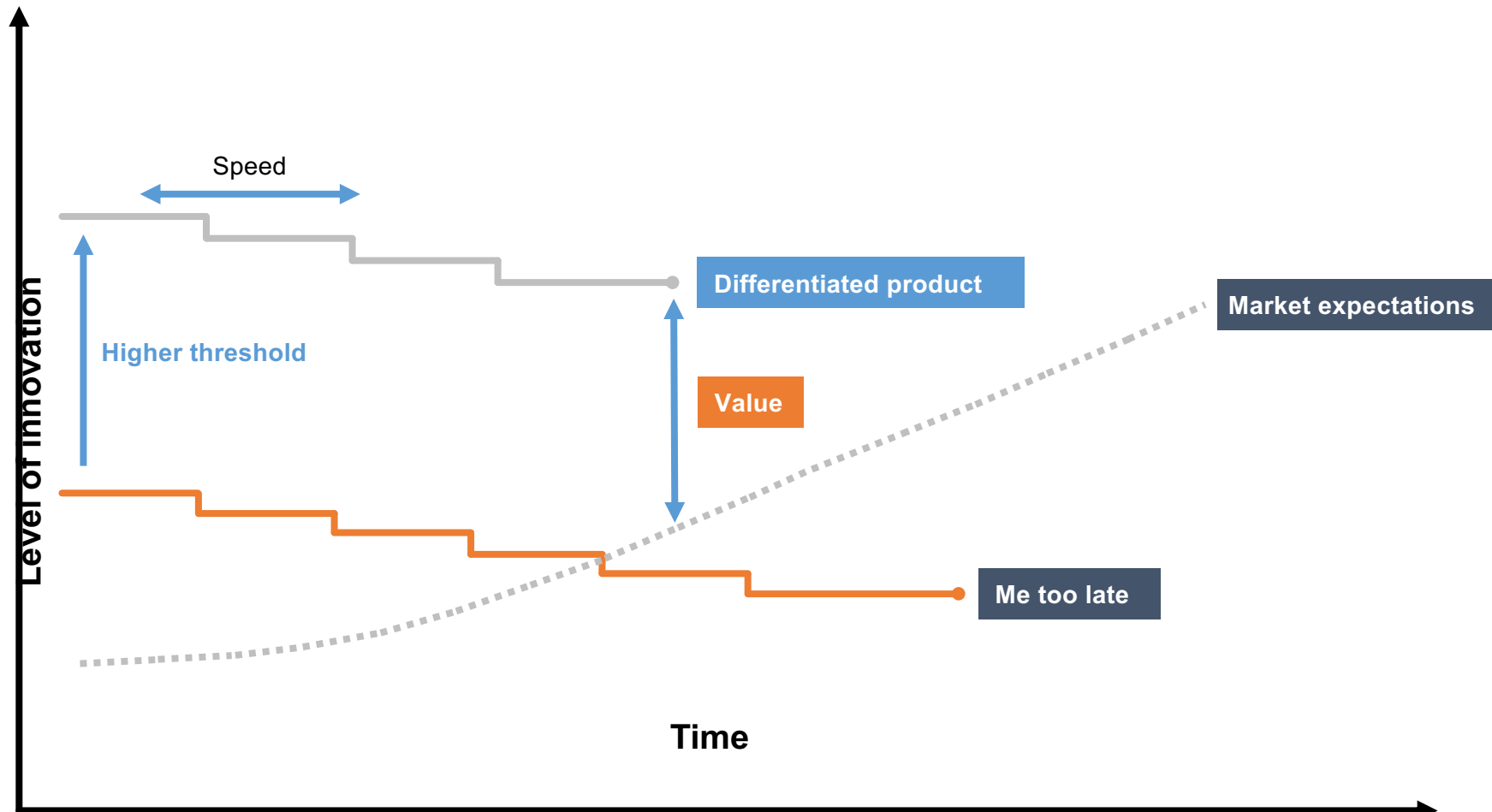
Take home message

Prof. Pascal Verdonck

Future value



INNOVATION level must be high

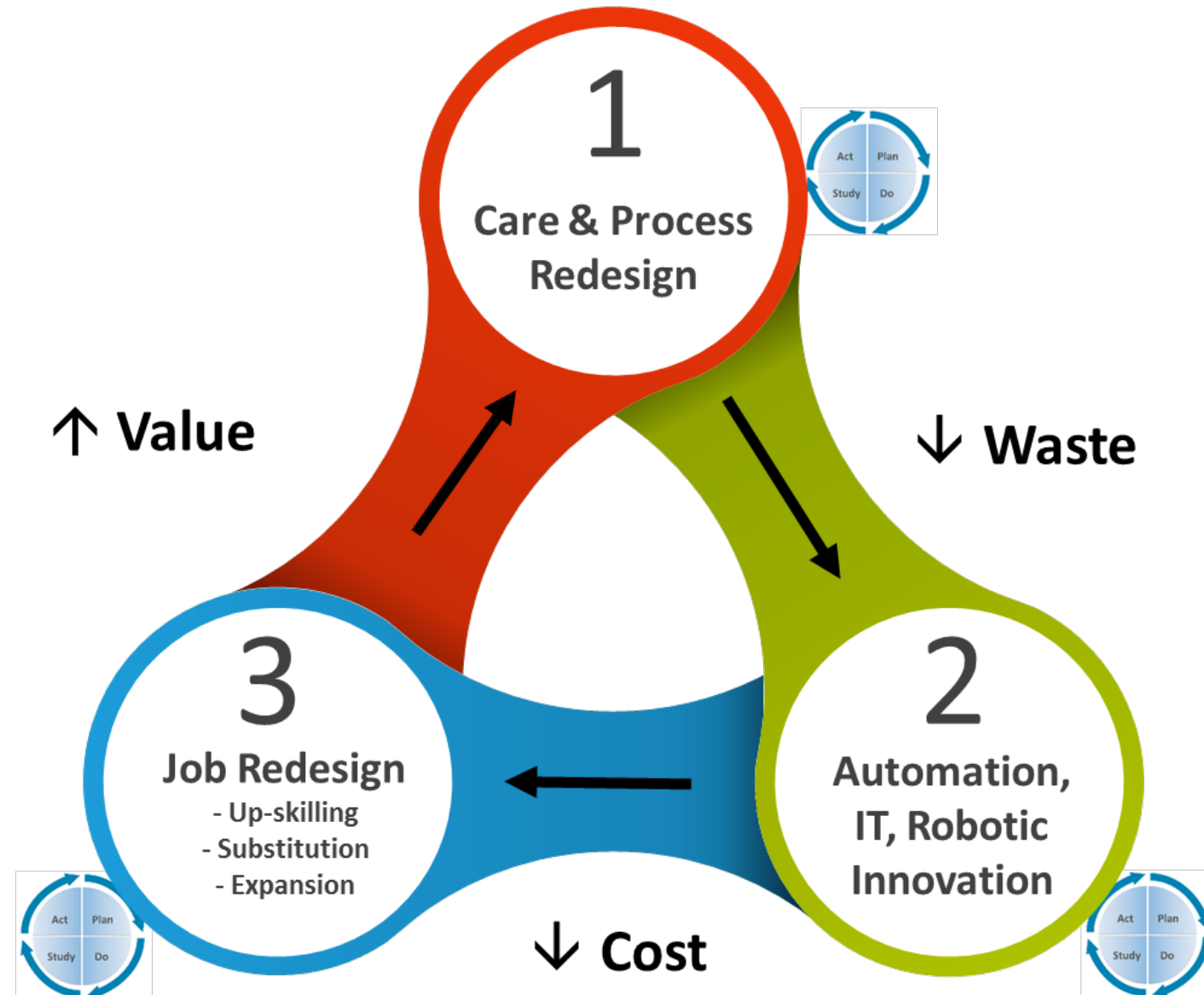


°Paul Stoffels, CSO J&J

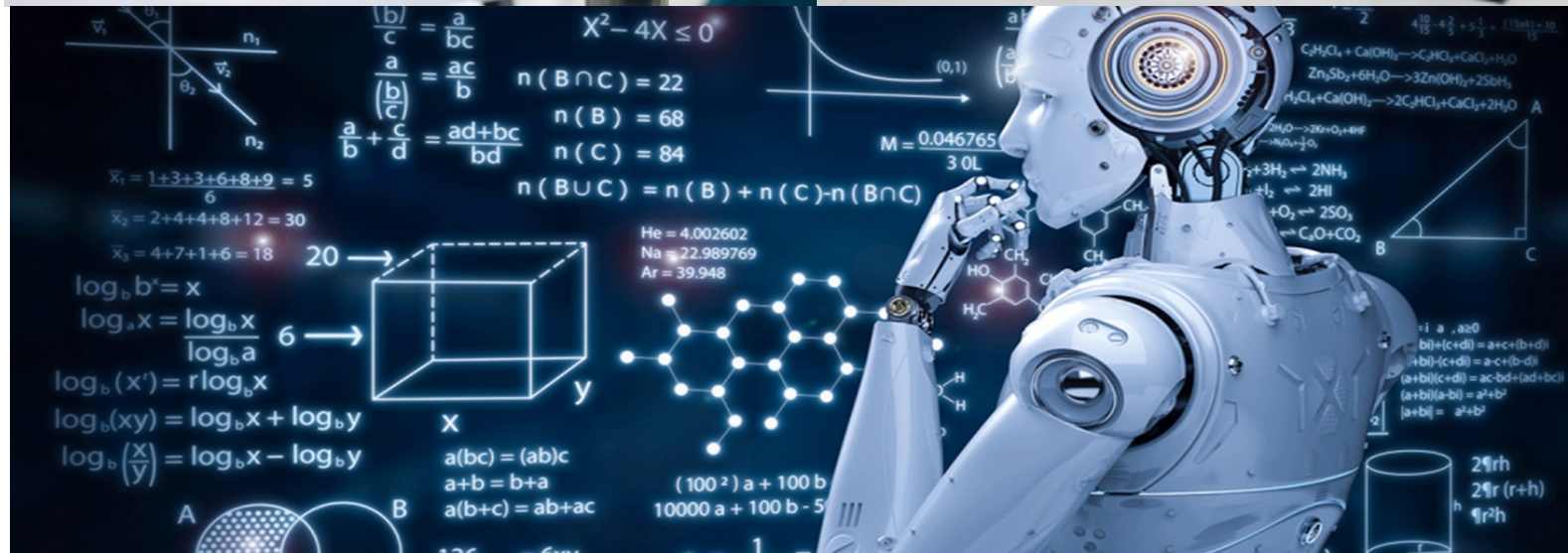
Need for new competencies



Roadmap towards the hospital of the future



“The patient first”



Prof. Pascal Verdonck
professor medical technology

Pascal.verdonck@ugent.be

www.engforhealth.be



Ghent University



@ugent



Ghent University