Barnabas Health

Life is better healthy.

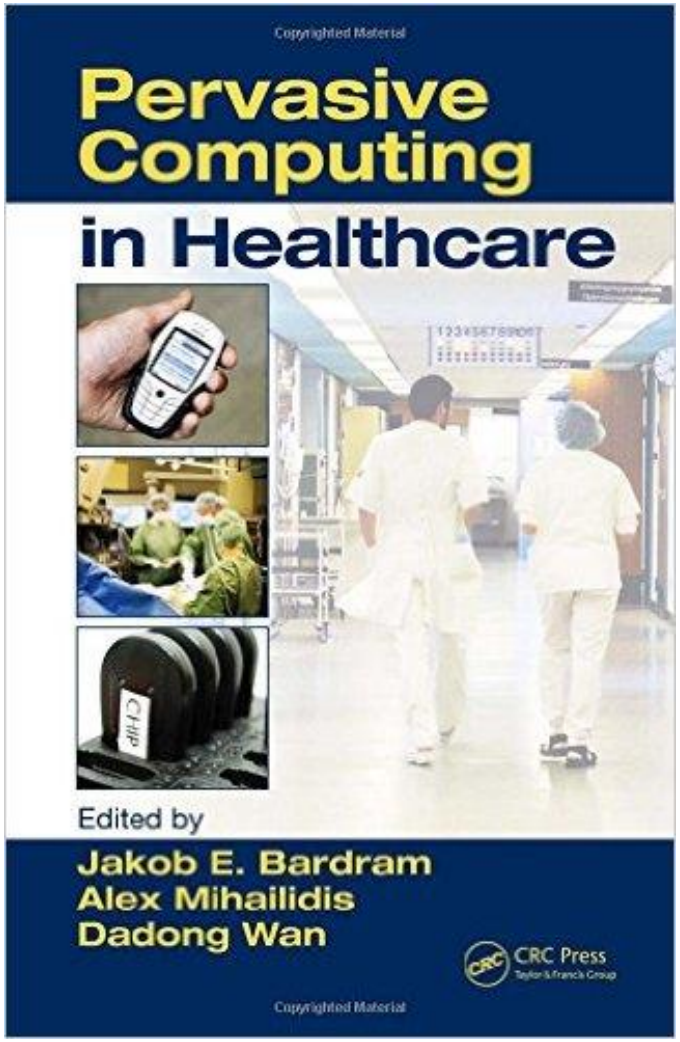
Internet of Things in Healthcare

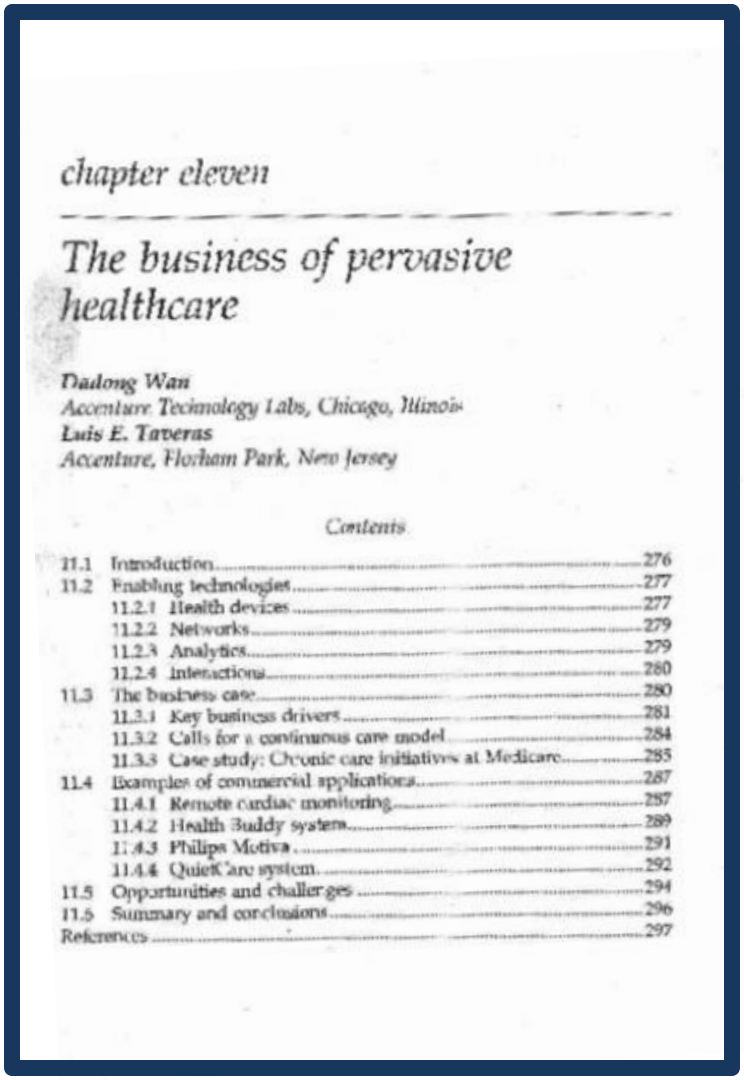
Heart of America HIMSS Chapter

L.E. Taveras, Ph.D.
Senior Vice President & Chief Information Officer

January 2016

How far have we come?





chapter eleven

The business of pervasive healthcare

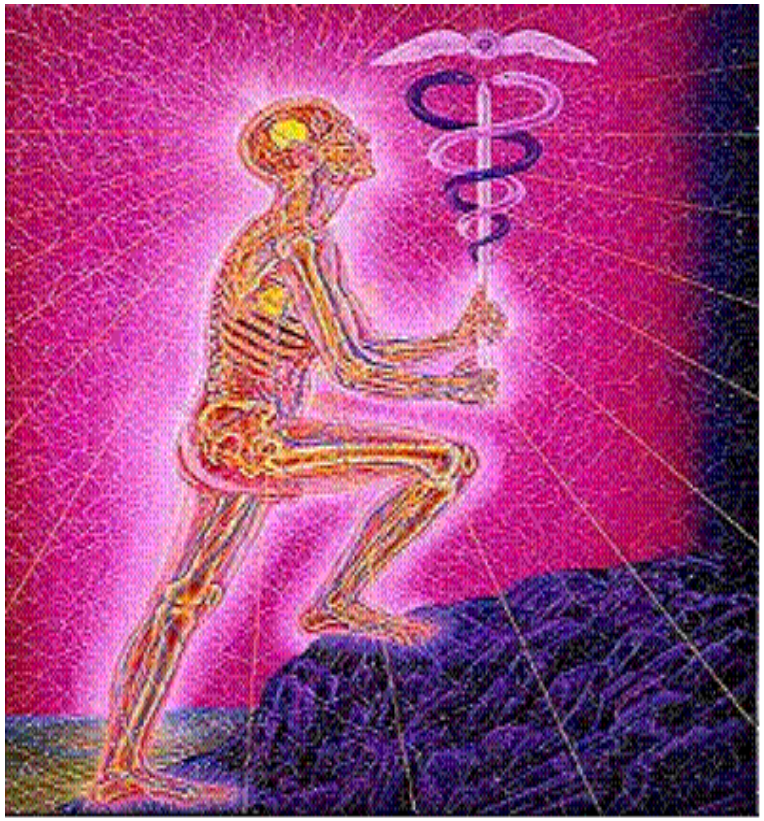
Dadong Wan
Accenture Technology Labs, Chicago, Illinois
Luis E. Taveras
Accenture, Florham Park, New Jersey

Contents

Confidential

Agenda

- What is the Internet of Things (IoT)
- Imagine the possibilities
- Major challenges and risks
- What's the future
- Summary



What is the Internet of Things (IoT)

Definitions

- General Definition

Almost "anything" – including "living things" – connected to the internet regardless of location or other physical restrictions. The network of physical objects or "things" embedded with electronics, software, sensors and connectivity to enable it to achieve greater value and service by exchanging data with the manufacturer, operator and/or other connected devices.
'Wikipedia, 2015

Smart, connected products
Harvard Business Review, 2014

- Healthcare
  - "…a device that is connected via the Internet and informs clinical decision-making which bridges the digital and physical worlds to change physician and patient behavior."

    Goldman Sachs

- mHealth, eHealth, telemedicine, etc.

Enablers

Big Data

Tech Savvy Consumers

Tech Savvy Providers

Proliferation of Devices

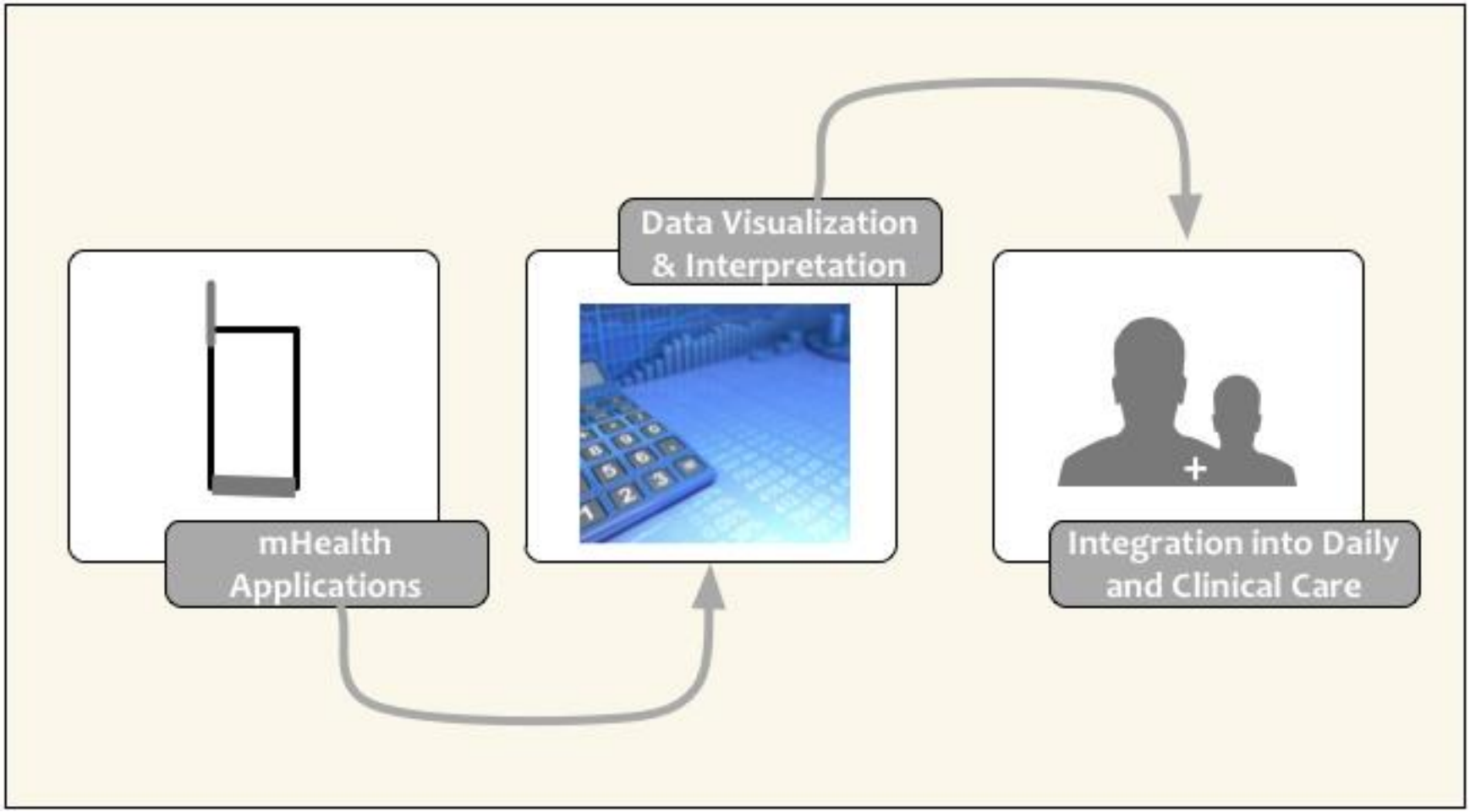
Remote Monitoring

Wearable devices/Sensors

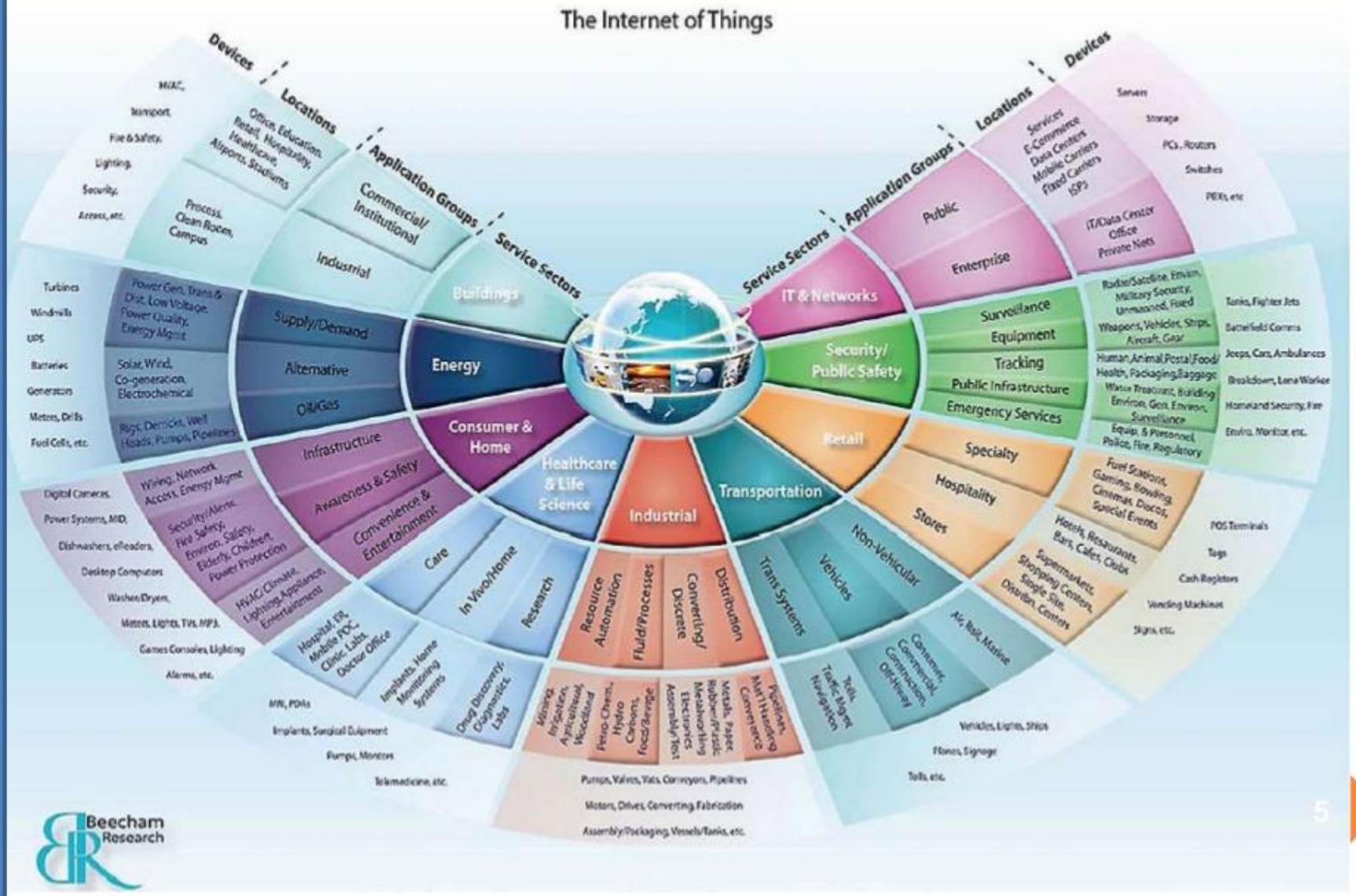
Components

- Things, e.g., engines, humans, electricity grids, chemical production plants
- Sensors, e.g., light, heat, position, chemical composition, temperature, biometrics
- Processor and analytics on “the thing,” e.g., mobile phone, embedded microprocessor
- Connectivity – the Internet
- “Central” analytics (often cloud-based), e.g., traffic flow, feedback on blood sugar control, predictive analysis of impending cardiac event

High Level Architecture



Applications using IoT



Diverse Range of Personal Sensors

Barnabas Health

IoT by the Numbers

$305B
Potential Annual Savings

$34B
Telemedicine market by 2020

70M
People in the US wearing trackable devices

65%
of nurses use mobile devices at work

- Enhance the Patient and family Experience
- Increase Revenues
- Increase efficiency and productivity
- Lower Operating Costs
- Key component of Population Health Management

$4T

Source: http://www.beckershospitalreview.com/hospital-management-administration/100-healthcare-statistics-to-know.html

IoT Strategic Categories

ENABLERS

Develop and implement the underlying core technology.

- Wearable devices
- Sensors
- Remote Monitoring
- Integrating Hubs
- Big Data
- Tech Savvy Consumers

ENGAGERS

Design, create, integrate, and deliver IoT services to customers.

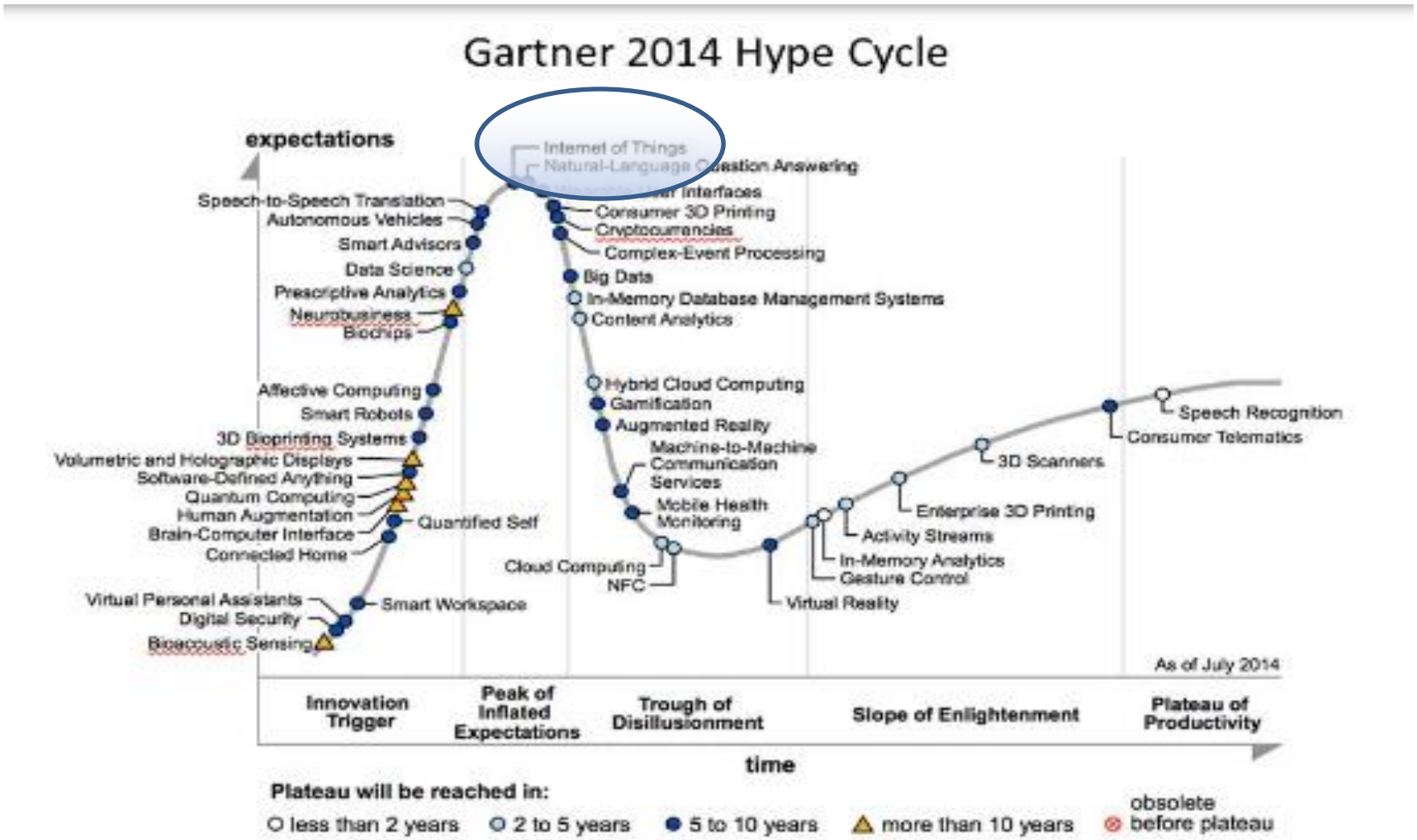
- Google Glass
- Smart Home
- Connected care
- Digital Retailer

ENHANCERS

Devise their own value-added services, on top of the services provided by Engagers, that are unique to the Internet of Things.

They provide integrated services that reframe and repackage the products and services of the Engagers. They succeed by finding new ways of creating and extracting value from the data, relationships, and insights generated from IoT activity.

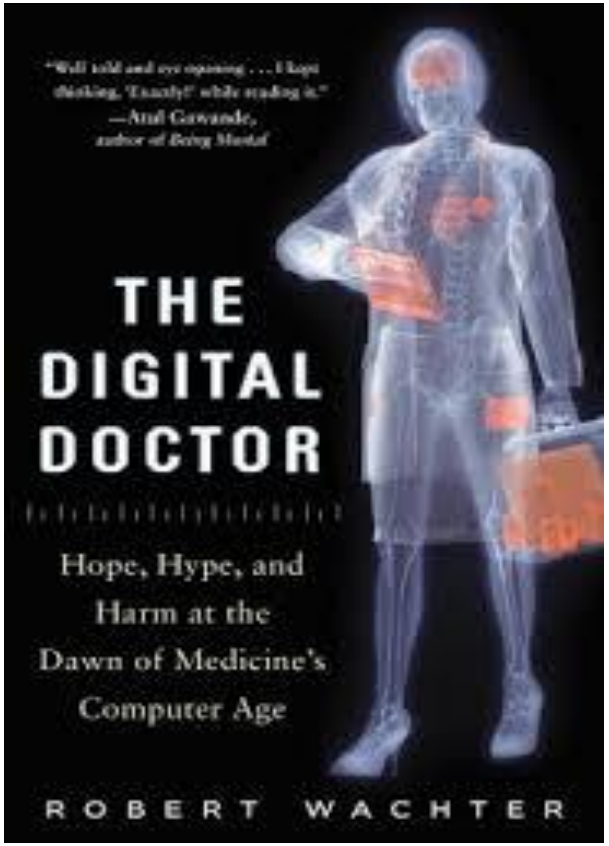
IoT is at the Peak of Hype



Barnabas Health

Imagine the Possibilities

BIGHERO6



Barnabas Health

Barnabas Health

Panasonic On4Care *Patient Experience*

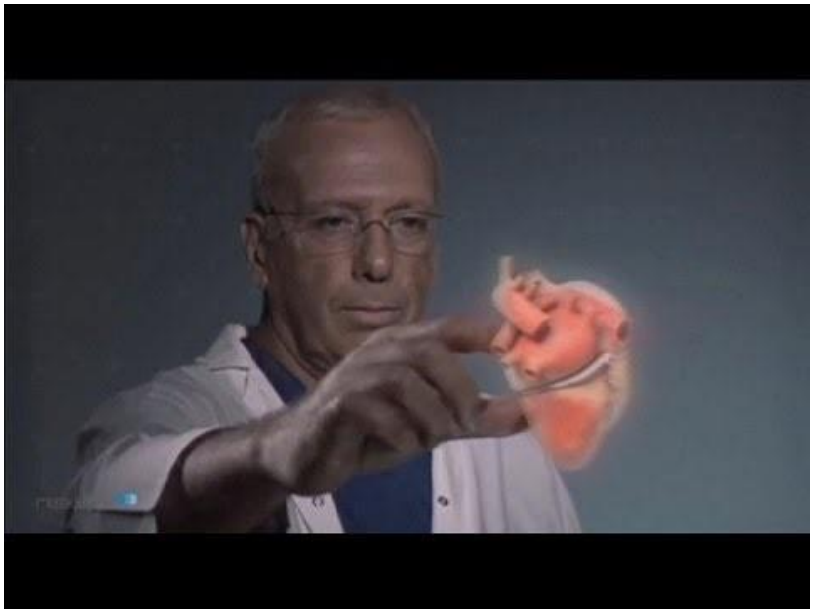
Panasonic

- Interrupts TV with video prompt
- Reading confirmed on TV
- Custom questions presented
- Optional educational videos
- TV resumes

Step 1 Step 2 Step 3 Step 4

When sci-fi becomes reality: thanks to 3D holographic technology

Published on Jan 27, 2014
Developed by Israeli firm Real View medical holography, doctors are now able to visualize a patient's anatomy "floating" in mid-air in real time during surgery. The company says it has recently completed a successful clinical study in which surgeons used 3D holograms of their patients' beating hearts to help them operate.



https://youtu.be/rxTyyXmW6gU

realview medical holography™

http://www.realviewimaging.com/

Barnabas Health

Major Challenges and Risks

Challenges

- Infrastructure capacity
- Analytics maturity
  - Data Standards
- Security & Confidentiality
- Privacy
- Distinguishing value from noise

What's the Future?

Growth Potential

- Percent of microprocessors deployed today that are not in mobile phones, laptops, desktops, etc. = 80%
- Number of “things” connected to the Internet today = 2 billion
- Number of “things” expected to be connected to the Internet by 2020 = 50 billion
- Estimated size of the global healthcare IoT market by 2020 = $117B; 15% CAGR

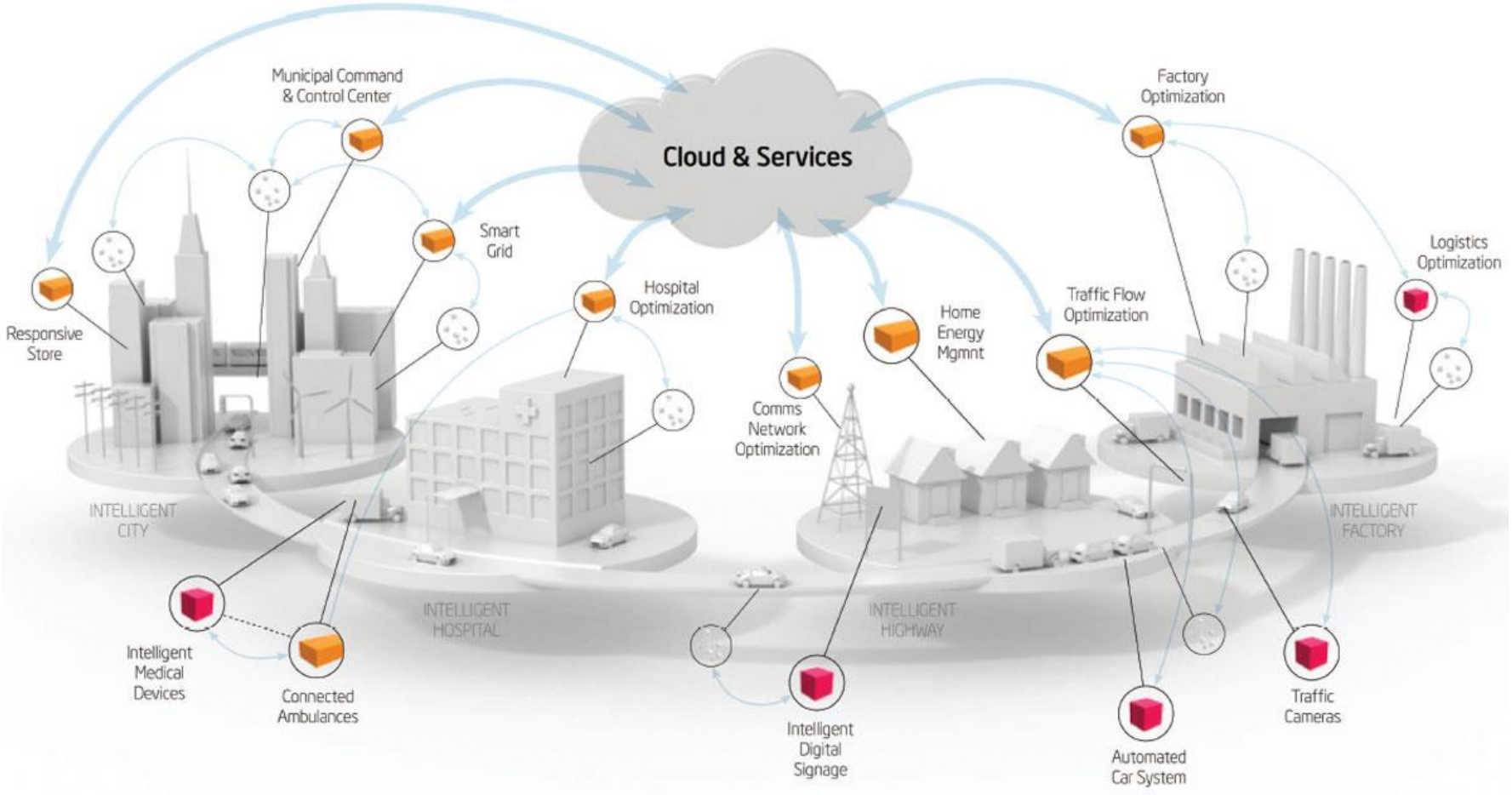
Top 10 Medical Innovation

From the Cleveland Clinic 2016 Top Ten Innovations: https://my.clevelandclinic.org/about-cleveland-clinic/newsroom/releases-videos-newsletters/2015-10-28-cleveland-clinic-unveils-top-10-medical-innovations-for-2016

UberHealth

Uber — the next home healthcare provider?
Written by Tamara Rosin (Twitter | Google+) | November 20, 2015
25
inShare
As part of a new experiment involving hundreds of Uber drivers, people in 36 cities had the opportunity during a four-hour window to summon a nurse to deliver a flu shot, according to *The Boston Globe*.
Uber's "on-demand healthcare" represents what many consider to be the future of healthcare — delivering healthcare services to patients when they need it instead of waiting for them to go get it.
UberHEALTH was conceived by John S. Brownstein, PhD, chief innovation officer of Boston Children's Hospital and an associate professor at HarvardMedicalSchool in Boston.
"The concept of bringing on-demand services . . . bringing physicians and nurses to people has so many opportunities," Dr. Brownstein told *The Boston Globe*.

Having a smart city will be important for future patient monitoring…KC is a Smart City…how do we leverage that infrastructure to improve the health status of all citizens? Do we create a health smart home for all? What does that mean from a clinical and technological standpoint?



SUMMARY

Conclusions

- The Internet of Things is at the height of hype but there is profound power in this category of technologies
- There are many challenges to be addressed
- Plan on how to convert the tsunami of data this is creating into actionable and clinically valuable information
- You need to understand and manage the impact to your organizations based on legitimate needs vs. pressure to do something because everyone else is doing it