



1ª MESA: INFORME DE LA UNESCO SOBRE BIG DATA Y SALUD



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Big Data and Health

Preliminary Draft Report of the IBC

Madrid 2017

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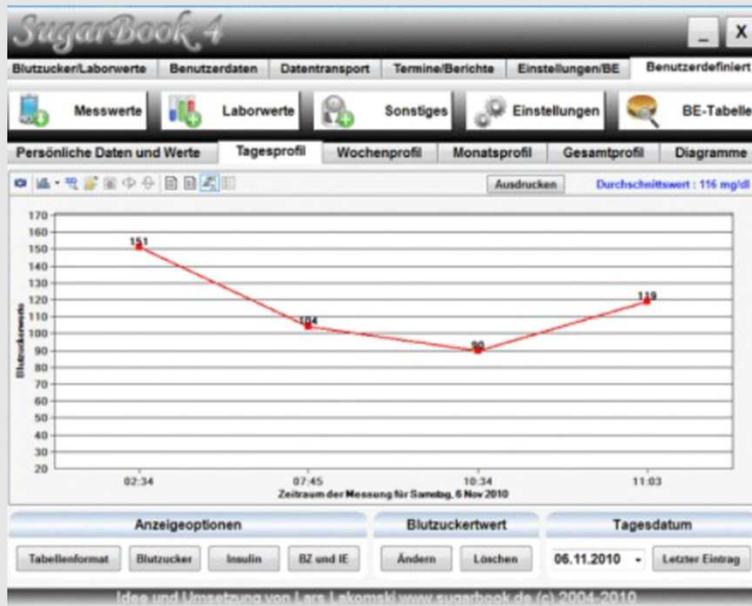
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Slide 2

The story of Felix, 4 years old

„Paper-Felix“
of traditional medicine



„Digital Felix“



Continuous assessment of

- Blood sugar
- Heart rate
- Skin resistance
- Sweating
- Movement

→ *Individual administration of insulin*

→ *40% less time of aggression and apathy*

Big Data. The 5 Vs

Volume

- The size of data

Velocity

- The speed at which the data is collected, processed and applied

Variety

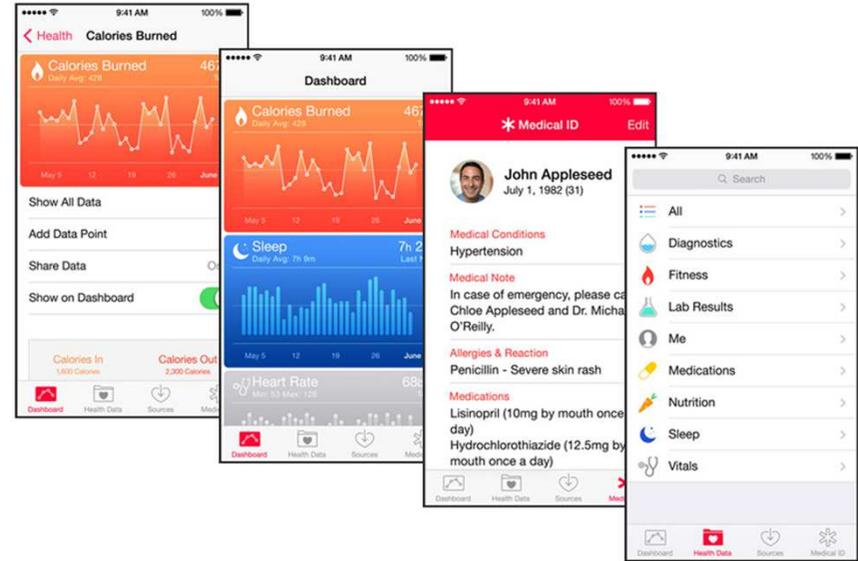
- The different types of data from different sources

Value

- The meaning of data

Validity

- The quality of data



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10 SEPTEMBER, 2015

U.S. FDA Accepts First Digital Medicine New Drug Application for Otsuka and Proteus Digital Health

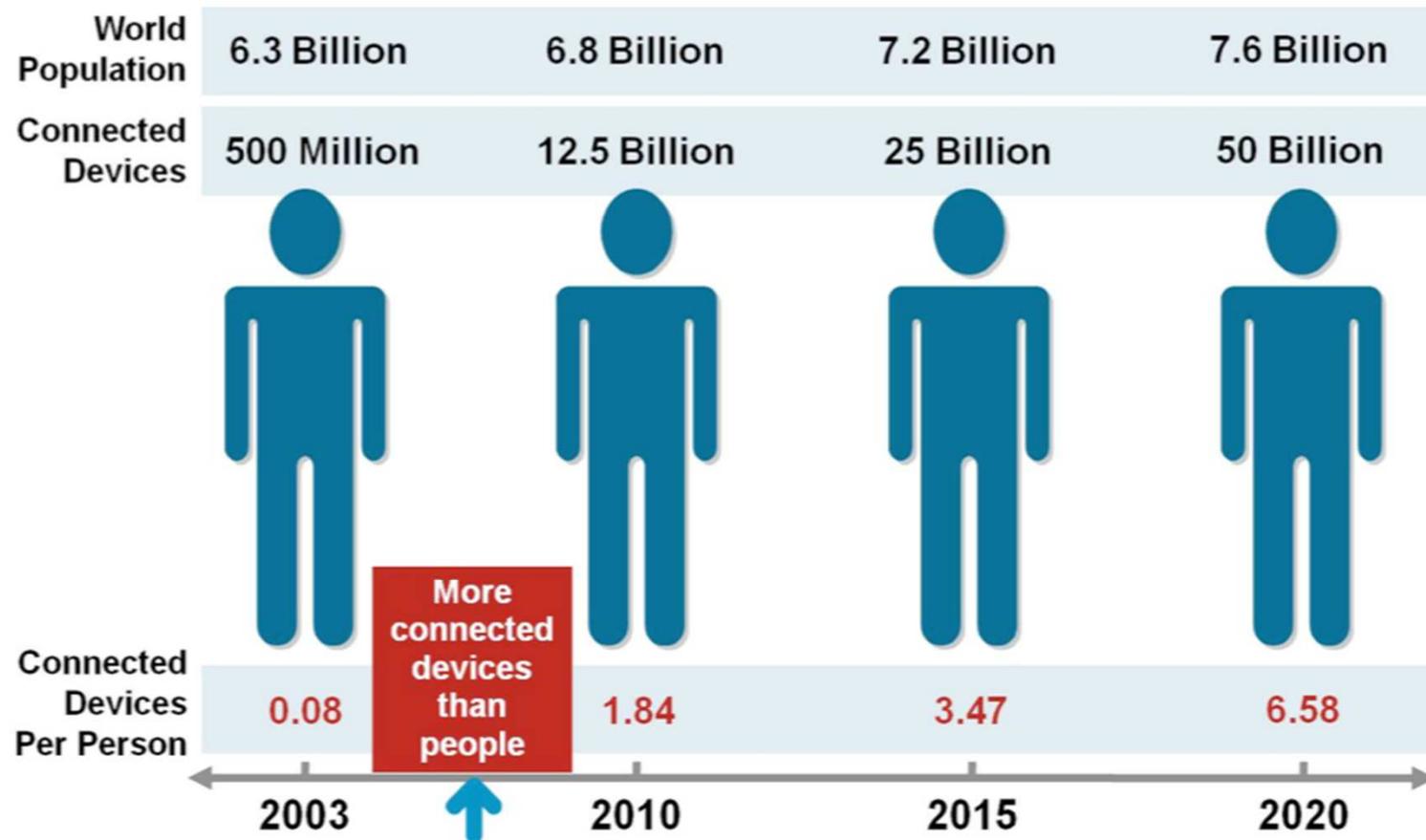
- **The first Digital Medicine, a drug/device product, combines Otsuka's ABILIFY® (aripiprazole) for serious mental illness, embedded with the Proteus® ingestible sensor in a single tablet to digitally record ingestion and, with patient consent, share information with their healthcare professionals and caregivers**
- **Otsuka and Proteus are pursuing a regulatory filing for a drug-device combination across multiple divisions of the FDA to support the unique system**
- **First opportunity to demonstrate the potential of Digital Medicines to provide an objective measure of medication adherence and physiologic response**

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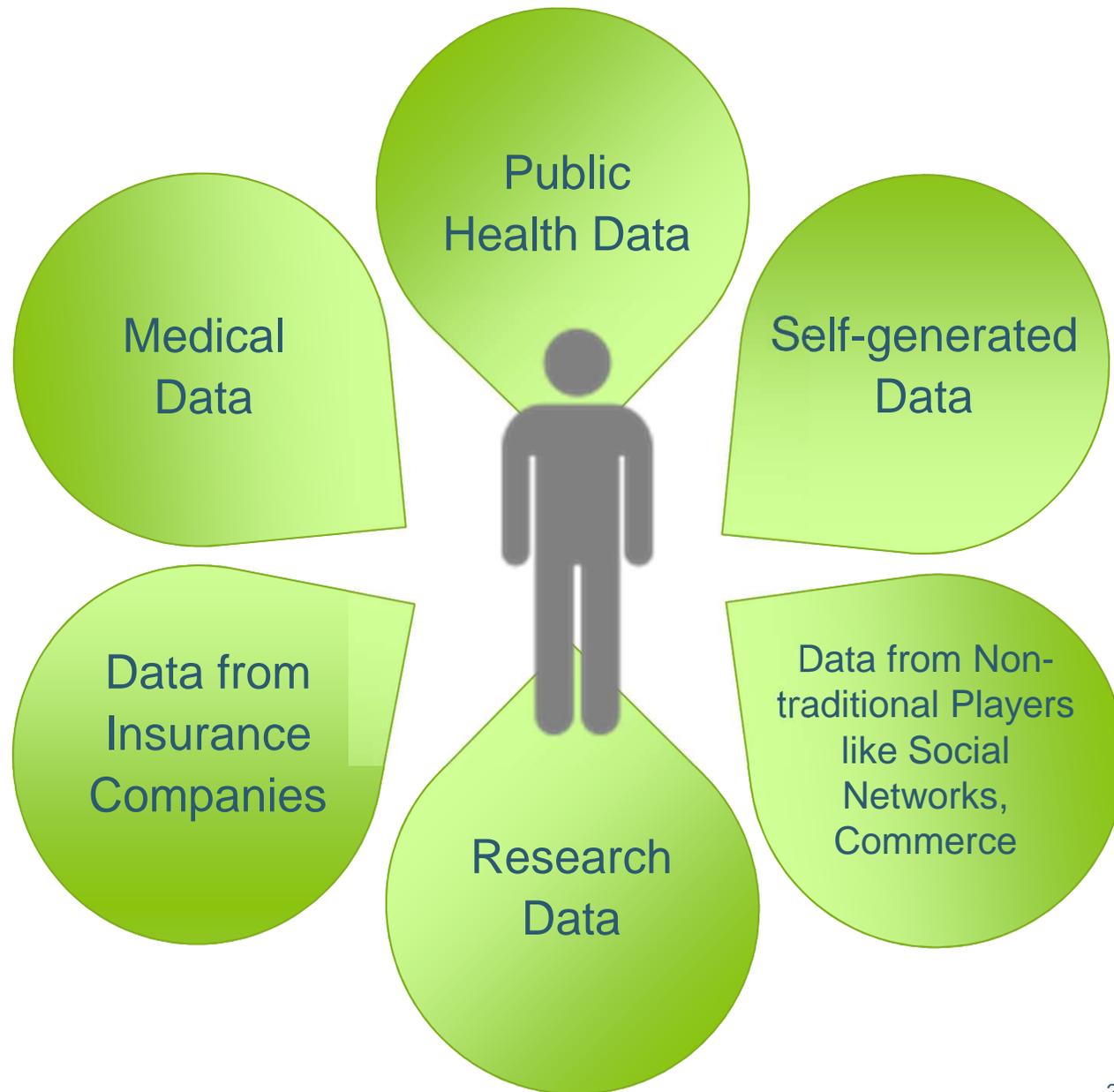
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Figure 1. The Internet of Things Was “Born” Between 2008 and 2009



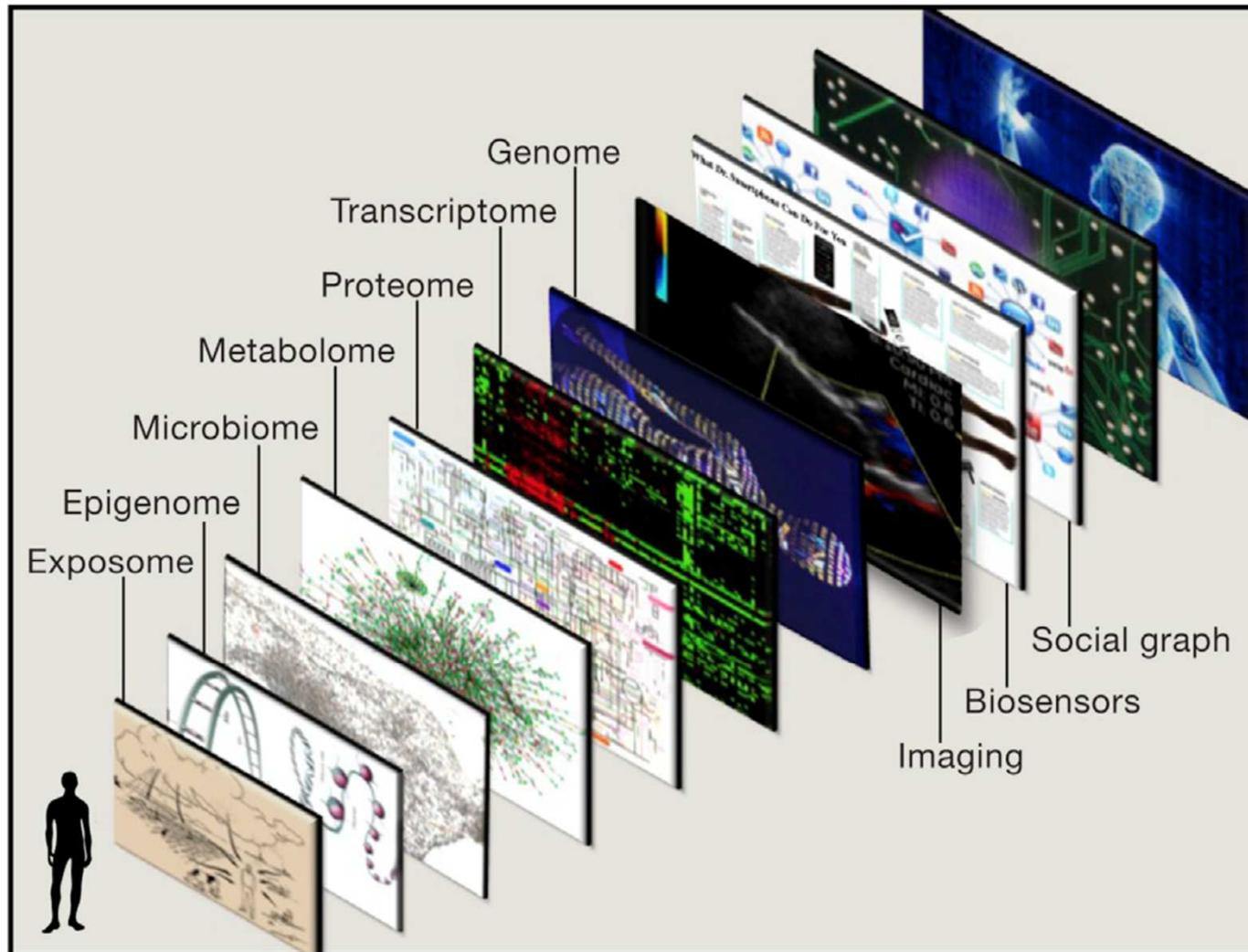
Source: Cisco IBSG, April 2011



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“The panoramic view”

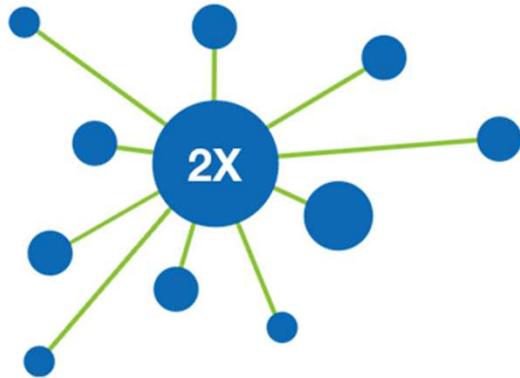
Geographic Information System of a Human Being

Topol, Cell 157, March 27, 2014

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The Data Explosion

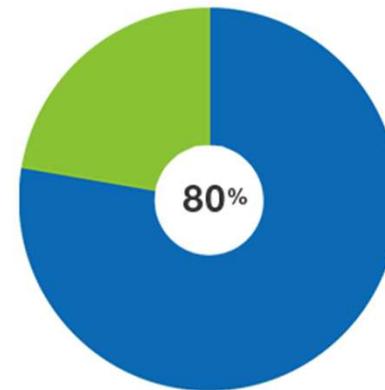
Medical data is expected to double every 73 days by 2020.



A Quick Study

Watson can read 40 million documents in 15 seconds.

<https://www.ibm.com/watson/health/>



The Great Unknown

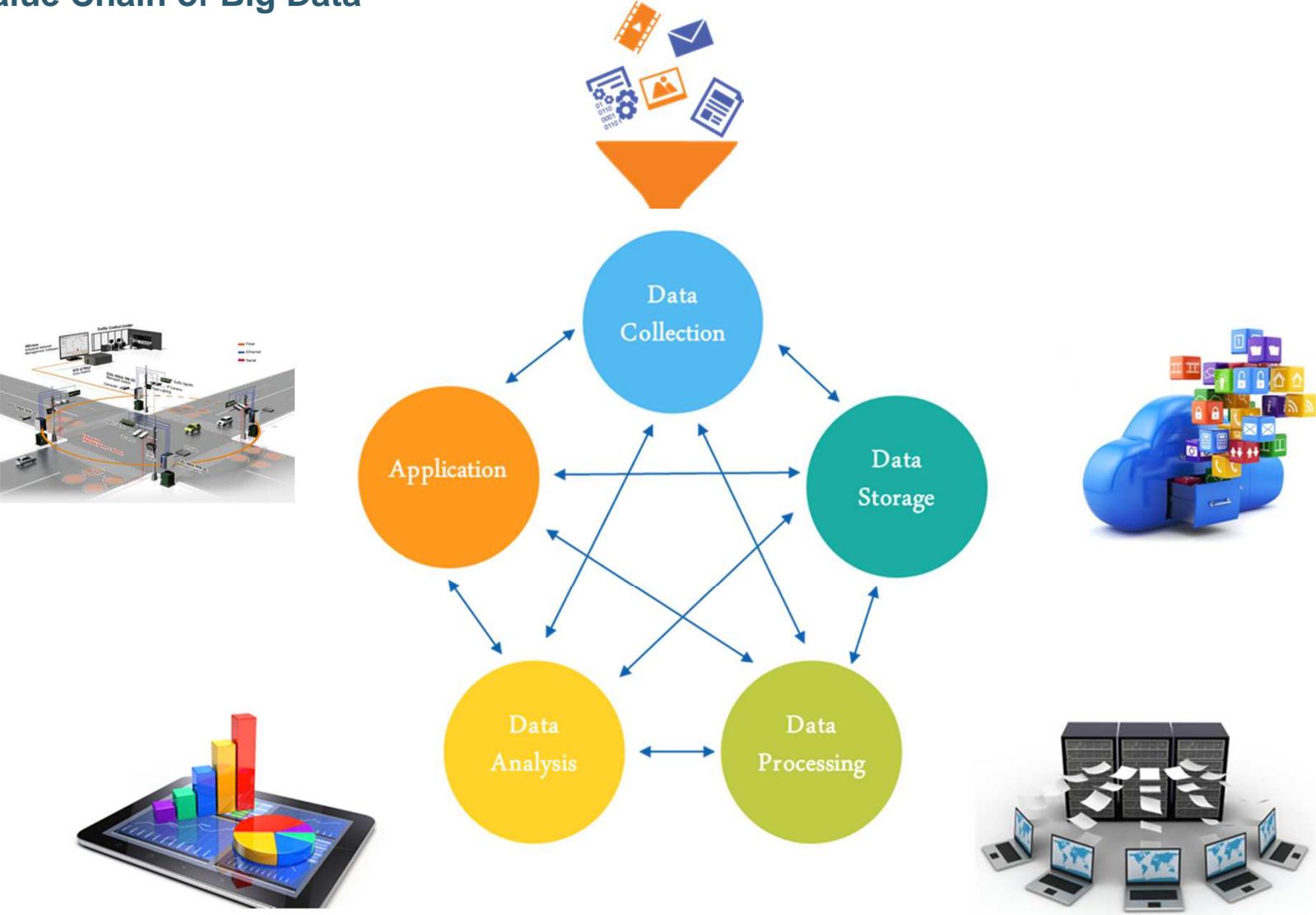
80% of health data is invisible to current systems because it's unstructured. Watson Health can see it.

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Value Chain of Big Data



Constitution of the World Health Organization

THE STATES Parties to this Constitution declare, in conformity with the Charter of the United Nations, that the following principles are basic to the happiness, harmonious relations and security of all peoples:

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

The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition.

The health of all peoples is fundamental to the attainment of peace and security and is dependent upon the fullest co-operation of individuals and States.

adopted 22 July 1946, New York

Vision of Big Data and health: Precision medicine and telemedicine

Personalized prevention and treatment

- targeted advice and
- the right intervention
- e.g. the right dosage of drugs
- at the right time
- for a specific person
- regardless where on this world



Berlin 2016
16 – 18 March

11th Global Summit of National Ethics / Bioethics Committees

Converging Technologies and Cybernetic Loops

*Rules for the digital human park
Two paradigmatic cases of breeding and
taming human beings: Human germline
editing and persuasive technology*

Rinie van Est, Jelte Timmer, Linda Kool, Niesl
Nijsingh, Virgil Rerimassie, Dirk Stemerding

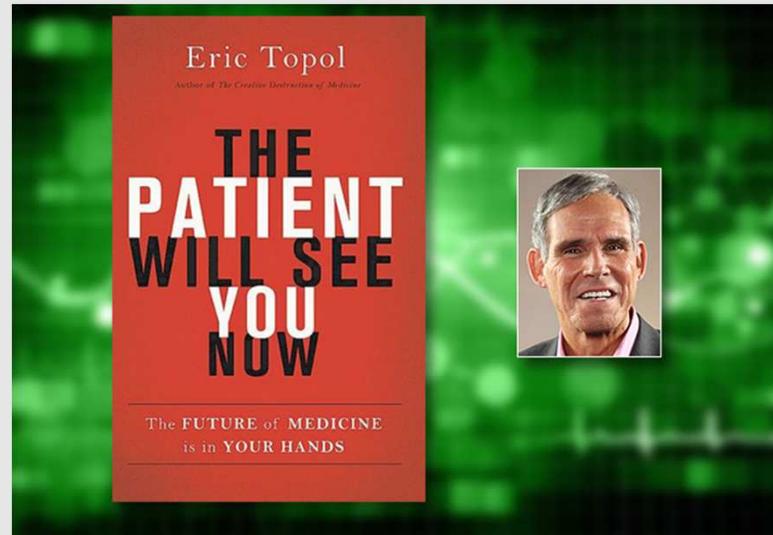


*„So while individuals are becoming
increasingly transparent,
our technological environment is
becoming ever more opaque.“*

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Slide 14



„We are embarking on a time when each individual will have all their own medical data and the computing power to process it in the context of their own world.“

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(At least) Four Paradigm Shifts in health care and public health

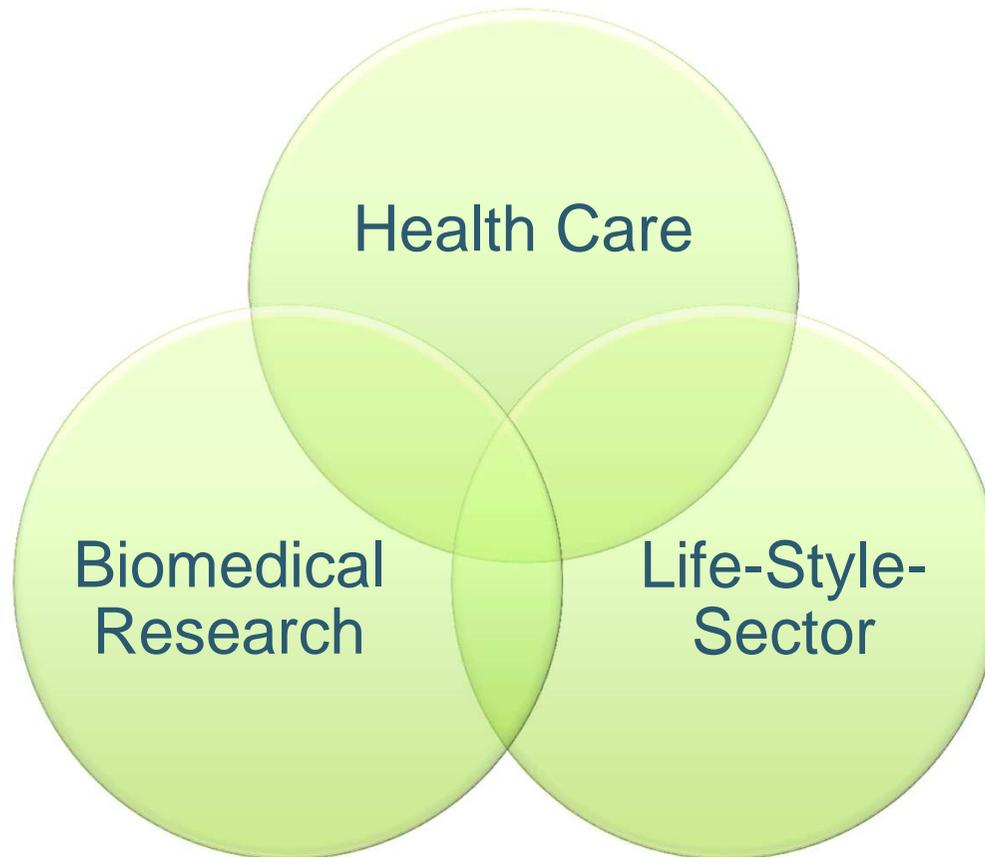


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Slide 16

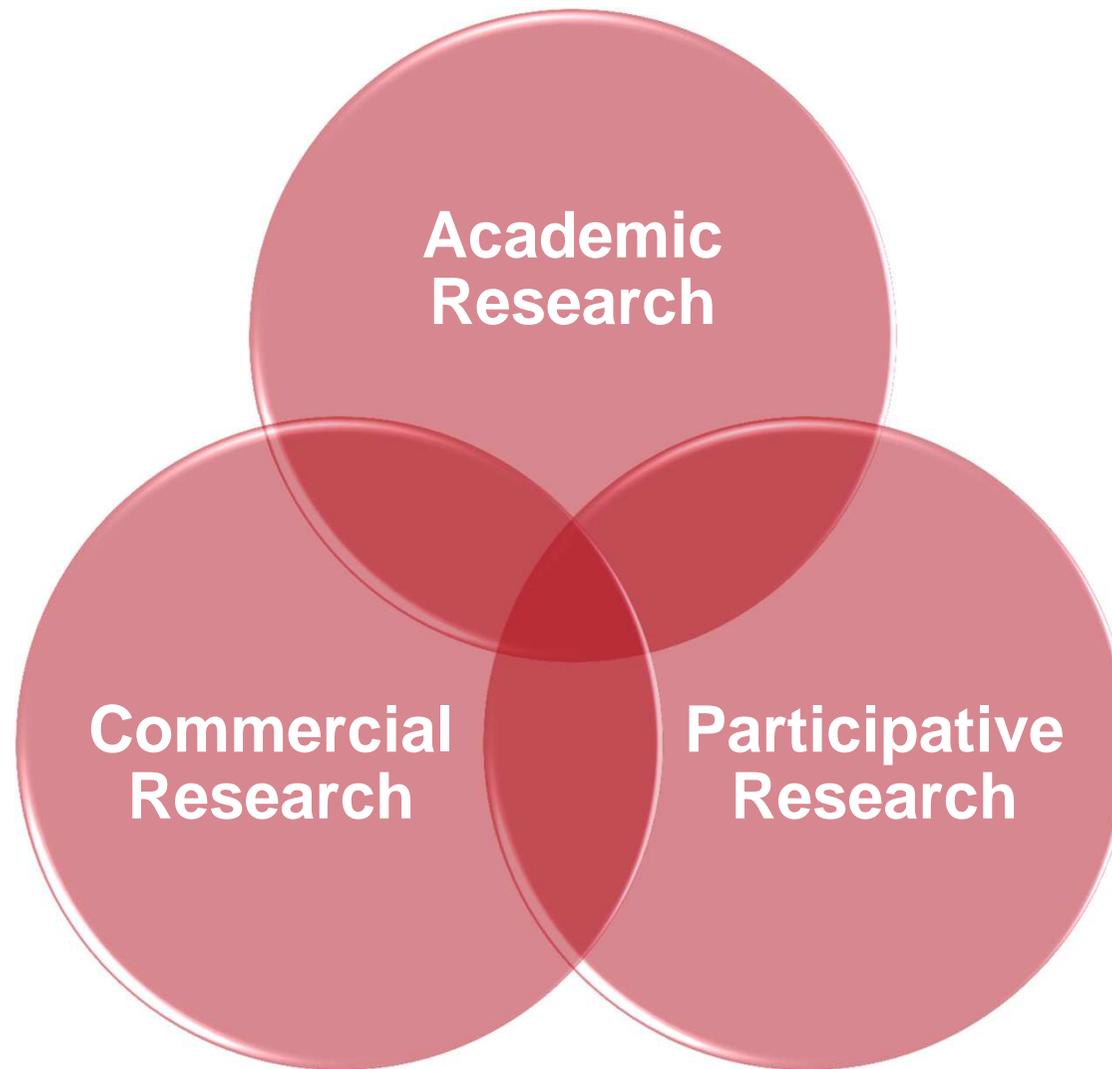
Blurring Lines



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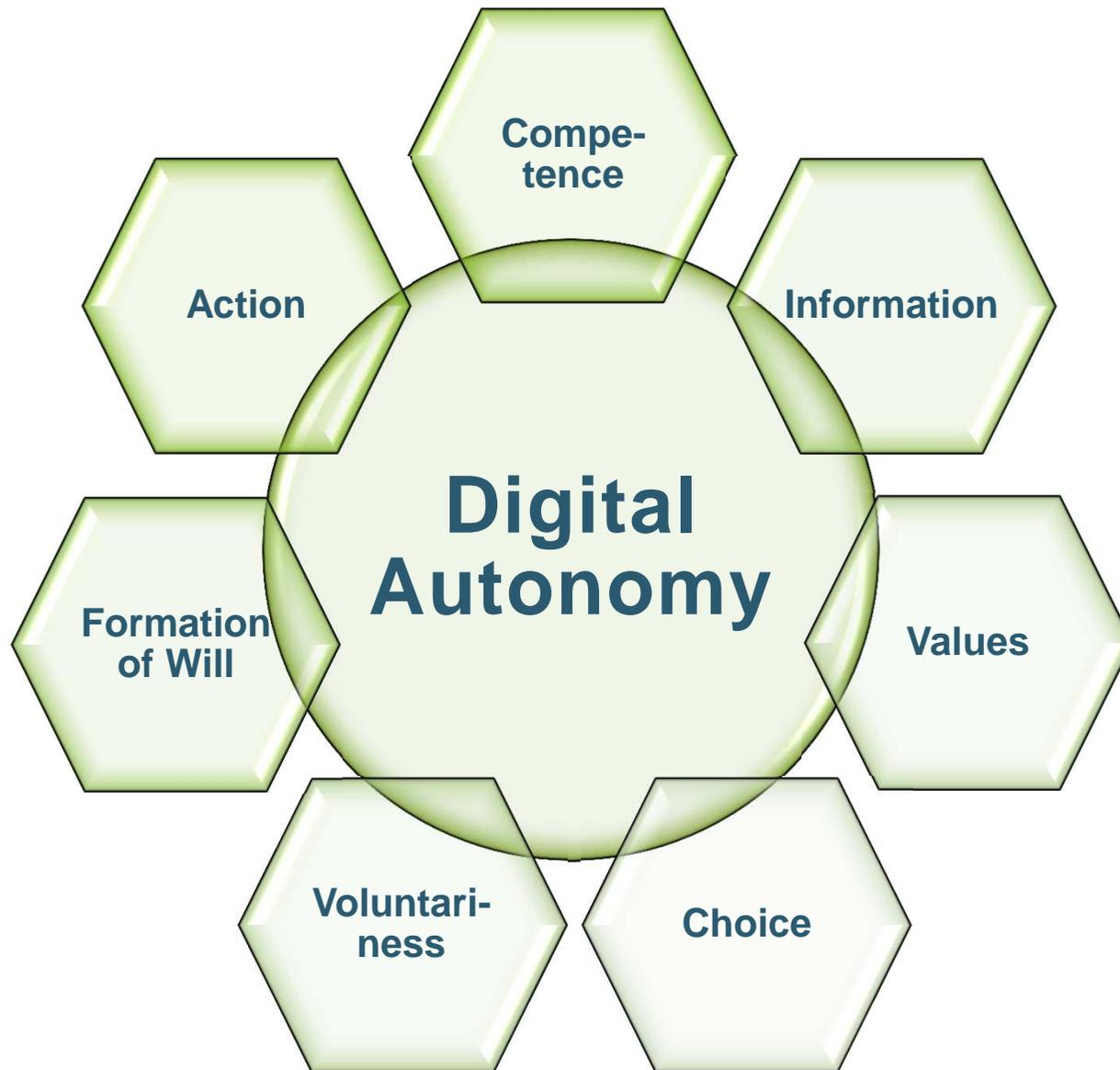
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Ethical Aspects

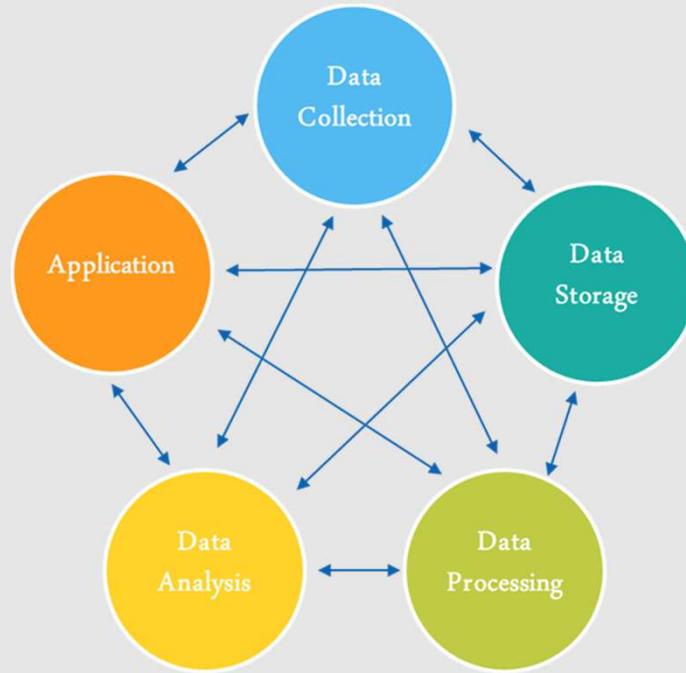




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Informed
Consent

Opt-in-/ Opt-
Out-Models

Broad
Consent

Dynamic
Consent

UDBHR Article 9 – Privacy and confidentiality

The privacy of the persons concerned and the confidentiality of their personal information should be respected. To the greatest extent possible, such information should not be used or disclosed for purposes other than those for which it was collected or consented to, consistent with international law, in particular international human rights law.

Traditional Principles of Data Protection are mainly counteracted by Big Data

Purpose binding and limitation

Data scarcity and minimization

Special protection of sensitive data

Data protection by technique and organization

In times of Big Data the right to respect for private life is more than data protection and entails intrusion into the private sphere by unwanted advertisement, recommendations and offers



APPLE'S 'DIFFERENTIAL PRIVACY' IS ABOUT COLLECTING YOUR DATA—BUT NOT YOUR DATA



Senior vice president of software engineering Craig Federighi.  JUSTIN KANEPS FOR WIRED

Differential privacy is the statistical science of trying to learn as much as possible about a group while learning as little as possible about any individual in it.

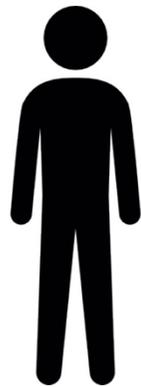
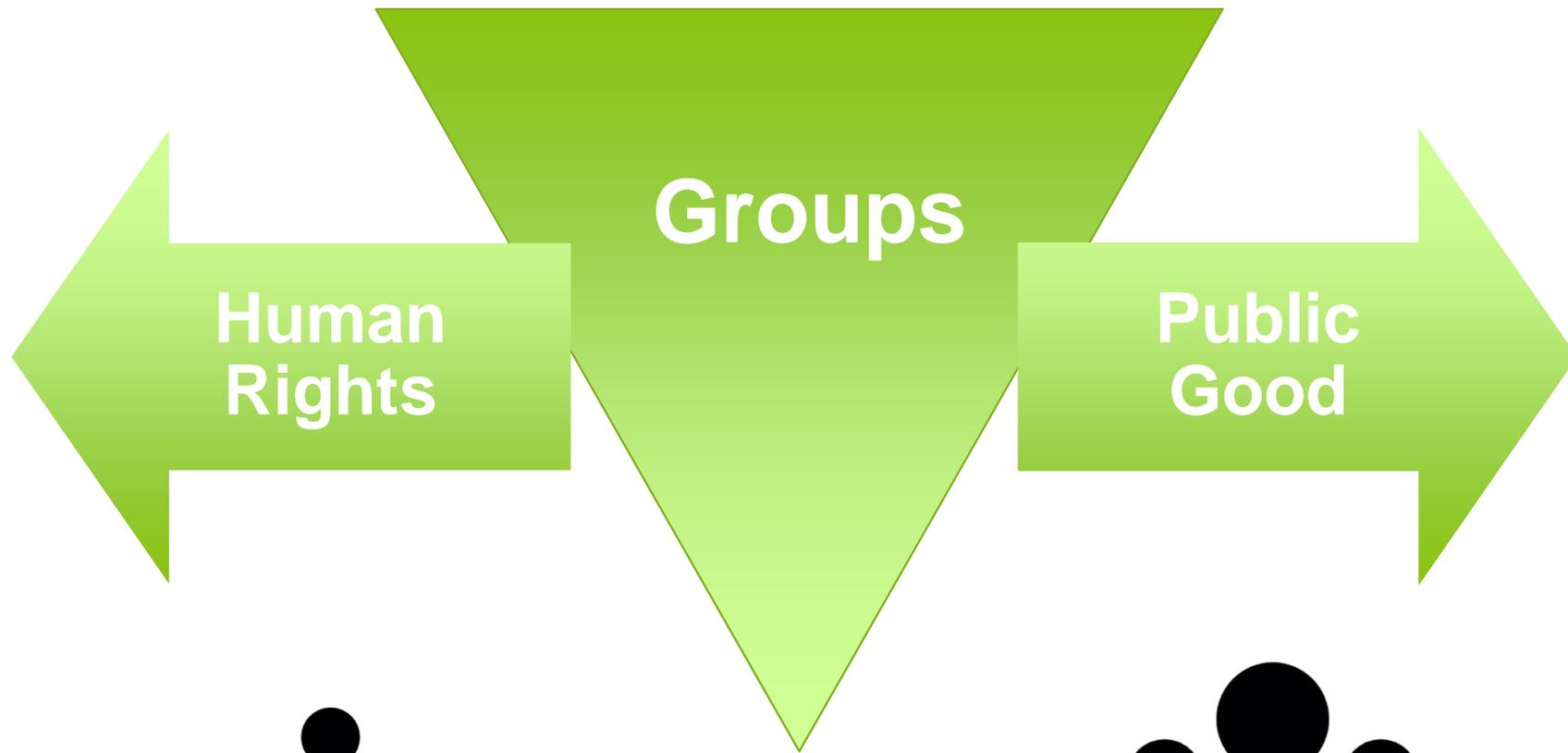
“We believe you should have great features and great privacy,” Federighi told the developer crowd. “Differential privacy is a research topic in the areas of statistics and data analytics that uses hashing, subsampling and noise injection to enable... crowdsourced learning

while keeping the data of individual users completely private. Apple has been doing some super-important work in this area to enable differential privacy to be deployed at scale.”

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„Sometimes the only way to protect the individual is to protect the group to which the individual belongs.“

Luciano Floridi



Justice

- Digital gap / divide
 - Access to health information and healthcare for everyone
 - Prerequisite: Access to ICT, sufficient equipment, motivation and skills
- Non-stigmatization and non-discrimination
- Sustainability: energy and environment



♥ Vitality - Health & Life Insurance That Rewards You For Being Healthy



Health Insurance

Our award-winning private health insurance gives you access to the best possible medical care if you get ill and need treatment. You won't just get looked after when you're in hospital - our care starts the minute you call us.



Life Insurance

Our philosophy is simple. Award-winning Life Insurance, Serious Illness Cover and Income Protection Cover that helps protect you and your family from the financial impact of illness, injury, disability and death.



Three groups of persons might be discriminated against:

- ✧ Who don't want to share their data
- ✧ Who cannot meet given standards
- ✧ Who don't want to meet given standards



Thank you very much for your attention!

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Slide 31