HEALTH SLAM '16
IoT for Healthcare Virtual Conference
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An IoT Slam® Production

Kollabio
HEALTH360

Going beyond Digital Health: Driving Ubiquitous and Continuous Wellness through Connected Living and Smart Sensors

Ashok Nare

Founder & CEO
Kollabio, Inc.

Technologist and Entrepreneur with over 20 years of hands-on, leadership and executive experience in building consumer facing and enterprise solutions, and leading high performance teams in multiple verticals. Worked as CTO for two startups prior to starting Kollabio.

Kollabio, Inc.

Kollabio is a Digital Solutions firm with a focus on building connected solutions using Wearables and IoT. Currently working on a Connected Digital Health platform called Health360.

Key Areas of Expertise

- Digital Health & IoT
- Digital Strategy & Transformation
- Cloud Architecture & DevOps
- Agile Systems Engineering & Delivery

Industries

- Healthcare
- Public Sector
- Transportation

Agenda.

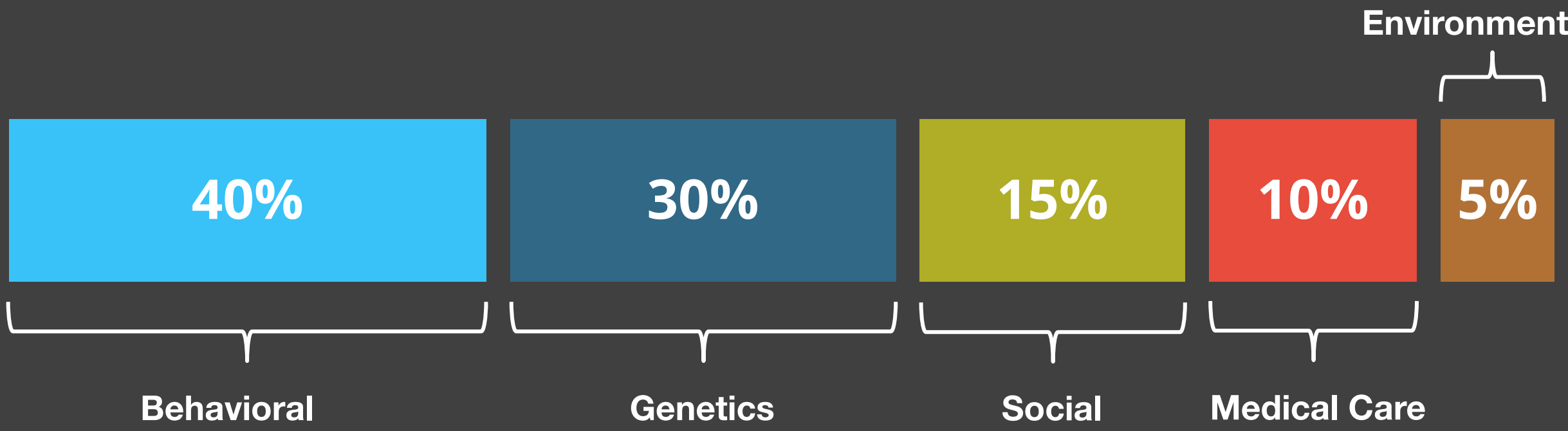
1. Challenges with Healthcare
2. Current Landscape of Digital Health
3. Market Forces Impacting Healthcare
4. Continuous Wellness w/ Smart Sensors
5. Closing Remarks

Challenges with Current Healthcare System

Lack of Holistic Context

Symptom Driven Reactive Care (Sick Care)

Factors Influencing Human Health



Source: McGinnis et al, Health Affairs, Vol 22(2)

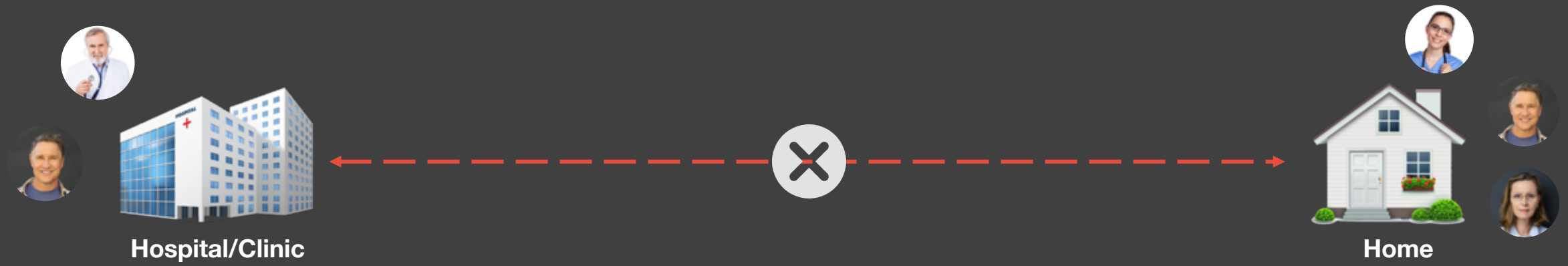
Focus is on "symptoms" around a specific episode

Lack of Care Continuity

Institutionalized or Localized Care Delivery

Healthcare is Fragmented and Reactive

Health/Wellness is “continuous” and is an integral part of our lives !



Care is delivered at “Point of Care” – Gaps in Care Continuum !

Digital Health is starting to address these challenges…

Current State of Digital Health

Technologies

- Wearables
- Bio-Sensors
- Genomics
- Data Analytics
- Connected Devices
- AI/Machine Learning

Capabilities

- Wellness Management
- Telehealth
- Patient Experience & Engagement
- Care Coordination
- Remote Monitoring
- Population Health

Top 10 Most Active Markets of 2016

By StartUp Health

DEALS & FUNDING | INVESTORS | 50+ MARKET

Genentech STARTUP +HEALTH

The Top 10 Most Active Markets of 2016 YTD

Patient / consumer experience remains a dominant market in the first half of the year, leading significantly in both funding amount and deal count.

	Market	$ Invested	# of Deals	Notable Deals
1	Patient / Consumer Experience	$958M	51	• Livongo • DocPlanner
2	Wellness	$854M	25	• Bloodbuy • Healthline
3	Personalized Health / Quantified-Self	$524M	19	• Guardant Health • Prenetics
4	Big Data / Analytics	$406M	19	• Lumiata • Apixio
5	Workflow	$328M	43	• Maxwell Health • Captricity
6	Clinical Decision Support	$234M	13	• ePatientFinder • RubiconMD
7	Medical Device	$227M	25	• MindMaze • Halo Neuroscience
8	E-Commerce	$172M	9	• Healthline • Bloodbuy
9	Research	$65M	7	• Elemental Machines • Strata Oncology
10	Population Health	$55M	8	• Virtual Health • Lightbeam Health Solutions

Note: StartUp Health Insights™ is inclusive of all seed, venture, corporate venture and private equity funding. • Source: StartUp Health Insights | www.startuphealth.com/insights

Disclosure: Information, data and figures represent publicly available data through 6/30/16. © 2016 StartUp Health, LLC

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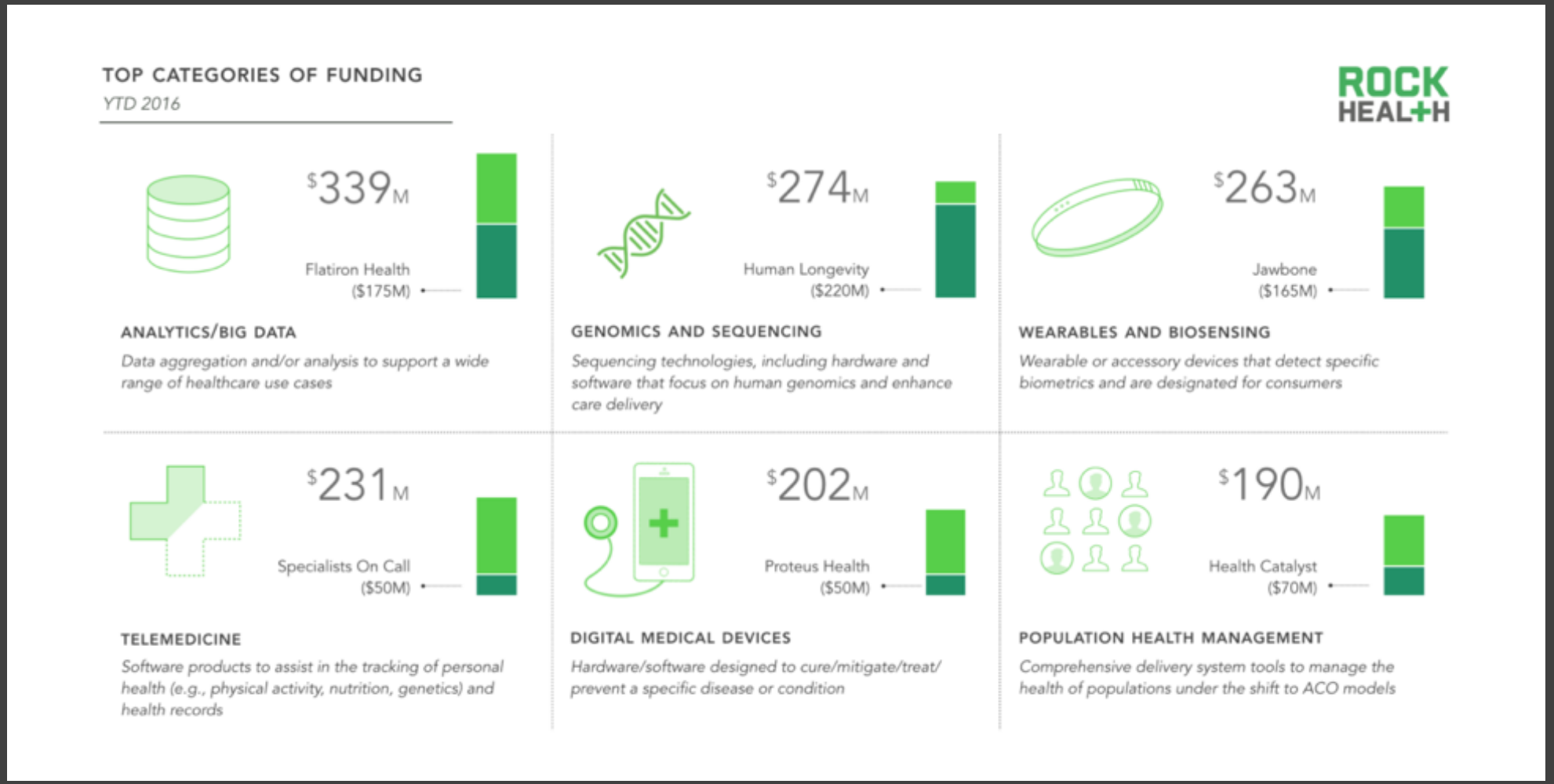
Active Digital Health Categories.

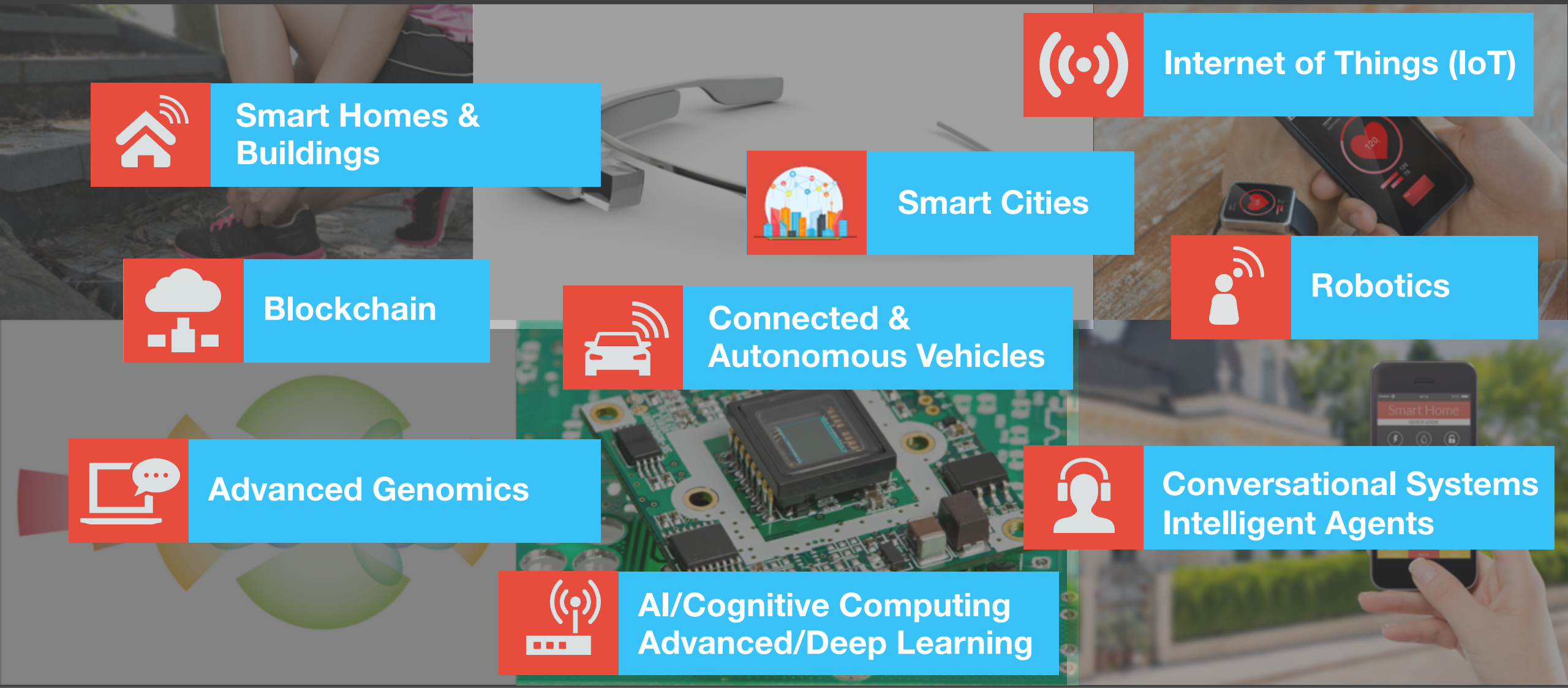


Rock Health, Q2, 2016.

What else is on the horizon?

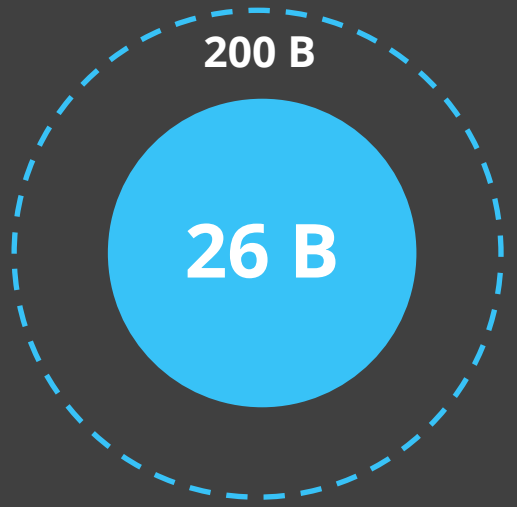
Digital Health
in the context of
Other Emerging Technology Trends

Emerging Technology Trends



- Internet of Things (IoT)
- Smart Homes & Buildings
- Smart Cities
- Robotics
- Blockchain
- Connected & Autonomous Vehicles
- Advanced Genomics
- Conversational Systems Intelligent Agents
- AI/Cognitive Computing Advanced/Deep Learning

Healthcare IoT Market Size

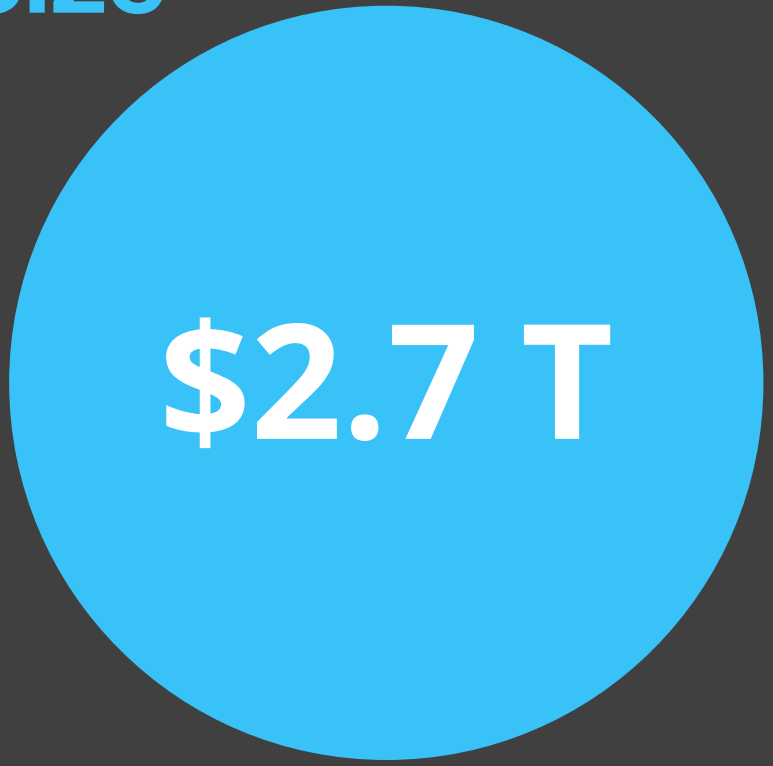


of “Things” connected by 2020

(Source: Cisco, Gartner, McKinsey, Intel….)

Healthcare IoT market by 2020.

(Source: Mind Commerce Report by MarketResearch.com)



Predicted global worth of IoT in Healthcare by 2025

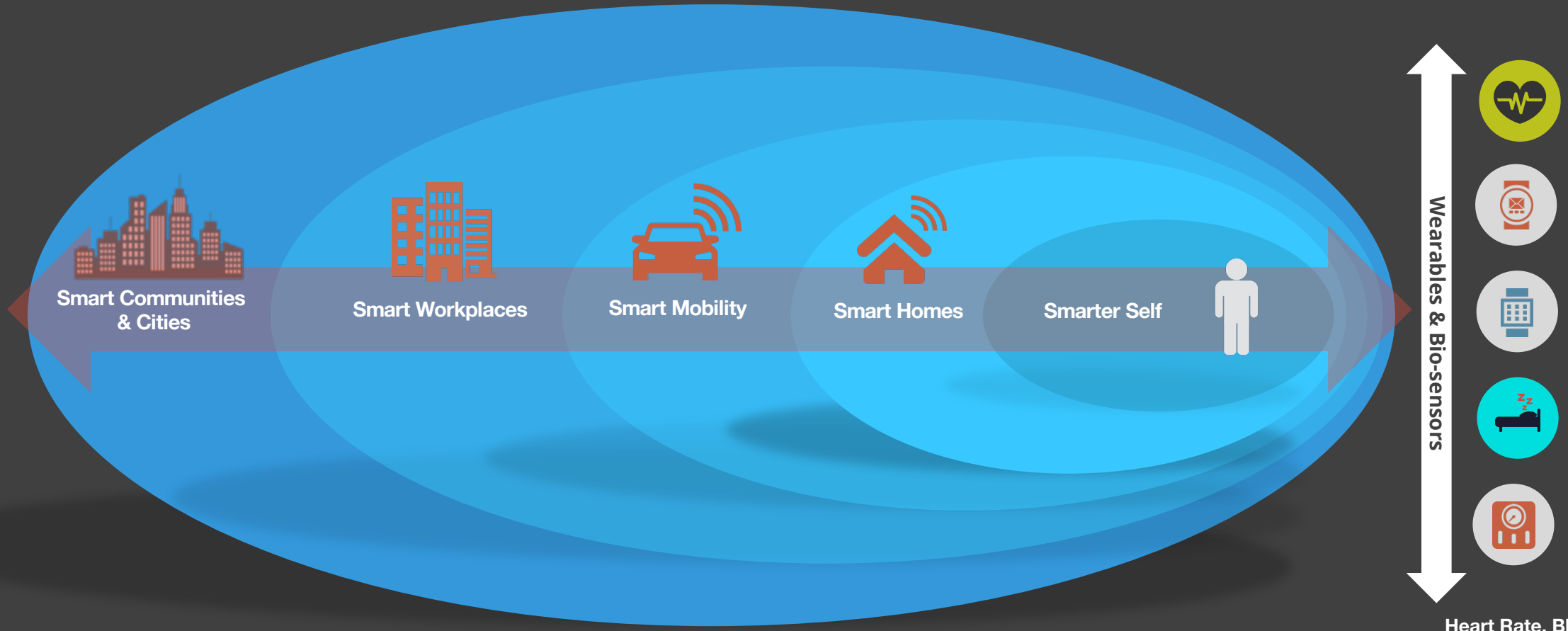
(Source: Intel, A guide to internet of things)

Innovations in IoT/Smart Sensors are gradually reshaping the the places we work, live and play (Homes, buildings, workplaces and cities)…

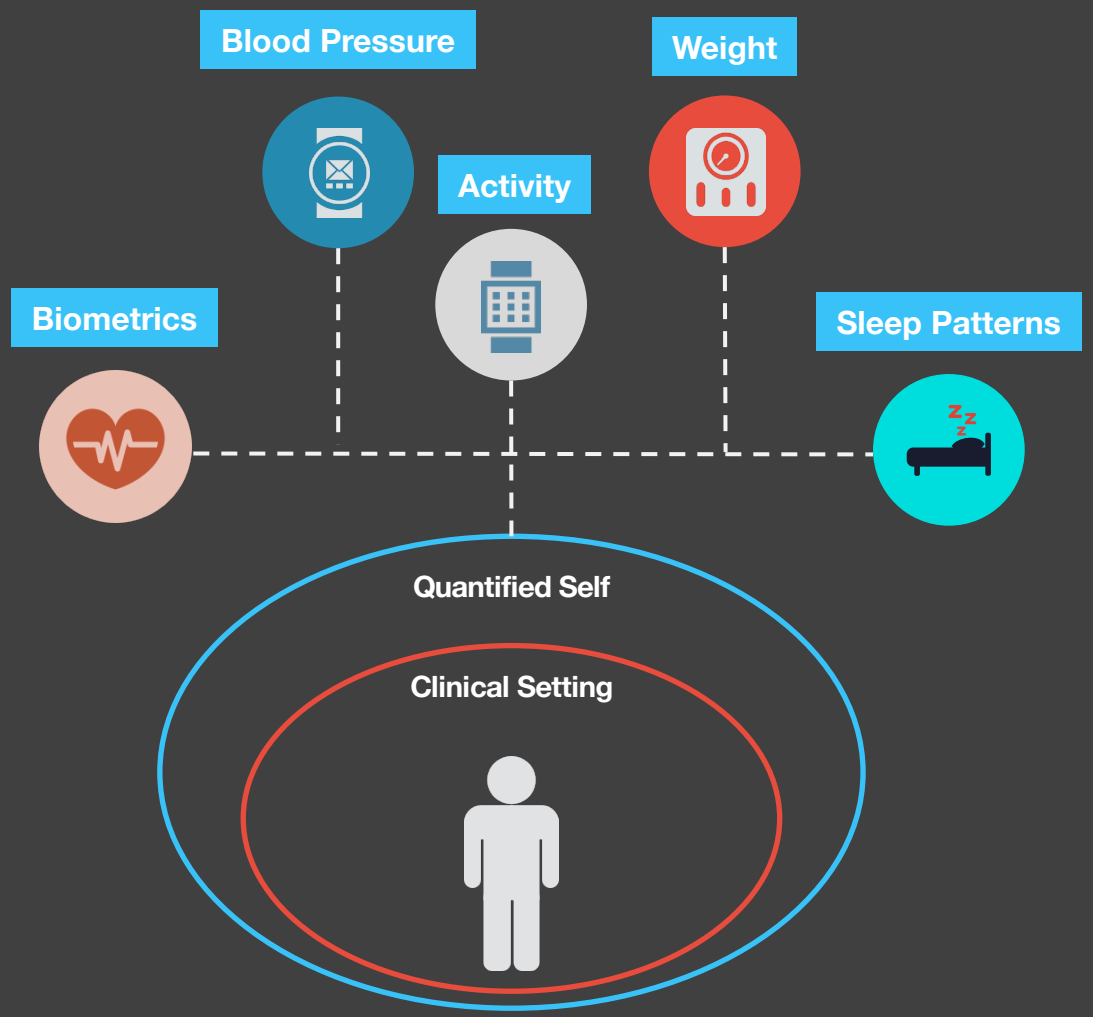
Soon, ubiquitous deployment of Smart Sensors will sense a whole range of features about the world around us….

…and help us better understand, manage and monitor our own Health/wellness as an integral part of our life.

The Layered Smart Health Ecosystem.



Smarter Self.



Wearables & Bio-Sensors.

Smarter Self

Features

- ✓ Wearable Fitness Devices
- ✓ Bio-sensors
- ✓ Connected Medical Devices

Usage Scenarios

- ✓ Continuous collection of bio-markers.
- ✓ Personal health checks at home.
- ✓ Remote condition monitoring and collaboration with providers.
- ✓ Real-time notifications to family members in emergencies.
- ✓ Assist with musculoskeletal and neurological disorders
- ✓ Become an extension of us – communicate with each other – augmented decision making

Emerging Wearables & Sensors.

Vital Signs Monitoring

Source: Scanadu Scout

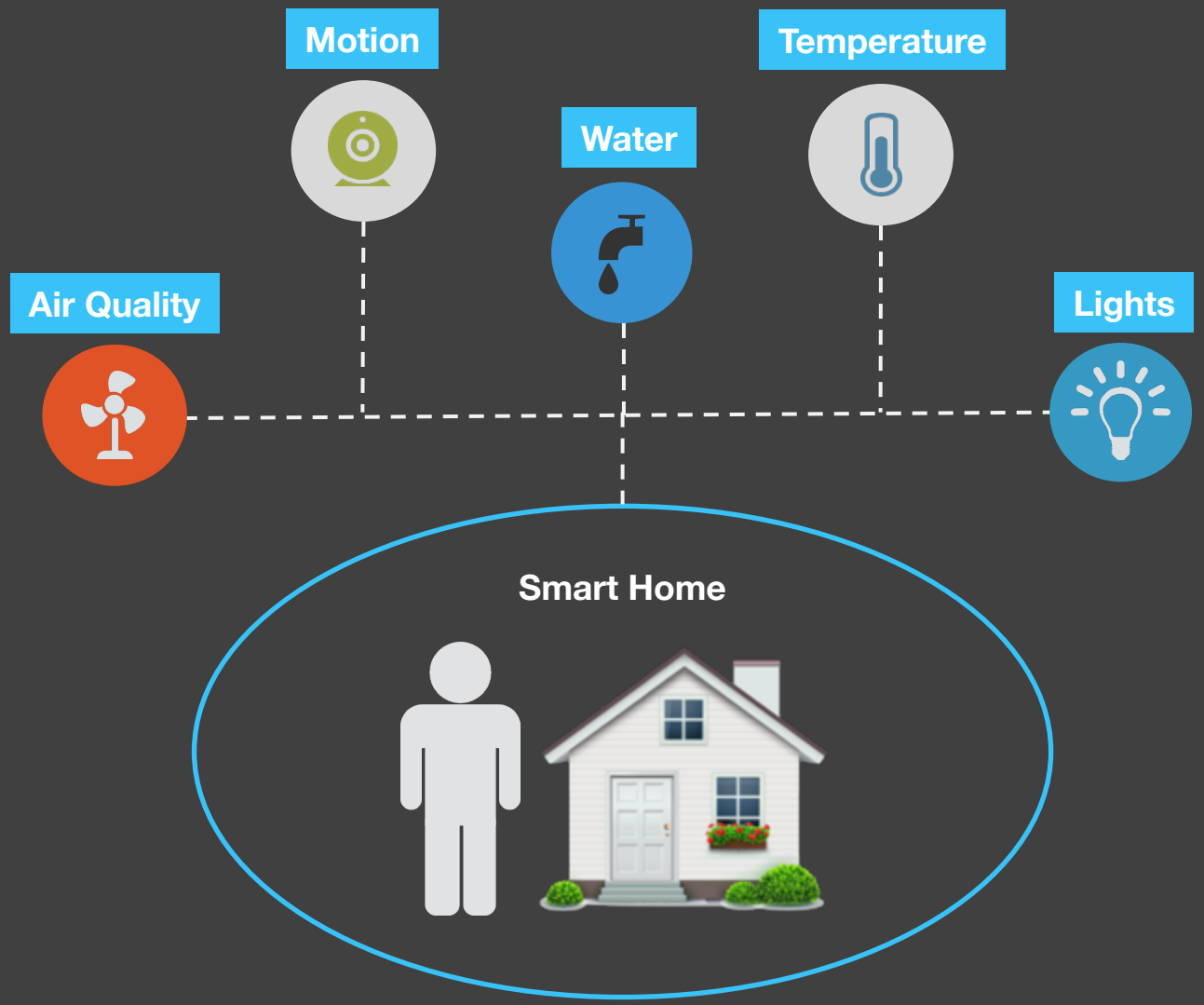
Brain Monitoring & Cognitive Assessment

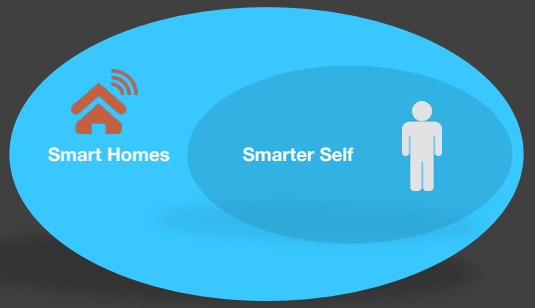
Source: Emotiv

Advanced Cardiac Care

Source: iRhythm

Smart Homes.





Features

- ✓ Temperature and environment control.
- ✓ Water and Air quality monitoring.
- ✓ Motion and Presence detection.
- ✓ Automation of lights and appliances.

Usage Scenarios

- ✓ Monitor for deviations from normal patterns.
- ✓ Remote monitoring of elderly and chronic care.
- ✓ Real-time alerts on environmental quality.
- ✓ Security and safety for the occupants.

Emerging Smarter Home Devices.

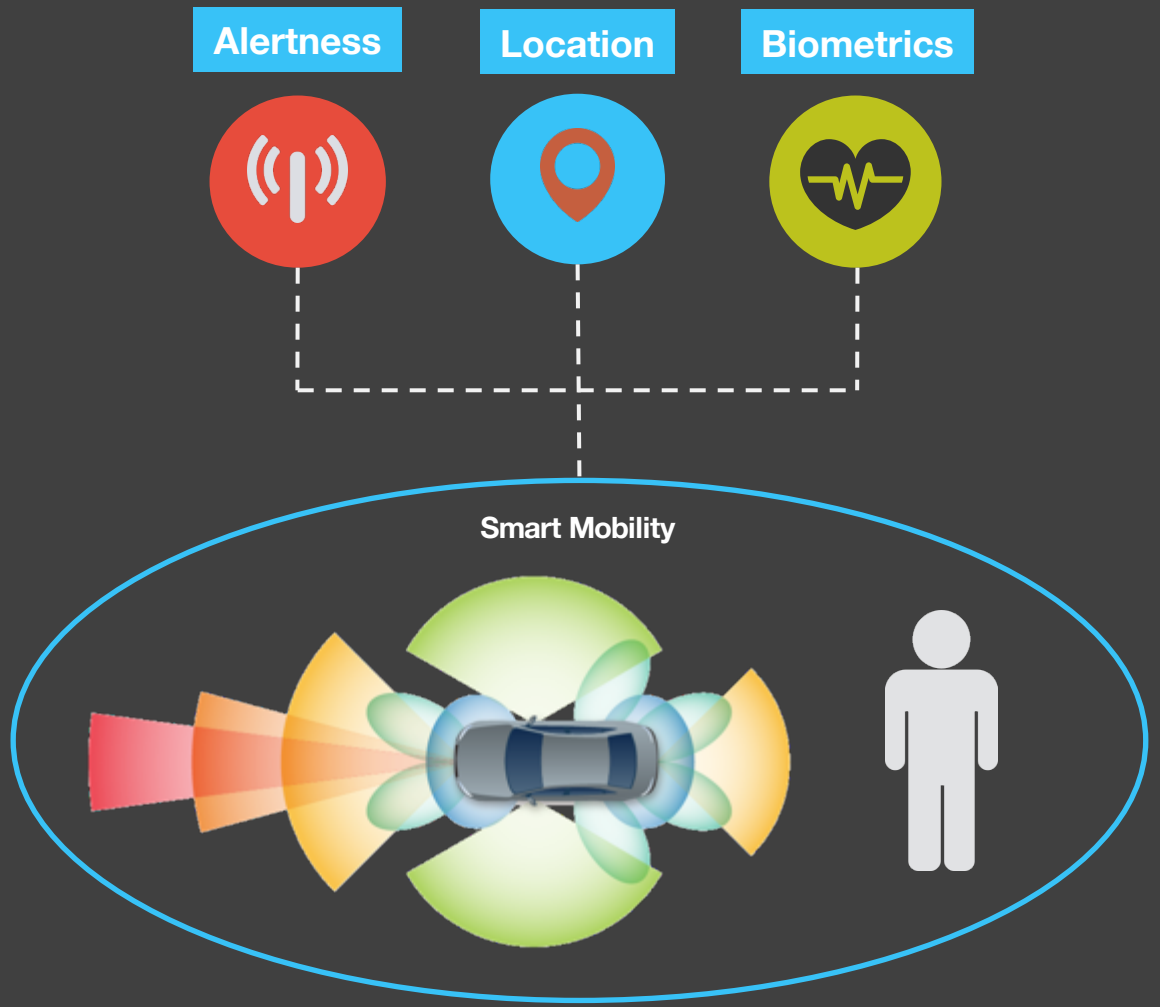
Integrated Interfaces

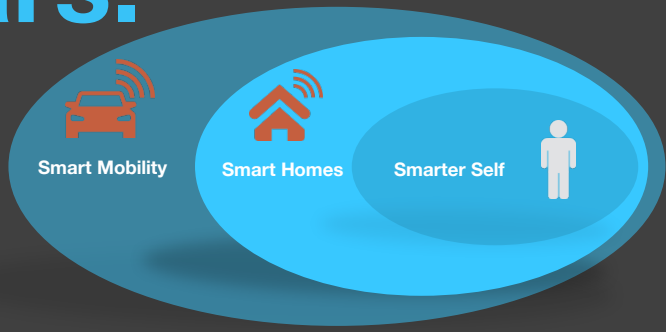
Personal Home Health Robot
(Source:Pilo)

Conversational Devices
(Source:Amazon Echo)

- ✓ Track Medication Adherence
- ✓ Dispense Medications
- ✓ Order Refills
- ✓ Connect with Care providers
- ✓ Control Other Devices
- ✓ Control temperature and humidity

Smart Mobility/Connected Cars.





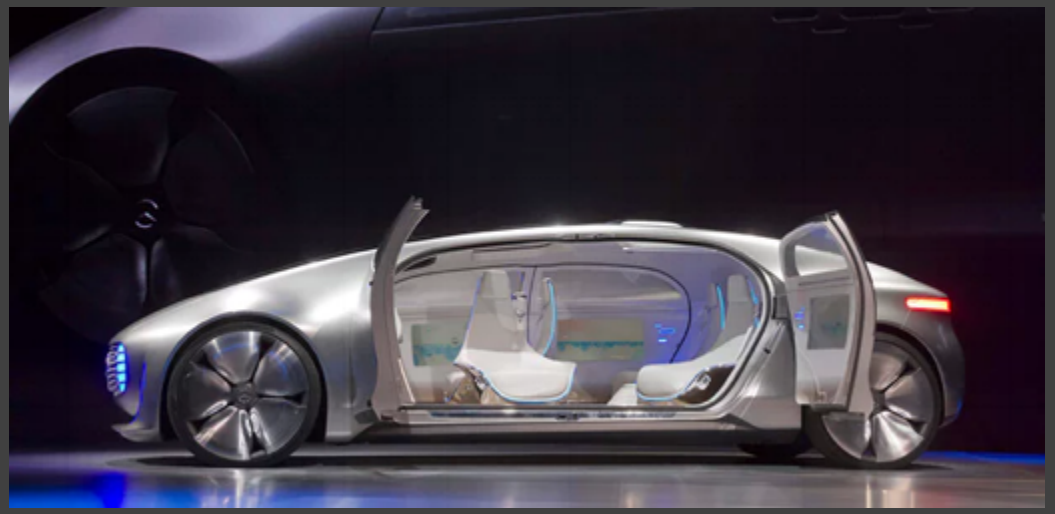
Features

- ✓ Embedded Biosensors.
- ✓ Condition Monitoring.
- ✓ Location Tracking.
- ✓ Autonomous driving and Driver-assist.
- ✓ Real-time Notifications.

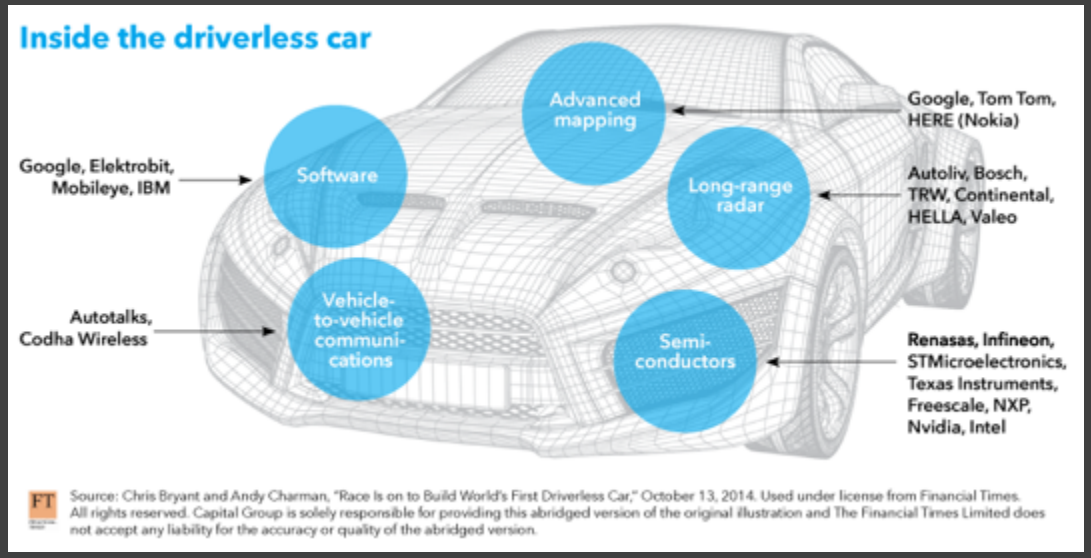
Usage Scenarios

- ✓ Personalized recommendations based on location and Geo-fencing.
- ✓ Continuous monitoring of select bio-markers through embedded sensors
- ✓ Posture and alertness detection of drivers
- ✓ Traffic monitoring and driver assist to avoid accidents due to lack of driver attention
- ✓ Drive to the near-by healthcare facility in case of an emergency

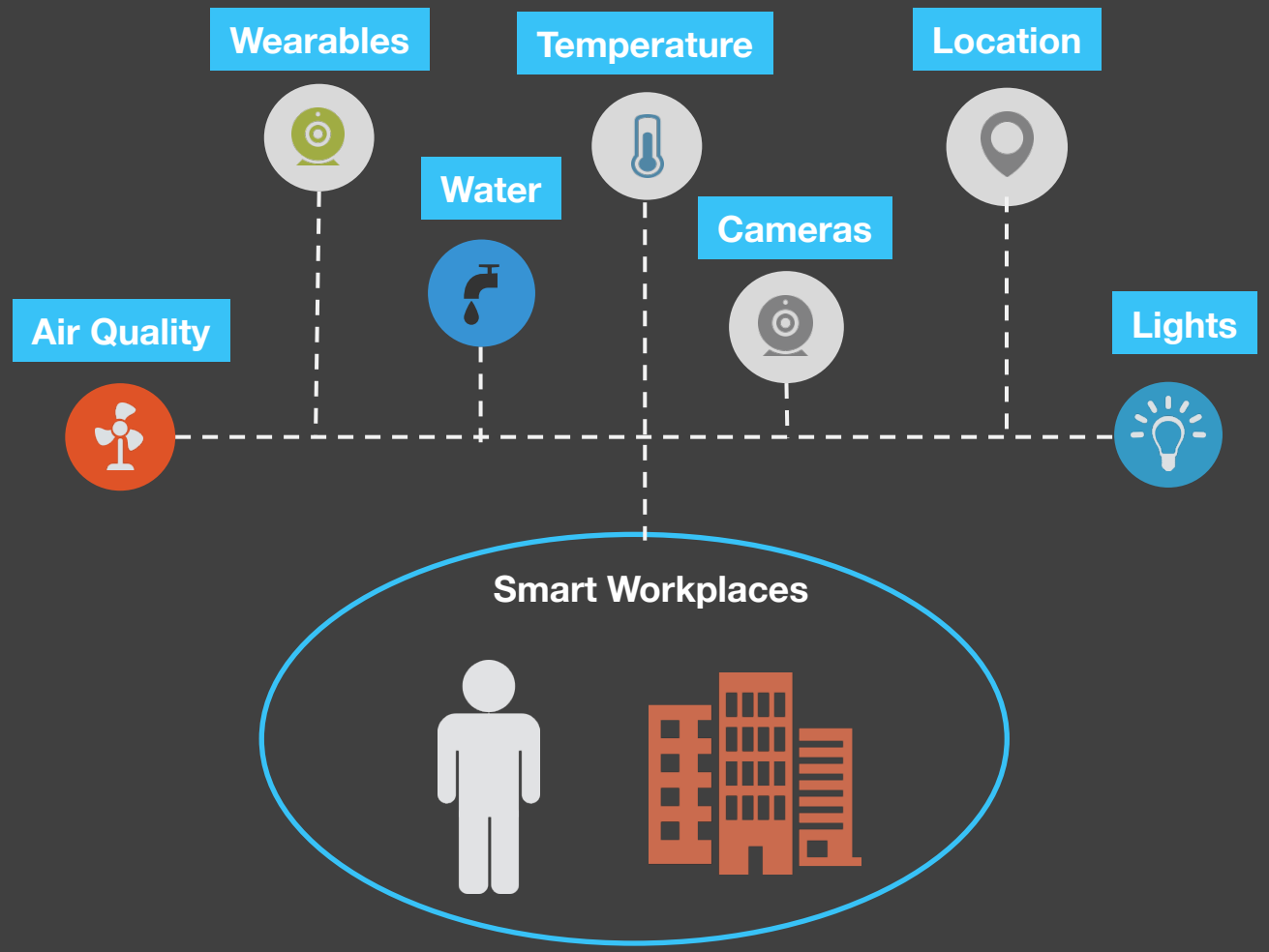
Driverless Car Interface
(Source:wsj.com/Tesla)

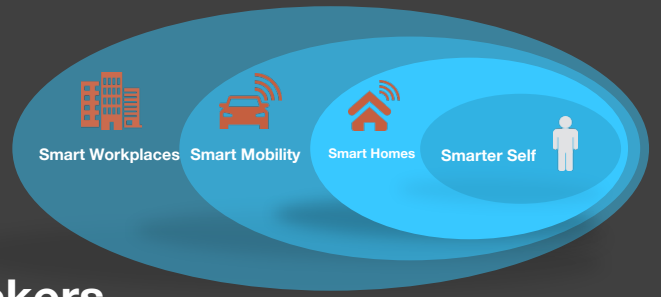


Driverless Concept Car
(Source:The Guardian/Mercedes)



Smarter Workplaces.





Features

- ✓ Wearable Trackers.
- ✓ Smart Buildings.
- ✓ Embedded Smart Sensors.
- ✓ Real-time Notifications.
- ✓ Integrated with Employee Details.

Usage Scenarios

- ✓ Focus on Safety, Health and Wellness of Employees.
- ✓ Productivity optimization through Wellness initiatives (Wearables).
- ✓ Real-time Notifications on safety and conditions of work sites.

Smarter and Safer Workplaces.

- ✓ Wearables and Wellness programs with a focus on Health and Productivity.
- ✓ Automated monitoring of bad postures and safety risks (Desk Jobs).
- ✓ Real-time Notifications of employee and workplace safety (Factory/Mines).
- ✓ Monitoring of environmental conditions and safety hazards (Mines).
- ✓ Connectivity between workers and machines through Wearables and IoT.
- ✓ Heads-up display through augmented reality (Warehouses, Factories).
- ✓ Safer, more comfortable and productive workplaces/smart buildings.

Smarter Workplace Examples.

Connected Accessories
(Source:Smart Cap)

Augmented Reality
(Source:Atheer AiR Glasses)

Smart Seating/Desk
(Source:HumanScale)

Smart Communities & Cities.

Smart Lighting

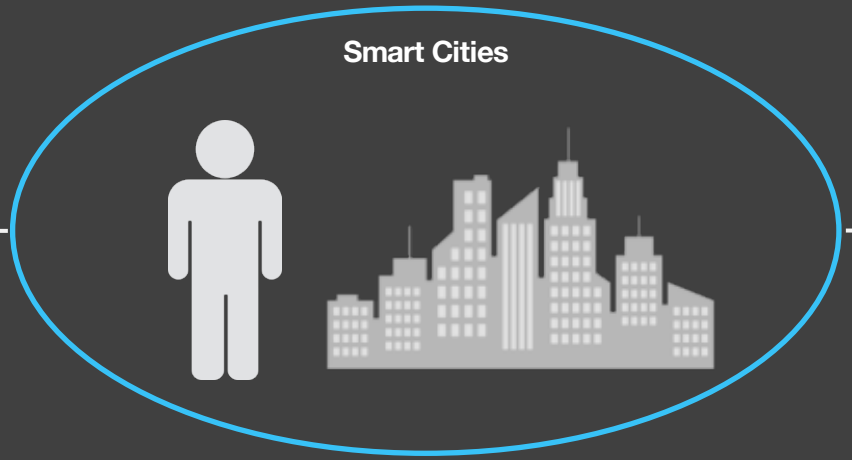
Traffic Management

Smart Mobility

Location Intelligence

Temperature Monitoring

Smart Sensors for Traffic, Infrastructure, Streets, Buildings and Environment



Connectivity

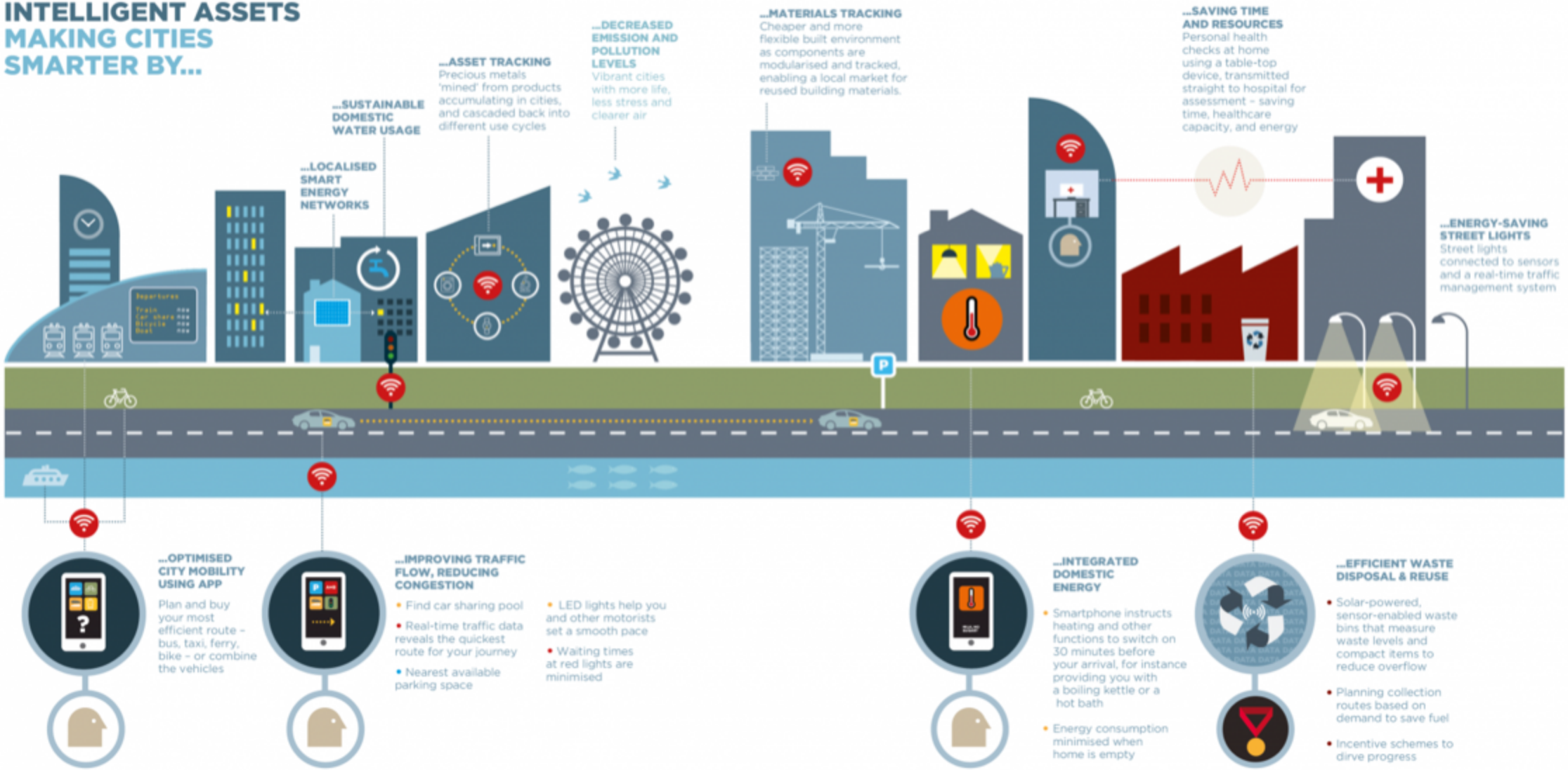
Water Quality Monitoring

Air Quality Monitoring

Cameras

- ✓ Efficient, Safe and Productive Buildings
- ✓ Efficient, Smart, Safe Lighting.
- ✓ Real time alerts on Environmental quality.
- ✓ Community based health monitoring
- ✓ Personal Health integrated with Population Health

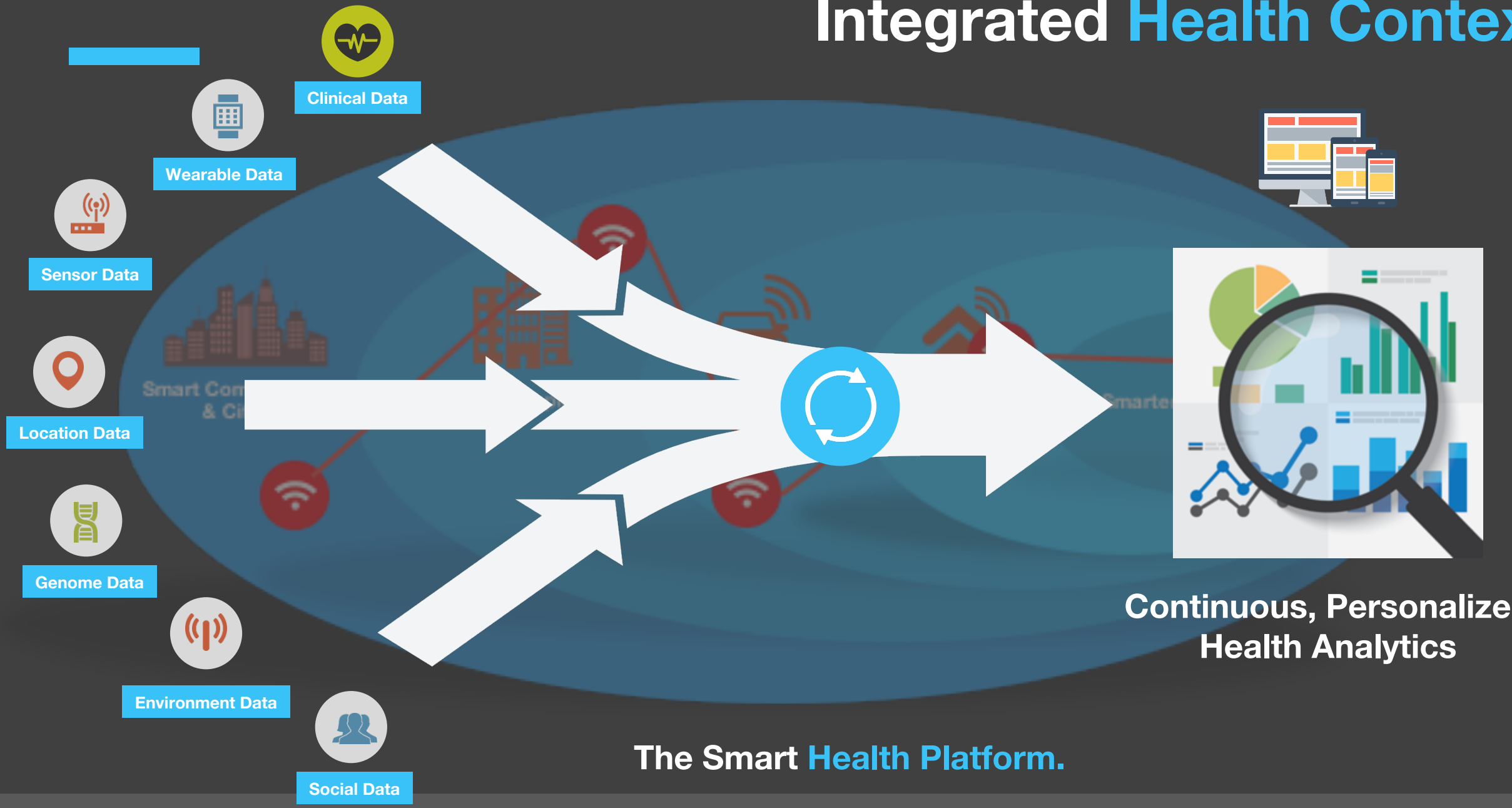
INTELLIGENT ASSETS MAKING CITIES SMARTER BY...



SOURCE: World Economic Forum and Ellen MacArthur Foundation, *Intelligent Assets – Unlocking the circular economy potential* (2016)
www.ellenmacarthurfoundation.org/publications/intelligent-assets

ELLEN MACARTHUR FOUNDATION

Integrated Health Context.



The Smart Health Platform.

Challenges Remain.

Privacy and Security

- Information security
- De-identification where applicable
- Potential for unintentional inferences and economic decision making
- Consumers should have control over their data and decide who sees it

Digital Adoption

- Awareness of technology
- Training and education for both consumers and care providers
- Digital solutions that are designed for the target user base

Interoperability

- Need for standards to enable different “things” to work with each other seamlessly

Payment Models

- Reimbursements and reward models for digital health interventions are still in progress
- Industry needs to catch up with innovation

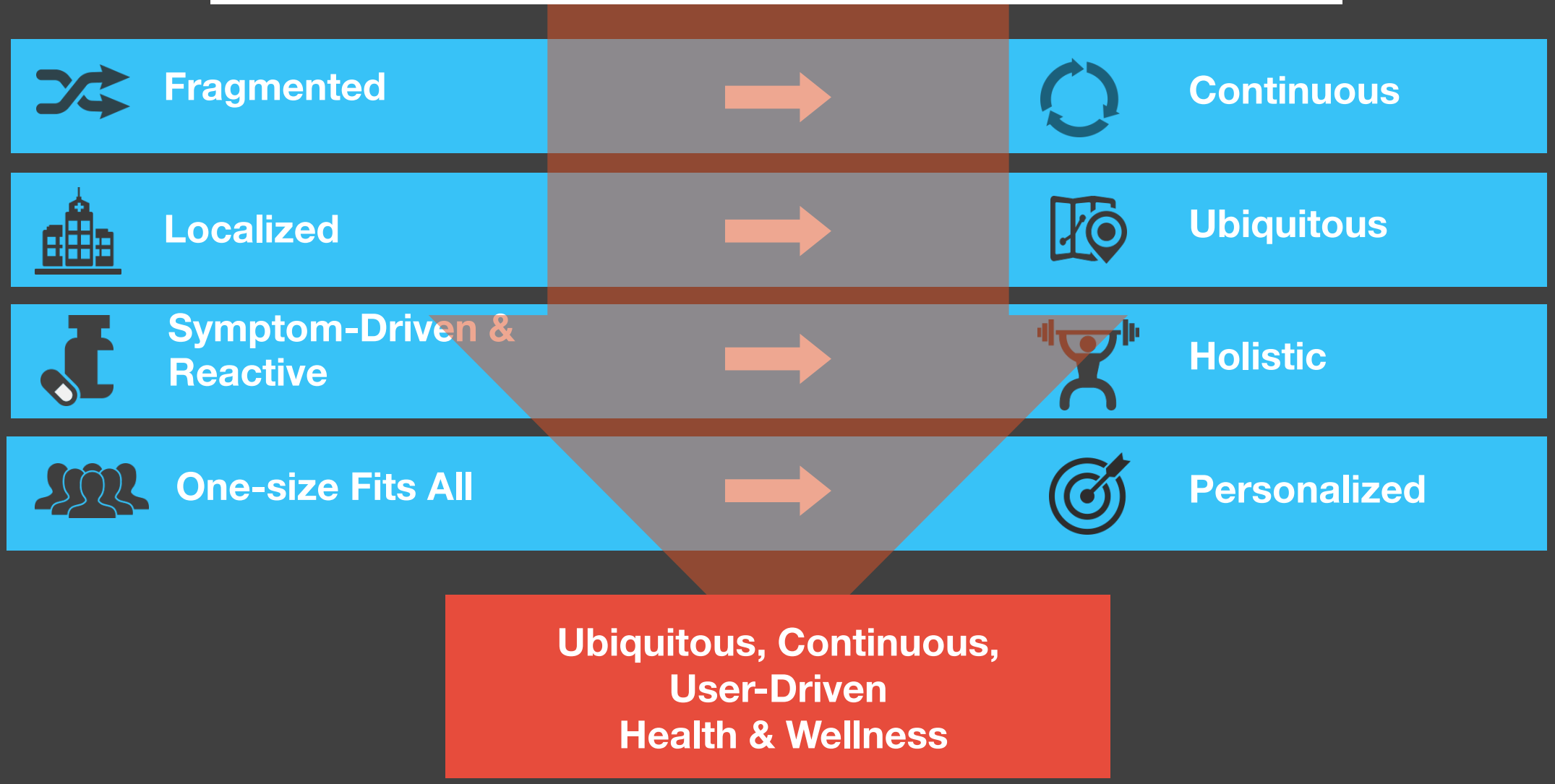
The Data Deluge

- Making sense of the raw data
- Provide the right level of detail for decision making

Smart Sensor Ecosystem.

A Connected eco-system of Smart Sensors and Data sources will force us to rethink how Health is measured, managed and care is delivered…..

Smart Sensors + Cloud + Mobile + Analytics



THANK YOU

Kollabio

HEALTH360

Email: ashok.nare@kollabio.com
Ph: 571-295-7209