May, 2017

Ten Digital Health Tensions Provide Energy of Innovation

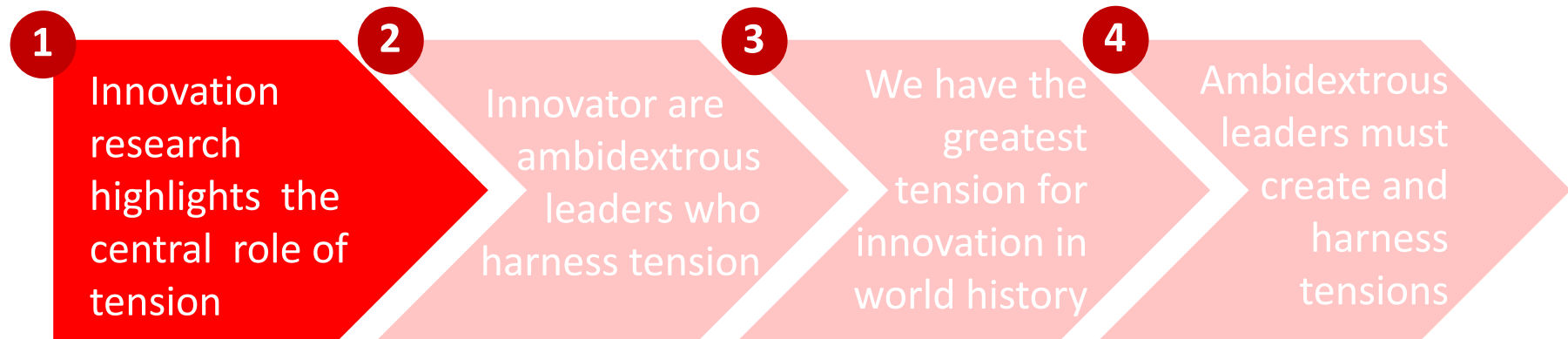Powering us towards the medicine and healthcare of tomorrow

Dr. Chris Wasden
Executive Director

Our focus on high reliability and medical practices of the past are causing us to fail to innovate and adapt in a turbulent market

1 Innovation research highlights the central role of tension

2 Innovator are ambidextrous leaders who harness tension

3 We have the greatest tension for innovation in world history

4 Ambidextrous leaders must create and harness tensions

We must apply Complexity Science to overcome our failure to innovate!

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3

Tension between incrementally improving the status quo and disrupting it
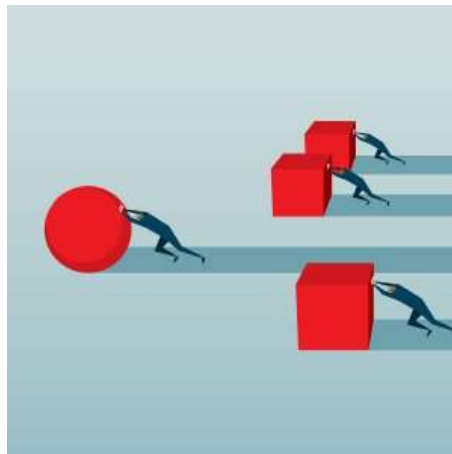
Disruptive Innovation
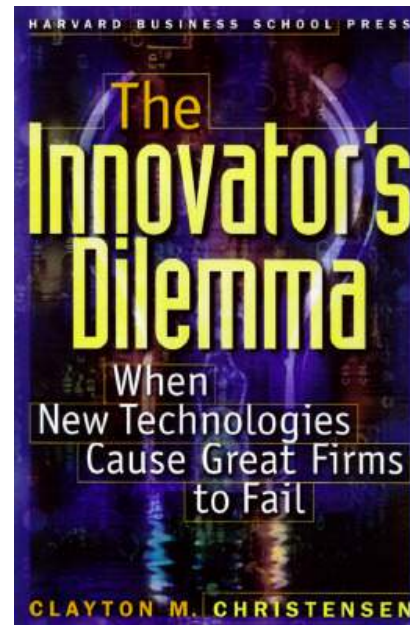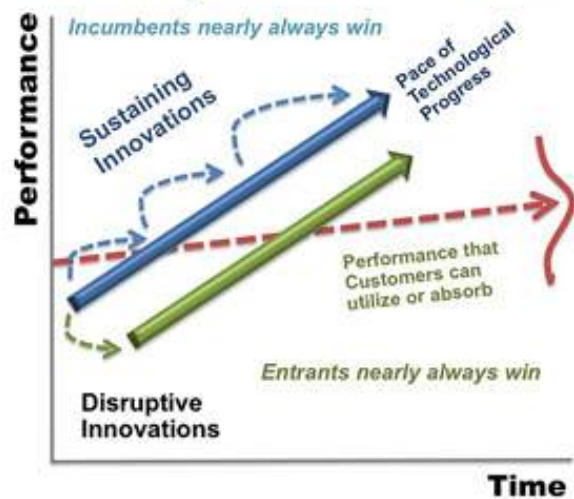
Sustaining Engineering

Tension between adding new technologies and creating new business models of value creation
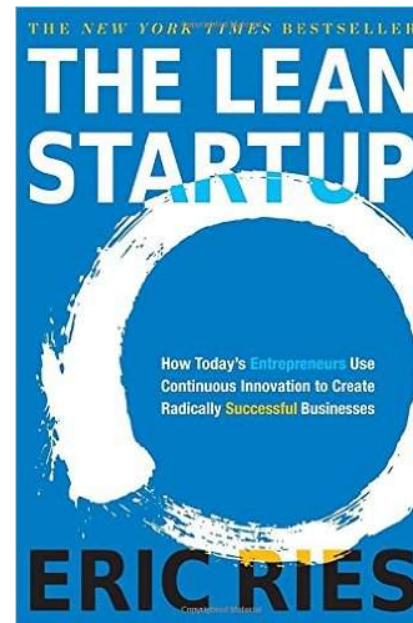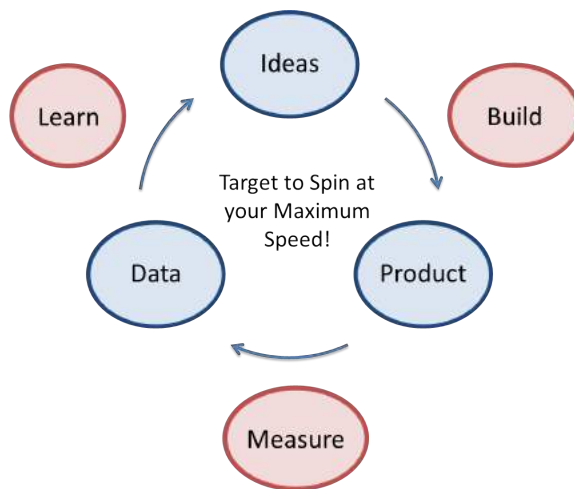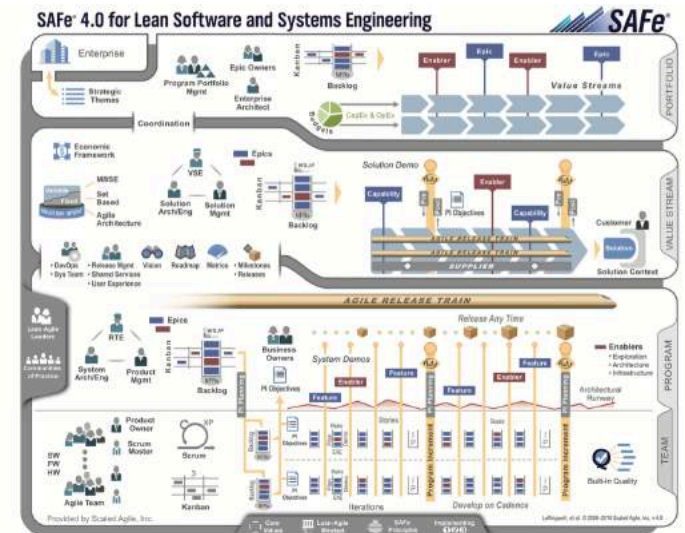
Business Model Innovation

Technological Innovation

The Innovator's Prescription
A Disruptive Solution for Health Care
Clayton M. Christensen
BESTSELLING AUTHOR OF *THE INNOVATOR'S DILEMMA*

5

Tension in how you regard and manage failure
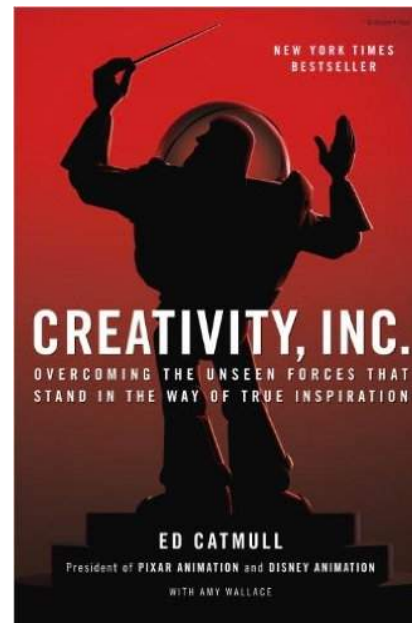
Lean Startup

Lean Scaled

Tension between nurturing the ugly baby and feeding the hungry beast
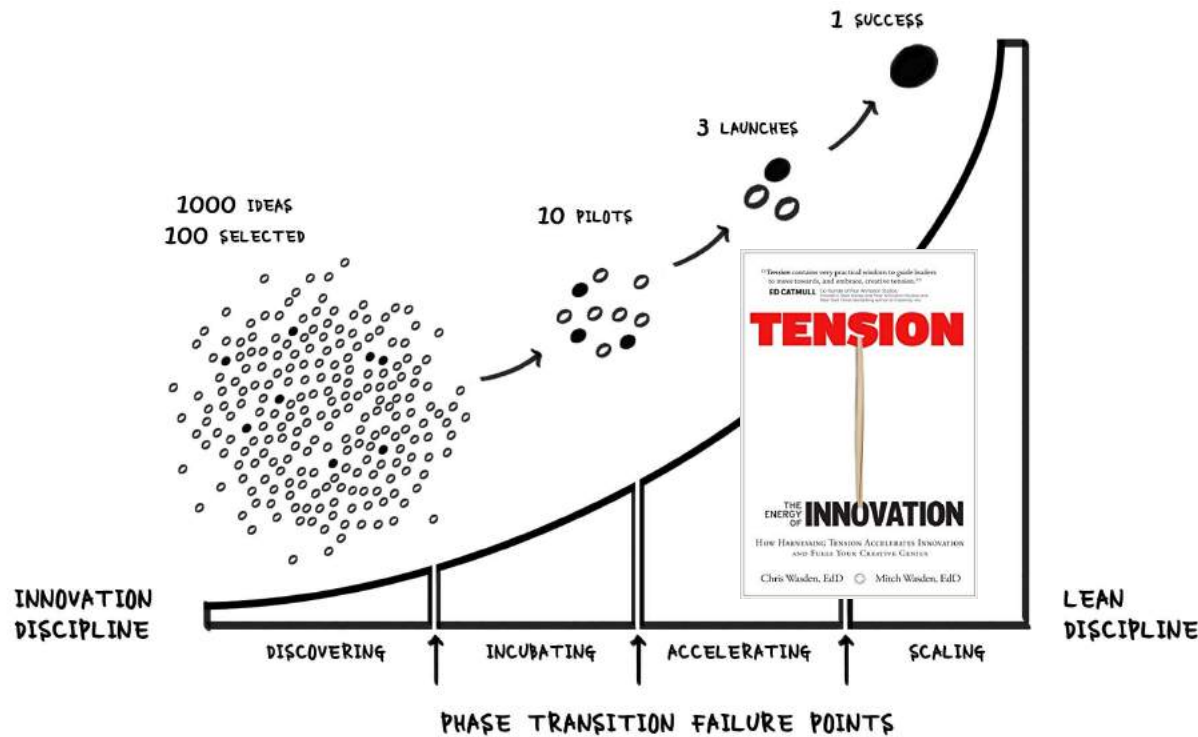
Ugly Baby

Hungry Beast

Experience and research indicates a huge difference in the way that established companies and startups deal with innovation

small

big

Tension paradox is that all innovation is born at the edge of chaos but only succeeds by approaching the edge of equilibrium

MINDFULLY
Creating Tomorrow
EDGE OF CHAOS

MINDLESSLEY
Running Today
EDGE OF EQUILIBRIUM

1 SUCCESS

3 LAUNCHES

1000 IDEAS
100 SELECTED

10 PILOTS

TENSION

THE ENERGY OF INNOVATION

Hew Harnessing Tension Accelerates Innovation and Fules Your Creative Genius

Chris Wasden, EdD   Mitch Wasden, EdD

INNOVATION DISCIPLINE

LEAN DISCIPLINE

DISCOVERING   INCUBATING   ACCELERATING   SCALING

PHASE TRANSITION FAILURE POINTS

Innovation Lifecycle

9

High reliability organizations struggle to innovate because of their fear of failure

Moto: "Failure is not an option"
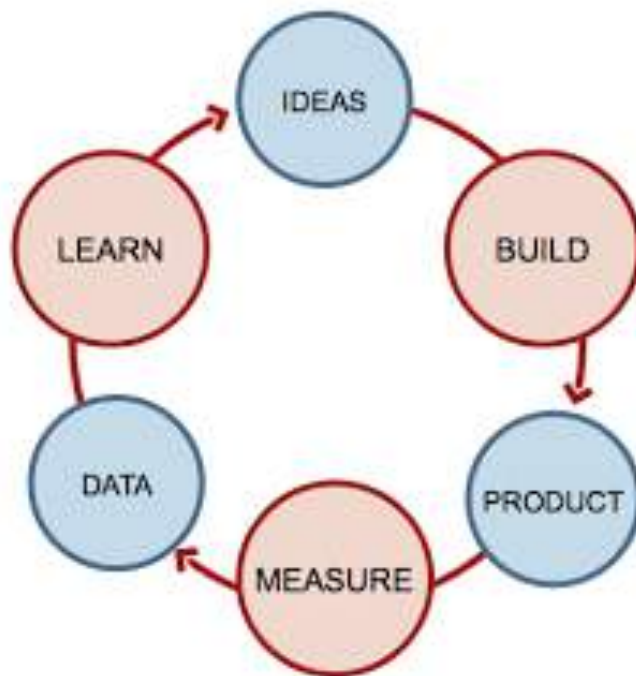
If failure is not an option

Then neither is innovation

The problem is that lean six sigma discipline eliminates the raw materials of innovation – variation, interaction and selection

Failing 3 times in 1 million attempts

12

Innovation requires a different discipline that enables a mindful and efficient and effective way for fast, frequent, frugal failure
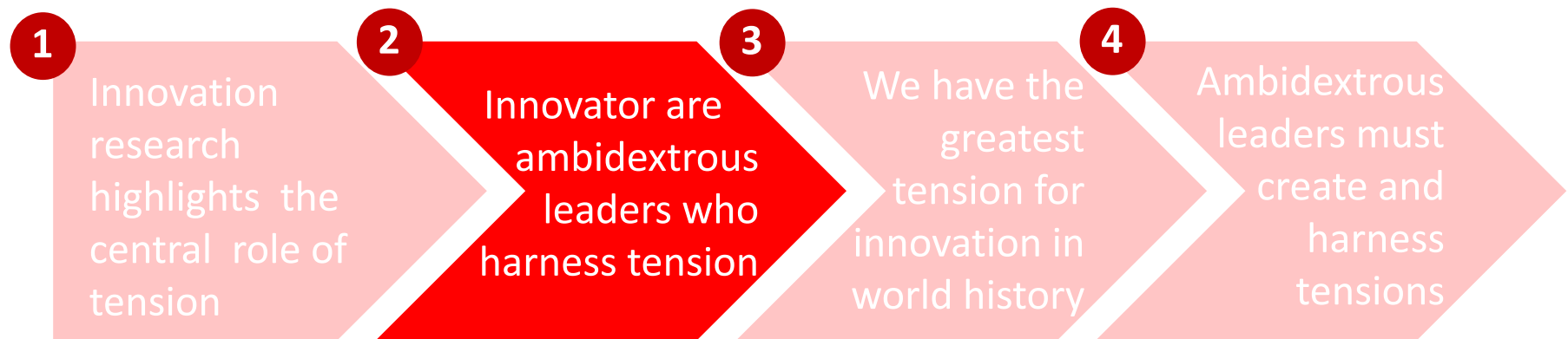

Failing
about
90%
of the time

# Simplicity doesn't precede complexity , it follows it.

Alan Perlis, First Recipient of the Turing Award in Computing

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We must apply Complexity Science to overcome our failure to innovate!

Iconic digital innovative leaders are masters are harnessing tensions to power disruptive digital innovations
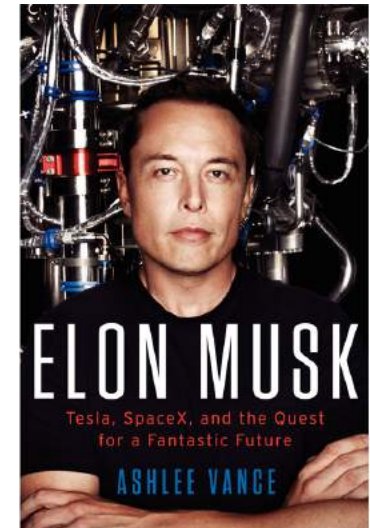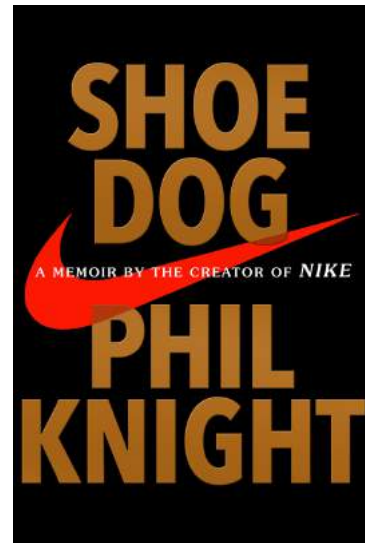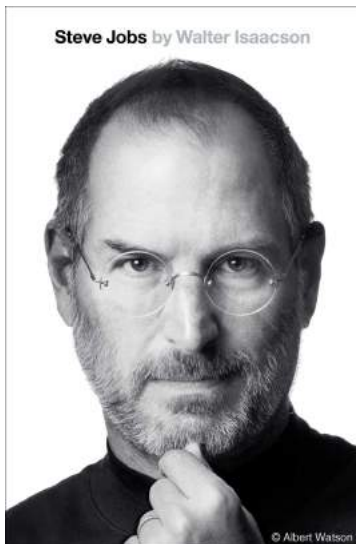
Great innovation leaders create, enable and harness creative tension to power the innovation processes

Interaction

Variation

Selection

"My job as a leader is to create discord and to impose deadlines."

Eric Schmidt, Chairman, Alphabet (Google)

These three process enable spontaneous order to emerge from chaos!

17

Is tension good or bad?

How would you answer these three tension questions:

- **How many of you enjoy and seek out tensions?**

- **How many of you create tensions to get other people to act?**

- **How many of you think that we can eliminate tensions in our lives?**

Innovative leaders create and harness tension as the energy source to power creativity, but …

What kind of tension do you harness?

Maladaptive Tension

- Fear and doubt
- Threats
- Reactive
- Belittling
- Mindless failure
- Emergent

- **Painful**

20

Innovative leaders create and harness tension as the energy source to power creativity, but ...

What kind of tension do you harness?

Maladaptive Tension	Adaptive Tension

- Fear and doubt
- Threats
- Reactive
- Belittling
- Mindless failure
- Emergent

- **Painful**

- Tweaks and modifications
- Incremental improvement
- Sustaining engineering
- Six sigma innovation
- Rewarding
- Planned, directed

- **Predictable**

Innovative leaders create and harness tension as the energy source to power creativity, but …

What kind of tension do you harness?

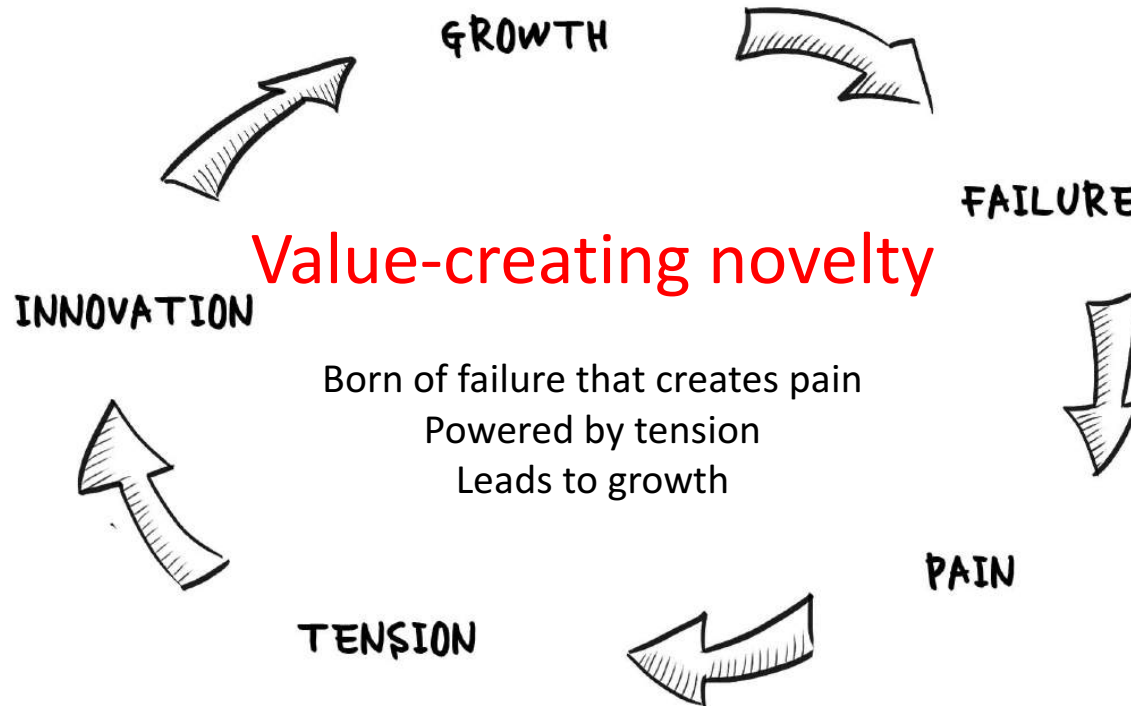| Maladaptive Tension	Adaptive Tension	Creative Tension
- Fear and doubt - Threats - Reactive - Belittling - Mindless failure - Emergent	- Tweaks and modifications - Incremental improvement - Sustaining engineering - Six sigma innovation - Rewarding - Planned, directed	- Radical and disruptive - Free will, agency - Transformative - Powerful - Inspired by faith and hope - Self-organizing
- **Painful**	- **Predictable**	- **Possible**

22

These leaders apply the **innovation cycle** to create new sources of value

GROWTH

FAILURE

INNOVATION

Value-creating novelty

Born of failure that creates pain
Powered by tension
Leads to growth

PAIN

TENSION

TENSION
THE ENERGY OF INNOVATION

23

Joseph Schumpeter's Theory of Creative Destruction says that new order spontaneously emerges from the failure of the old
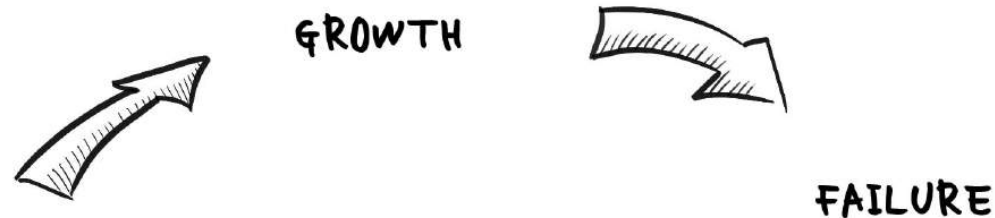
GROWTH

FAILURE

Karl Weick's Theory of Sensemaking says that we only learn and improve through experience failure and pain

GROWTH

FAILURE

PAIN

TENSION

THE ENERGY OF INNOVATION
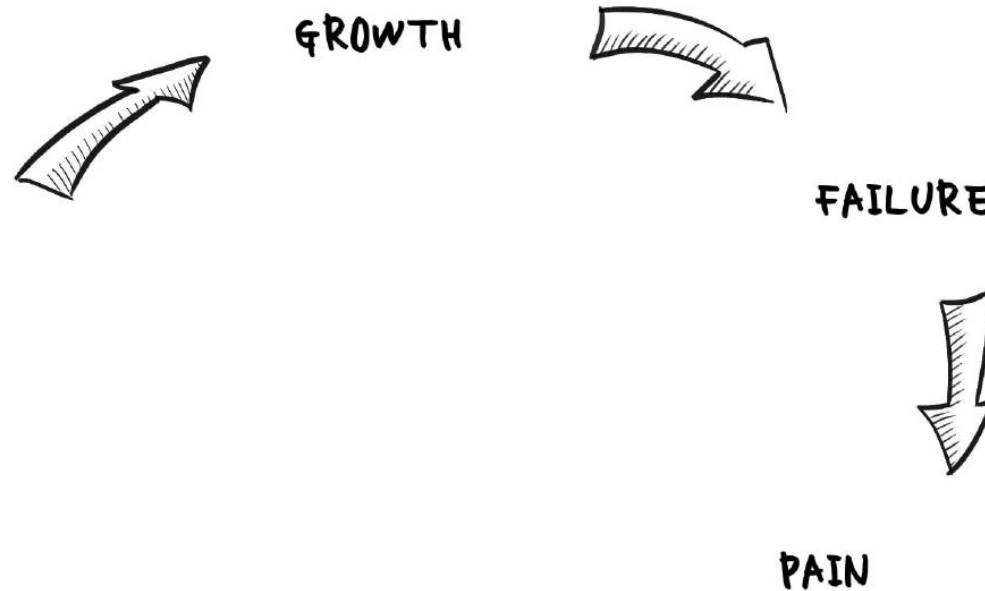
Rob Stone's Theory of Strong Structuration describes how we must have create structures and practices to innovate

GROWTH

FAILURE

INNOVATION

PAIN

TENSION

THE ENERGY OF INNOVATION

Walter Buckleys' Theory of Complex Adaptive Systems identifies "tension as the go" in all self organizing systems
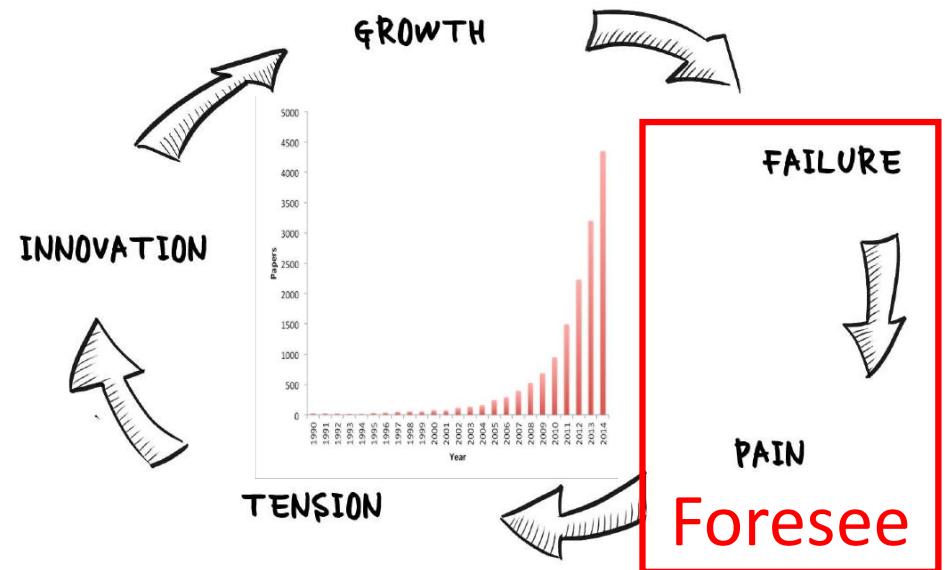

GROWTH

INNOVATION

FAILURE

PAIN

TENSION

The difference between managers and innovative leaders is how they apply the innovation cycle and lifecycle

GROWTH

FAILURE

INNOVATION

PAIN

Foresee

TENSION

The difference between managers and innovative leaders is how they apply the **innovation cycle and lifecycle**
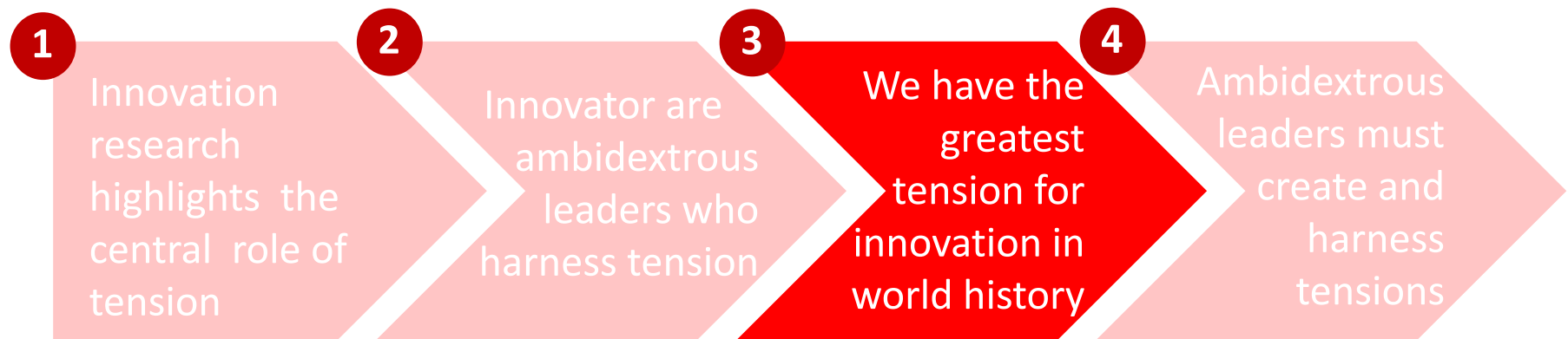

**Harness Creative Tension
to change the world**

GROWTH

INNOVATION

FAILURE

PAIN

Foresee

TENSION

Bring it Forward

29
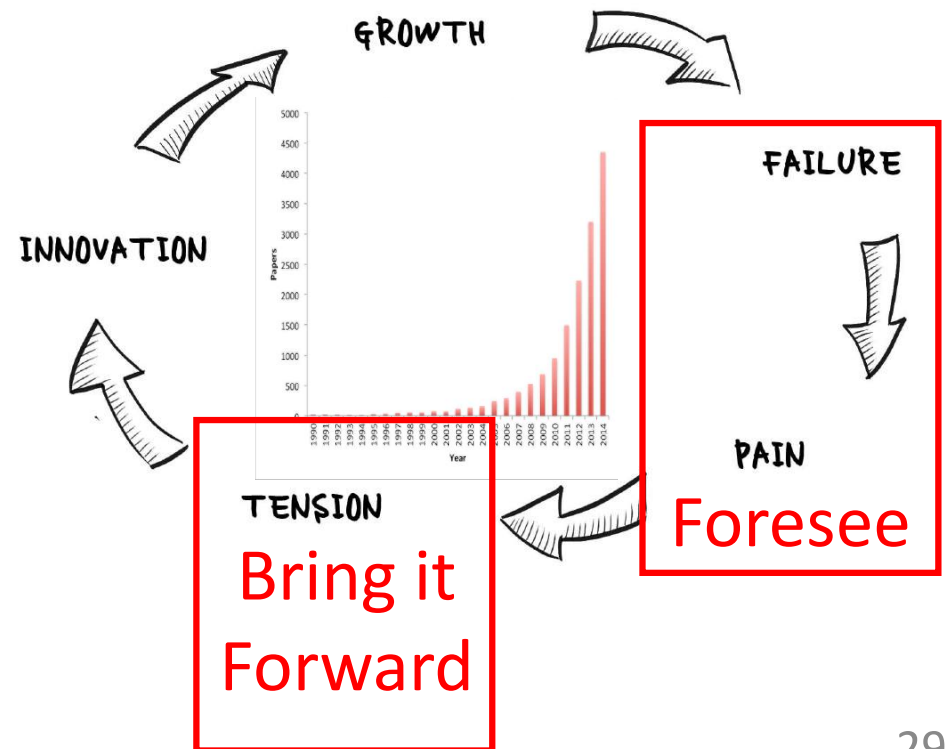
The reasonable man adapts himself to the world; the unreasonable one persists in trying to adapt the world to himself. Therefore all progress depends on the unreasonable man.

George Bernard Shaw, author

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31

Exponential changes occurring in society are the leading indicators of emerging tensions

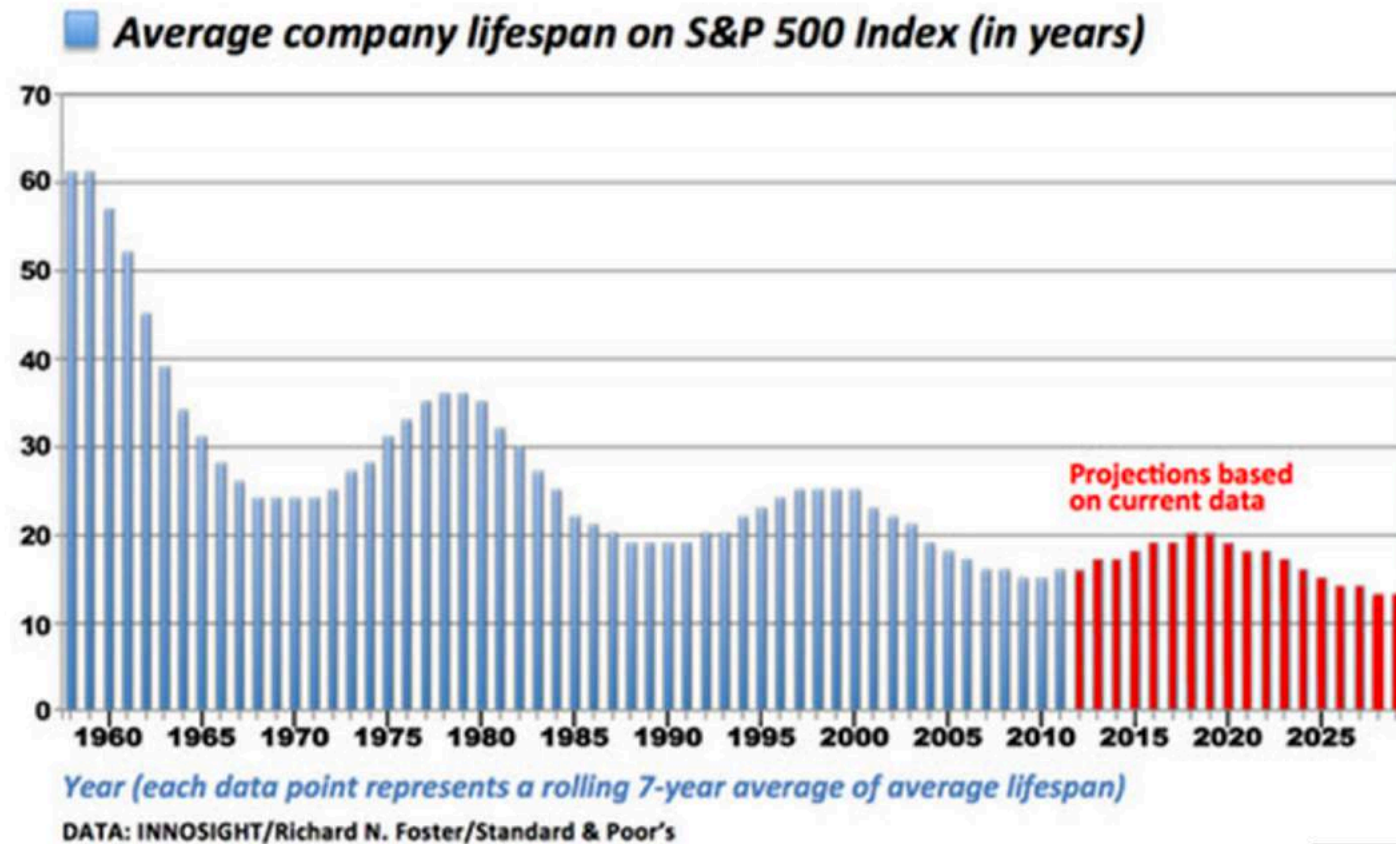**Use of the phrase 'Exponential growth' by decade**
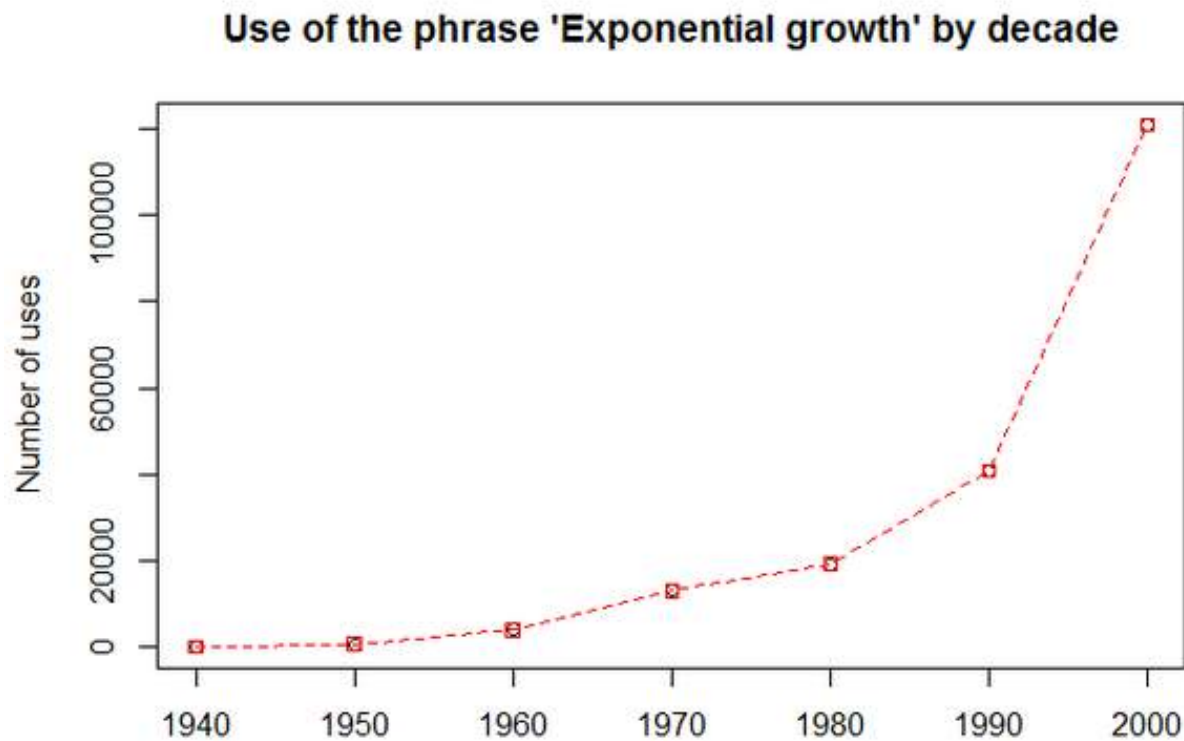
These tensions will create 200 centuries of change in just the 21st Century

Human Intuitive Perspective of Technological Advancement in Forty Years

A Trillion Times More Advanced
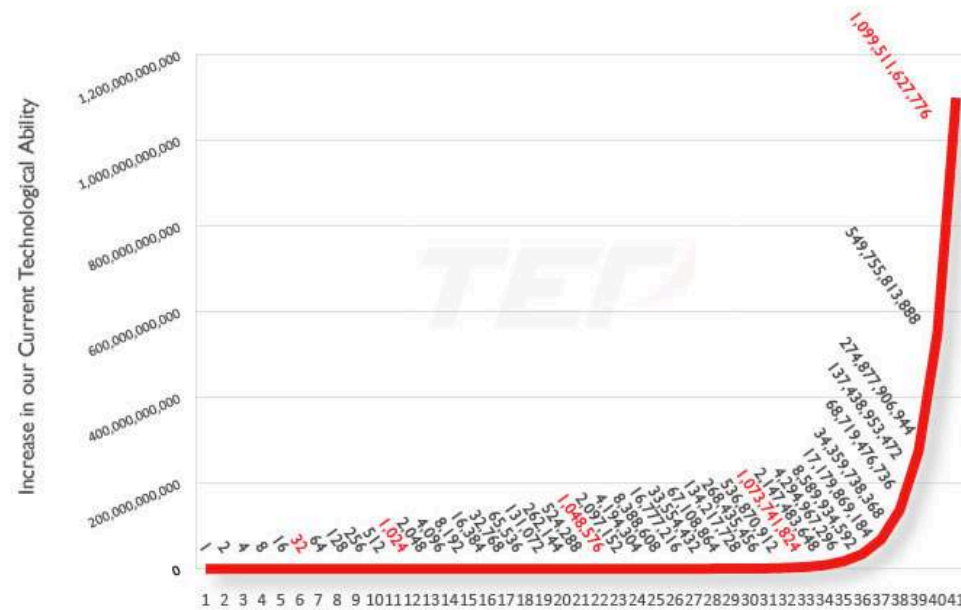
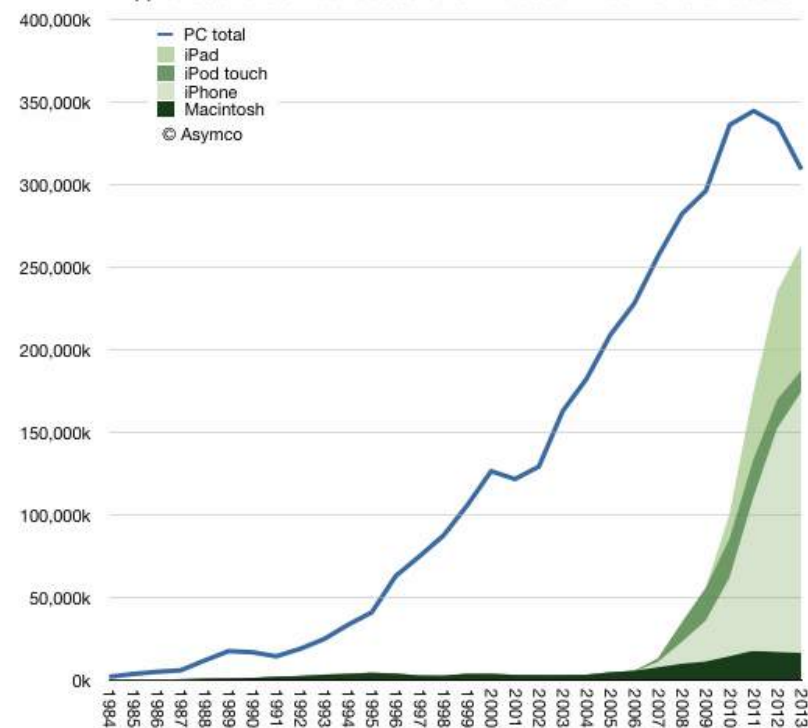These tensions power creative destruction that is decreasing the life of the S&P 500 to just 12 years

Average company lifespan on S&P 500 Index (in years)

Projections based on current data

Year (each data point represents a rolling 7-year average of average lifespan)

DATA: INNOSIGHT/Richard N. Foster/Standard & Poor's

34

The emergence of mobile technology has completely changed the landscape for greater convenience in healthcare

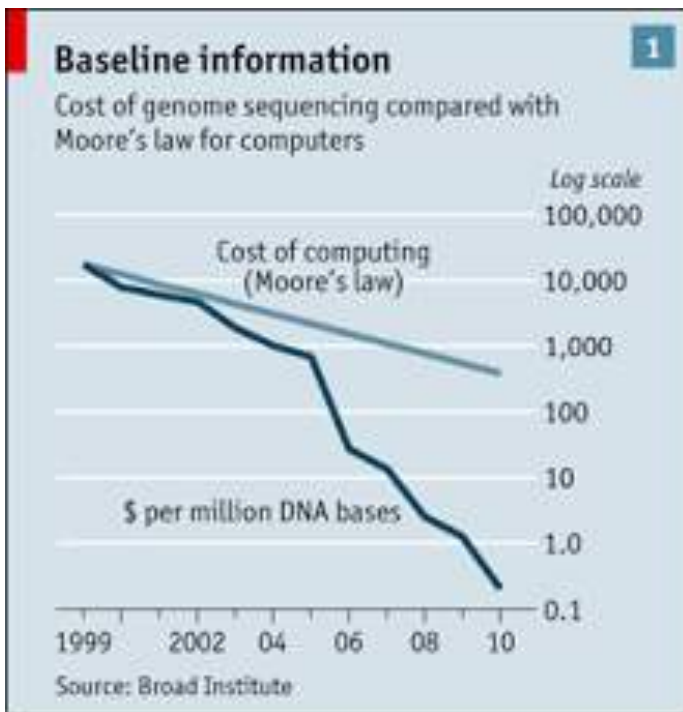| Eric Topol	The Rise of Mobile Technologies

Chart legend:
- PC total
- iPad
- iPod touch
- iPhone
- Macintosh
- © Asymco

Y-axis values: 400,000k, 350,000k, 300,000k, 250,000k, 200,000k, 150,000k, 100,000k, 50,000k, 0k

X-axis values: 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013
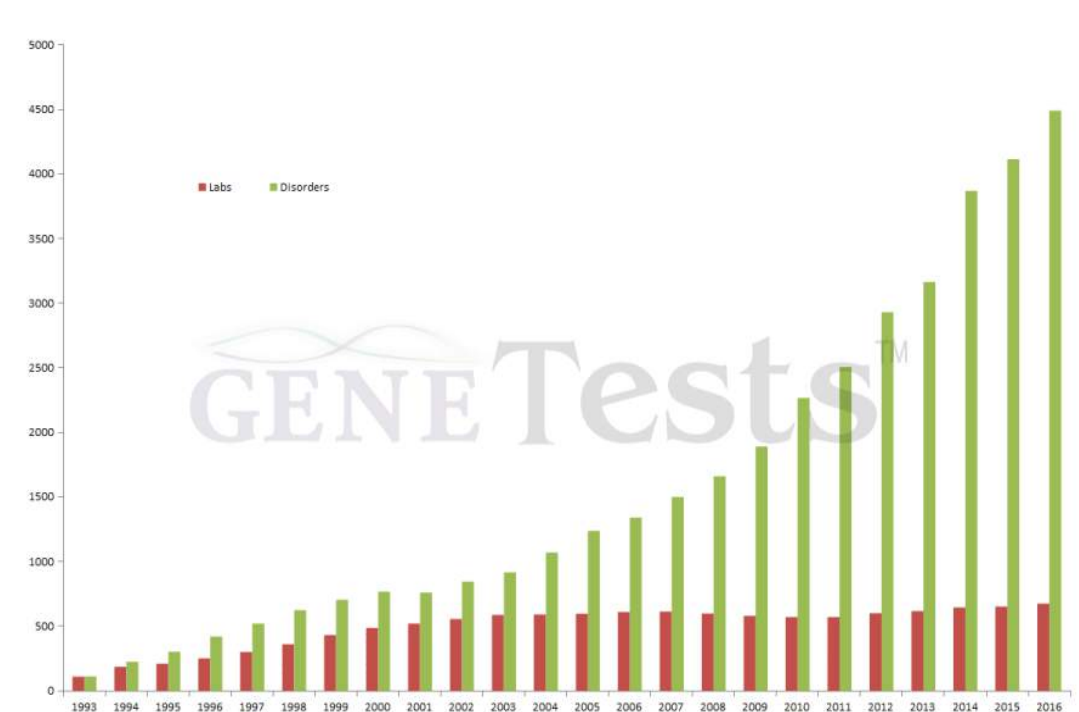
Problem   Point of View   Proposition   Position   Product   Process/Plan   People/Partners   Possibilities   Promotion   Profit

The double exponential decline in genomic costs has led to an exponential increase in genetic test - creating a new problem
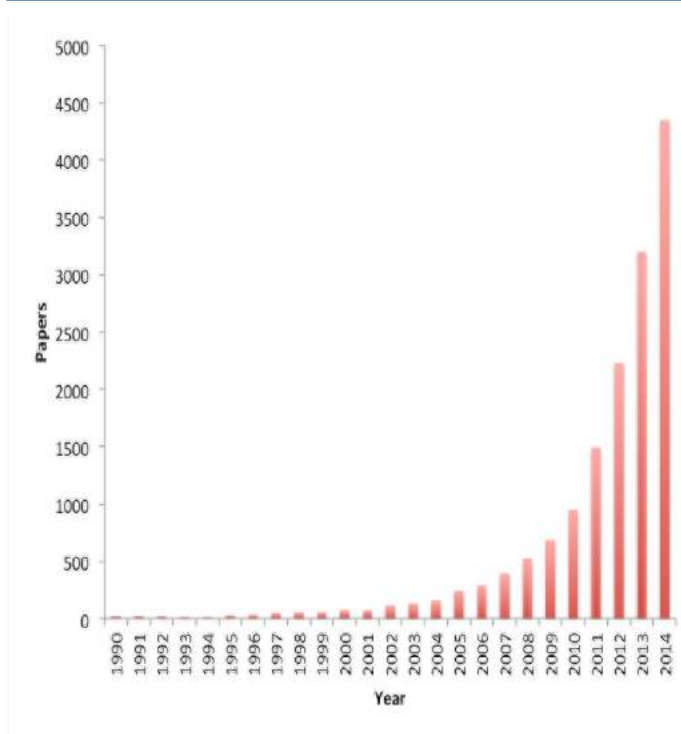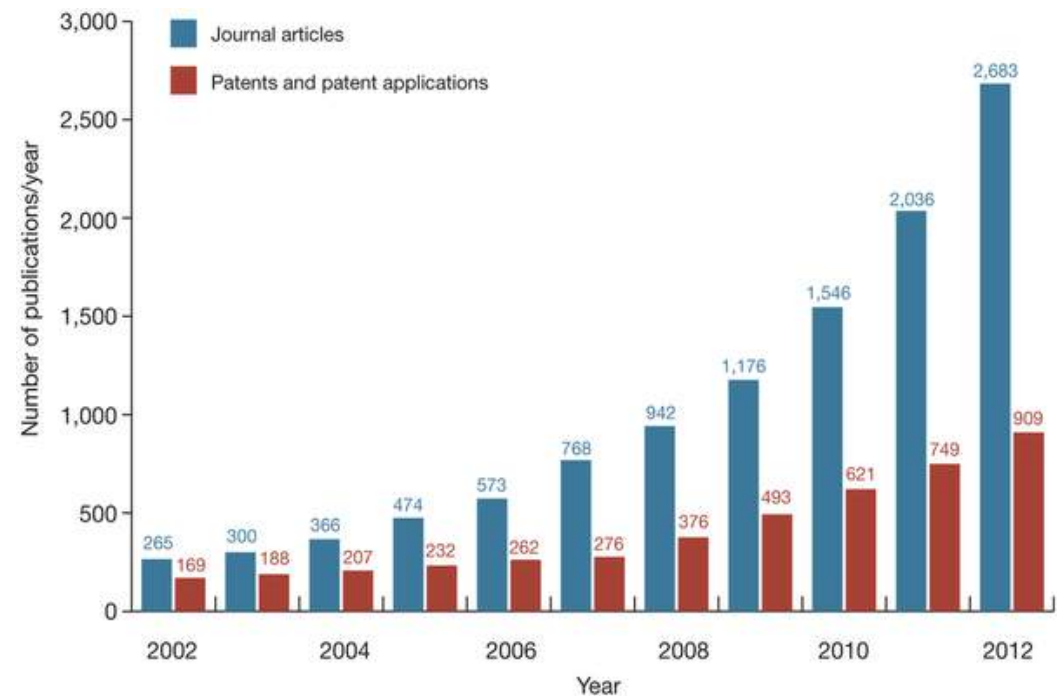
Cost of Genome Sequencing	Number of Gene Tests

Problem   Point of View   Proposition   Position   Product   Process/Plan   People/Partners   Possibilities   Promotion   Profit

36

One of the largest emerging problems is making sense of the microbiome, which appears more important than the genome
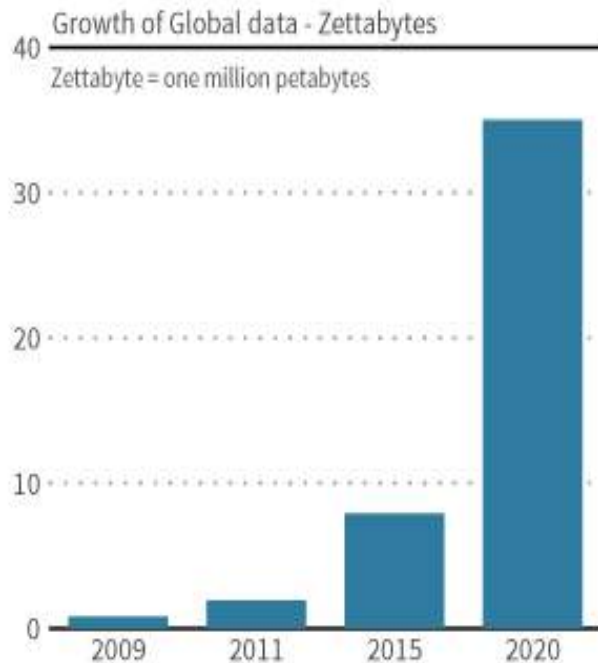
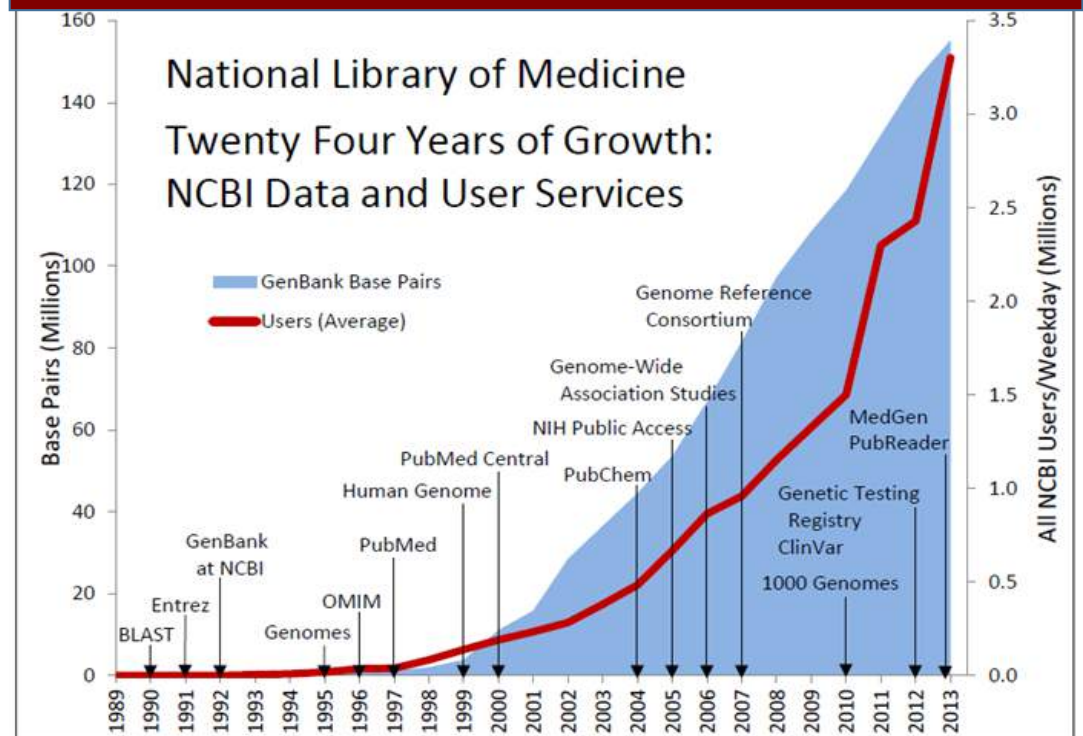| Microbiome Mentions	Microbiome Journal Articles & Patents

Problem Point of View Proposition Position Product Process/Plan People/Partners Possibilities Promotion Profit

37

Healthcare organizations are drowning in data, much of which comes from new types of testing

Growth in Big Data

Growth in Healthcare Related Data
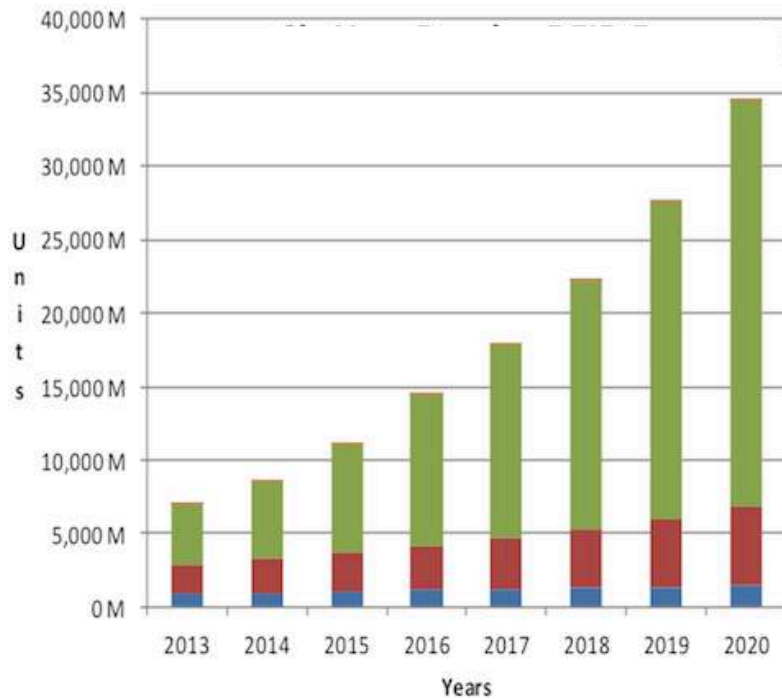
Problem Point of View Proposition Position Product Process/Plan People/Partners Possibilities Promotion Profit
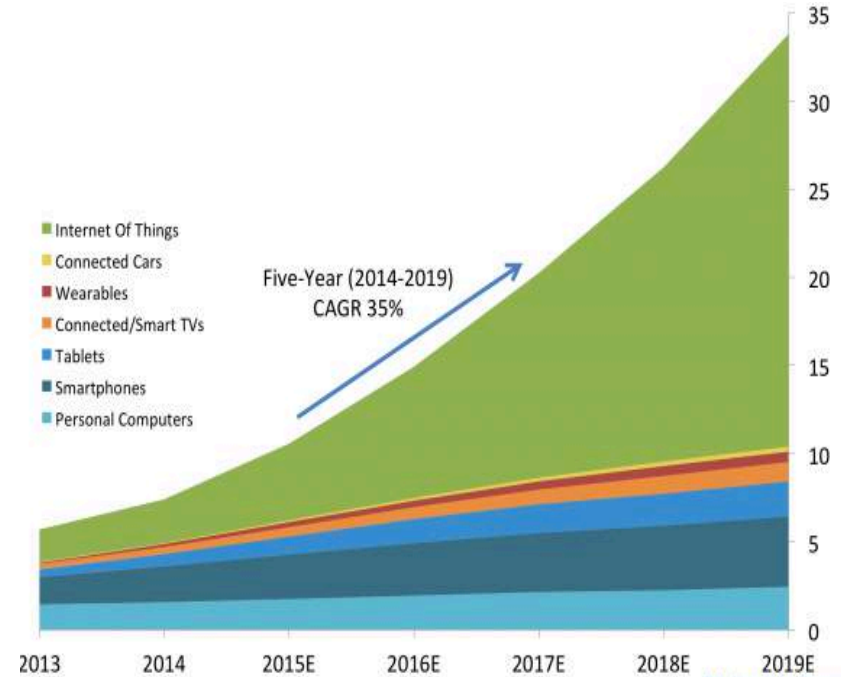
RFID and the IoT are exploding and will revolutionize global sourcing, requiring new capabilities
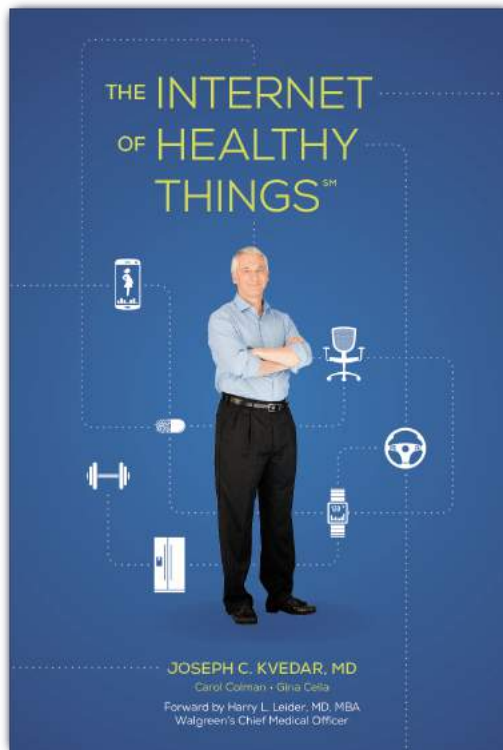
Societal Problem

RFID Forecast	Billions of Connected Devices

Problem Point of View Proposition Position Product Process/Plan People/Partners Possibilities Promotion Profit

IoT will be more disruptive than the internet to all aspects of business operations
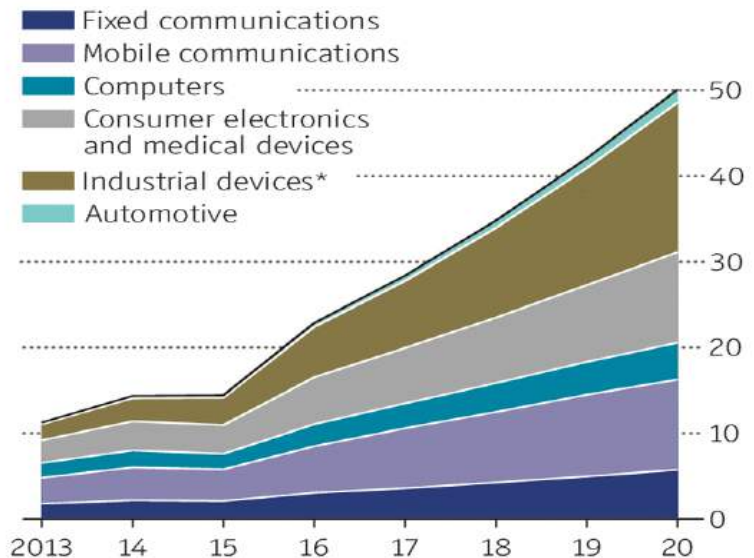

Industrial Devices - Largest

The 50 billion question

Worldwide number of internet-connected devices, forecast, bn

- Fixed communications
- Mobile communications
- Computers
- Consumer electronics and medical devices
- Industrial devices*
- Automotive

2013 14 15 16 17 18 19 20

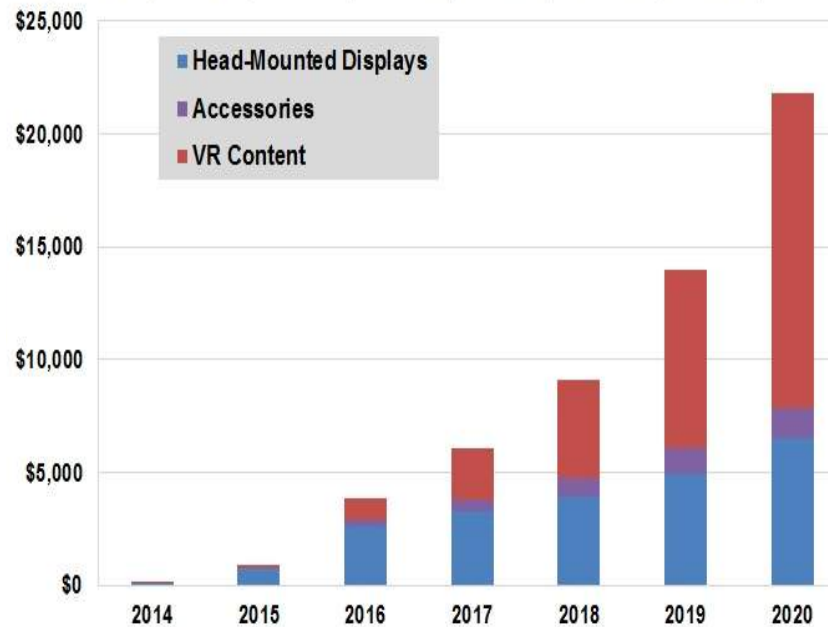Source: Cisco   *Includes military and aerospace

Problem   Point of View   Proposition   Position   Product   Process/Plan   People/Partners   Possibilities   Promotion   Profit

40

Virtual reality is a new way of thinking and applying IoT in consumer, commercial and industrial applications

Societal Problem

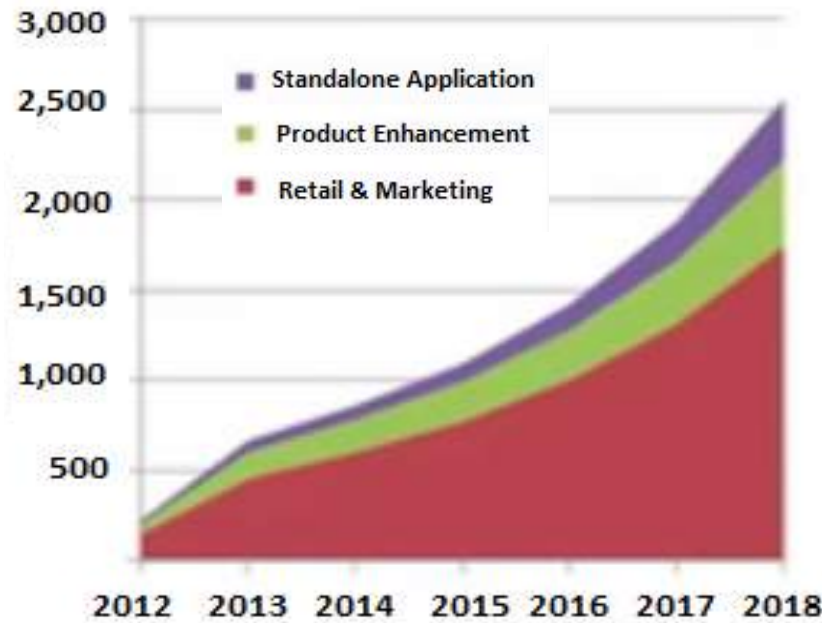| VR Revenue (M)	UCLA Neurosurgery

Problem Point of View Proposition Position Product Process/Plan People/Partners Possibilities Promotion Profit

41

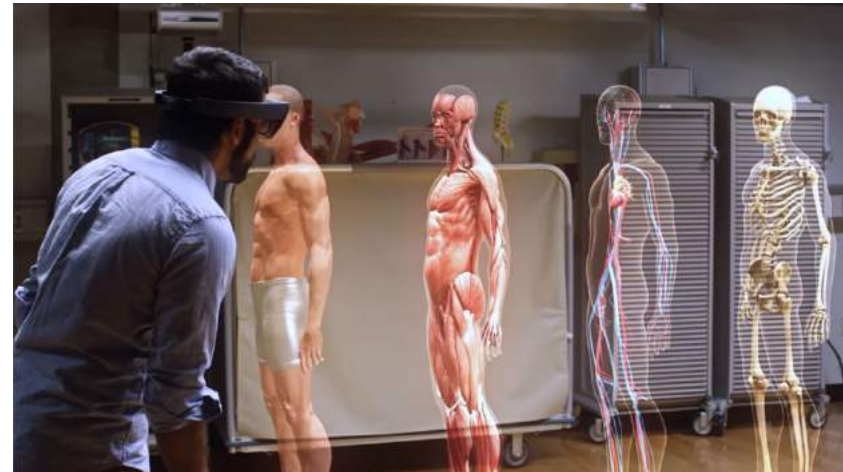# And similar growth in augmented reality will enhance products, marketing and retailing

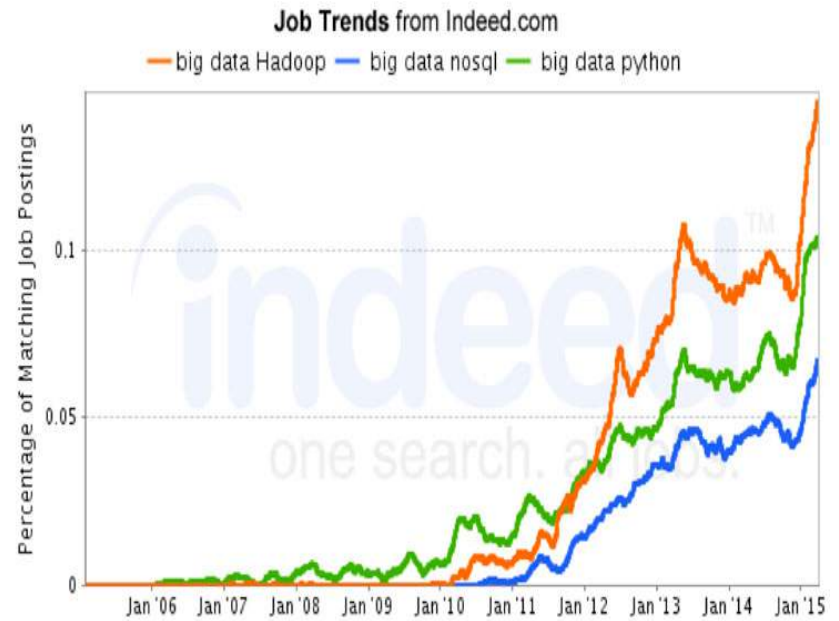**Societal Problem**

AR Revenue (M)

- Standalone Application
- Product Enhancement
- Retail & Marketing

Case Western Anatomy

IoT, Social Media, and Big Data are driving demand for analytics to predict, prevent, prescribe new behaviors

Societal Problem

Data Scientist Jobs	Big Data Tools Jobs

Job Trends from Indeed.com
— "data scientist"

Job Trends from Indeed.com
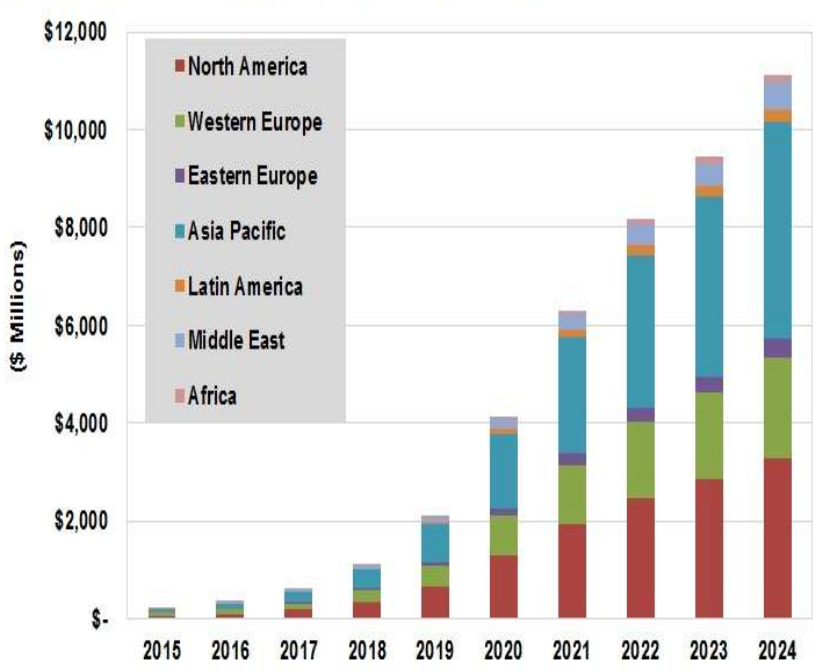— big data Hadoop — big data nosql — big data python

Problem   Point of View   Proposition   Position   Product   Process/Plan   People/Partners   Possibilities   Promotion   Profit

Artificial Intelligence (AI) and chatbots are considered the next big thing to predict, prevent, and prescribe behaviors

Societal Problem

Artificial Intelligence Revenue

Alexa Your Virtual Doctor

Amazon Alexa Can Now Be Your Doctor

Lee Bell, CONTRIBUTOR
I cover the latest tech and health innovations FULL BIO ∨
Opinions expressed by Forbes Contributors are their own.

Just when you thought Amazon's virtual assistant knew enough already, WebMD – the hypochondriac's favorite website – has teamed up with the retail giant to give Alexa medical diagnosis capabilities.

The integration will allow Amazon Echo, Echo Dot and Fire TV users to ask Alexa basic health queries, such as "Alexa, ask WebMD what are the symptoms of a heart attack", or "Alexa, ask WebMD how to treat a sore throat."
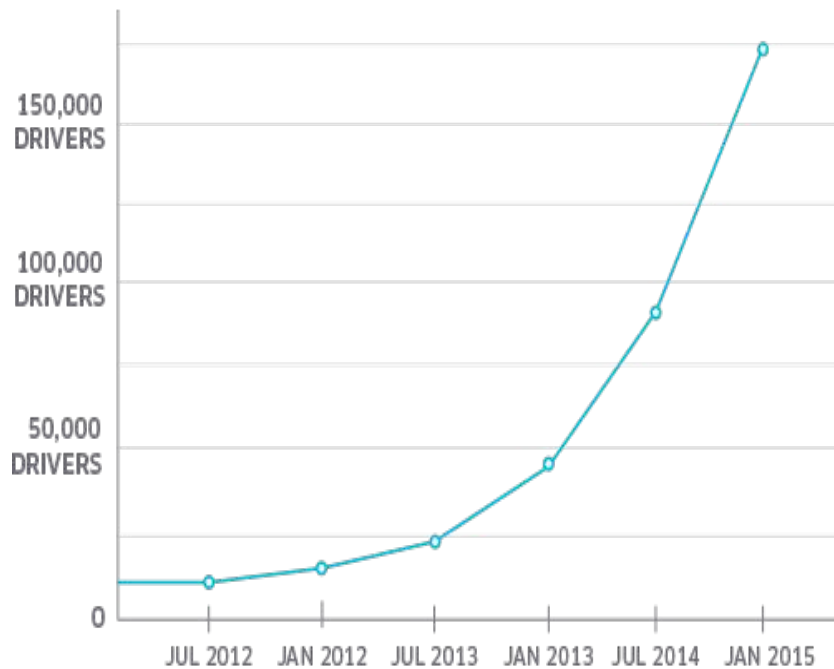

Amazon's Alexa virtual assistant now answers your basic health-related questions

Problem   Point of View   Proposition   Position   Product   Process/Plan   People/Partners   Possibilities   Promotion   Profit

The growth of Uber and its expansion into new markets will likely disrupt other transportation services

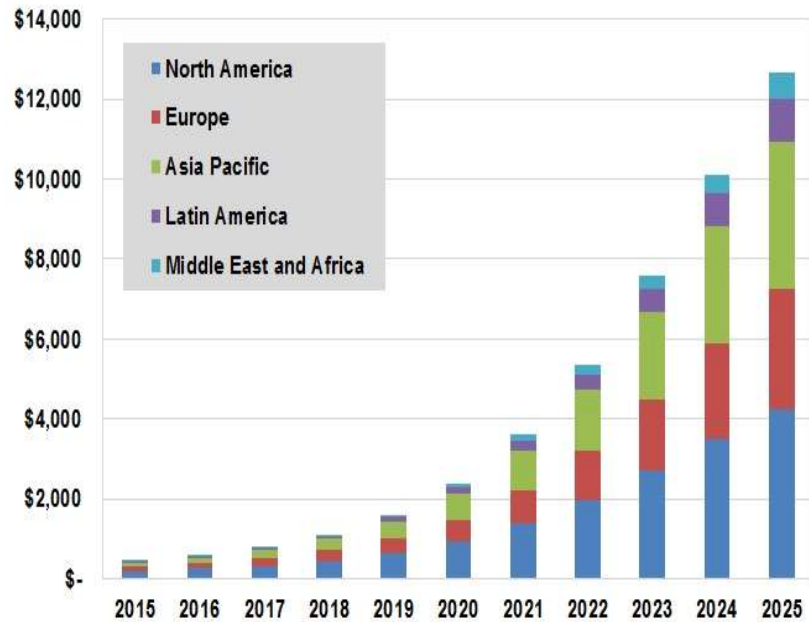| Uber Driver Growth	Uber Entering Healthcare

Hospitals Are Partnering With Uber to Get Patients to Checkups

The convenience could greatly reduce the likelihood of missed appointments.

ZHAI YUN TAN | AUG 15, 2016 | HEALTH

Problem   Point of View   Proposition   Position   Product   Process/Plan   People/Partners   Possibilities   Promotion   Profit

Drones represent an additional disruptive force in the global supply chain, but what about healthcare?

Societal Problem

Commercial Drone Revenues	Healthcare Drones

Chart legend:
- North America
- Europe
- Asia Pacific
- Latin America
- Middle East and Africa

Y-axis: $14,000 / $12,000 / $10,000 / $8,000 / $6,000 / $4,000 / $2,000 / $-

X-axis: 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025

Drones will begin delivering blood and medicine in the US

After launching in Rwanda, Zipline brings its fleet of medical drones to three US states

by Amar Toor | @amartoo | Aug 2, 2016, 6:03am EDT
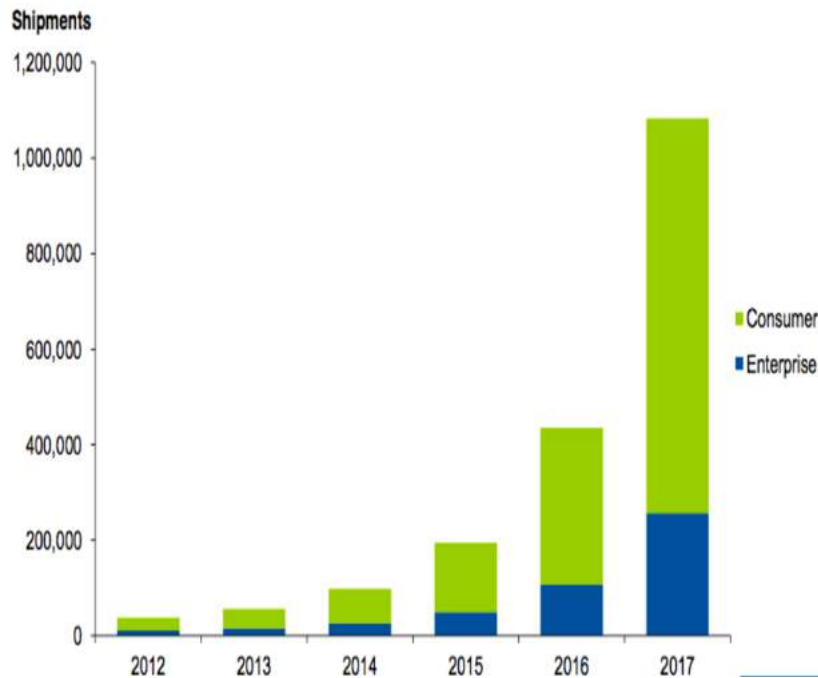
f SHARE ⓨ TWEET in LINKEDIN
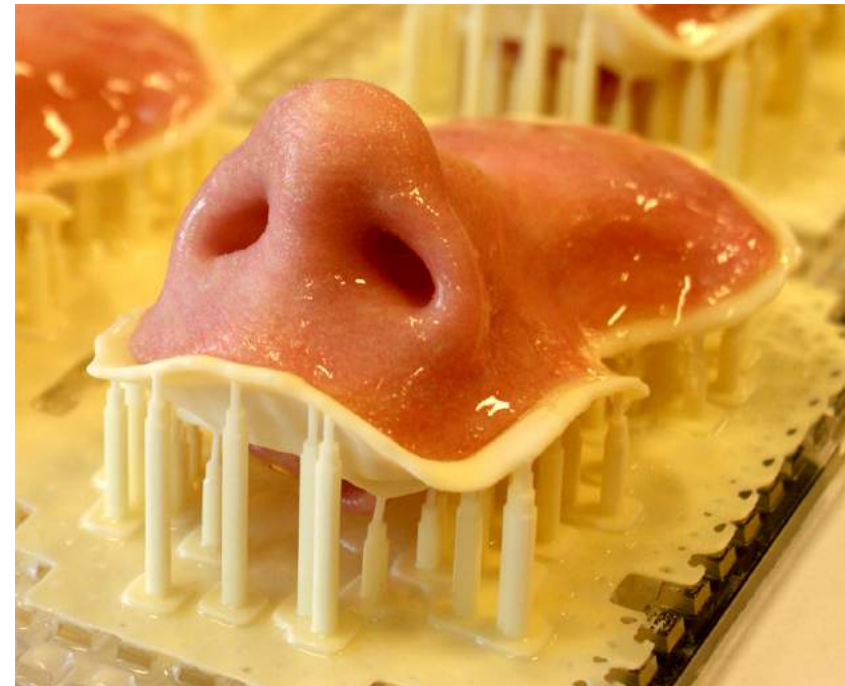

Zipline International

Problem   Point of View   Proposition   Position   Product   Process/Plan   People/Partners   Possibilities   Promotion   Profit

Automation, AI are further driving changes in Additive Manufacturing (aka 3D printing)

Consumer & Commercial AM

Healthcare 3rd Largest Market

Problem   Point of View   Proposition   Position   Product   Process/Plan   People/Partners   Possibilities   Promotion   Profit

47

We must abide the Law of Requisite Variety & Complexity

Variety in the External Environment	**=**	Variety in the Internal Environment

Organizations that fail to abide this law fail to survive

Are you living this law?

We must abide the Law of Requisite Variety & Complexity

Variety in the External Environment	=	Variety in the Internal Environment

49

We must abide the Law of Requisite Variety & Complexity
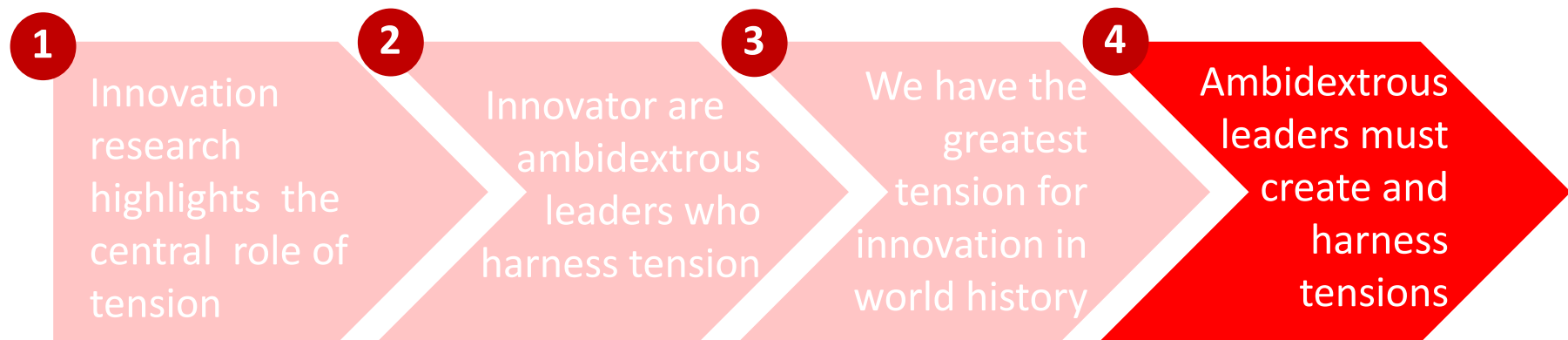
Variety in the External Environment = **Variety in the Internal Environment**

50

The test of a first-rate intelligence is the ability to hold two opposed ideas in the mind at the same time, and still retain the ability to function.

F. Scott Fitzgerald, author

Our focus on high reliability and medical practices of the past are causing us to fail to innovate and adapt in a turbulent market

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Life is like a ten-speed bicycle. Most of us have gears we never use.

Charles M. Schultz, cartoonist and author

We need to become ambidextrous to enable our people and organization to ride all kinds of cycles

MOUNTAIN BIKE
DISCOVERING

HYBRID BIKE
INCUBATING

ROAD BIKE
ACCELERATING

STATIONARY BIKE
SCALING

Failure
90%

Failure
3 in 1 M

The Law of Requisite Variety requires digital innovation – WE MUST BECOME MORE LIKE Amazon, Google, Apple

Original Sin of Healthcare – **Failure** to treat the consumer as customer – digital provides the tools to overcome failure but healthcare struggles due to Ten Tension of Digital Health
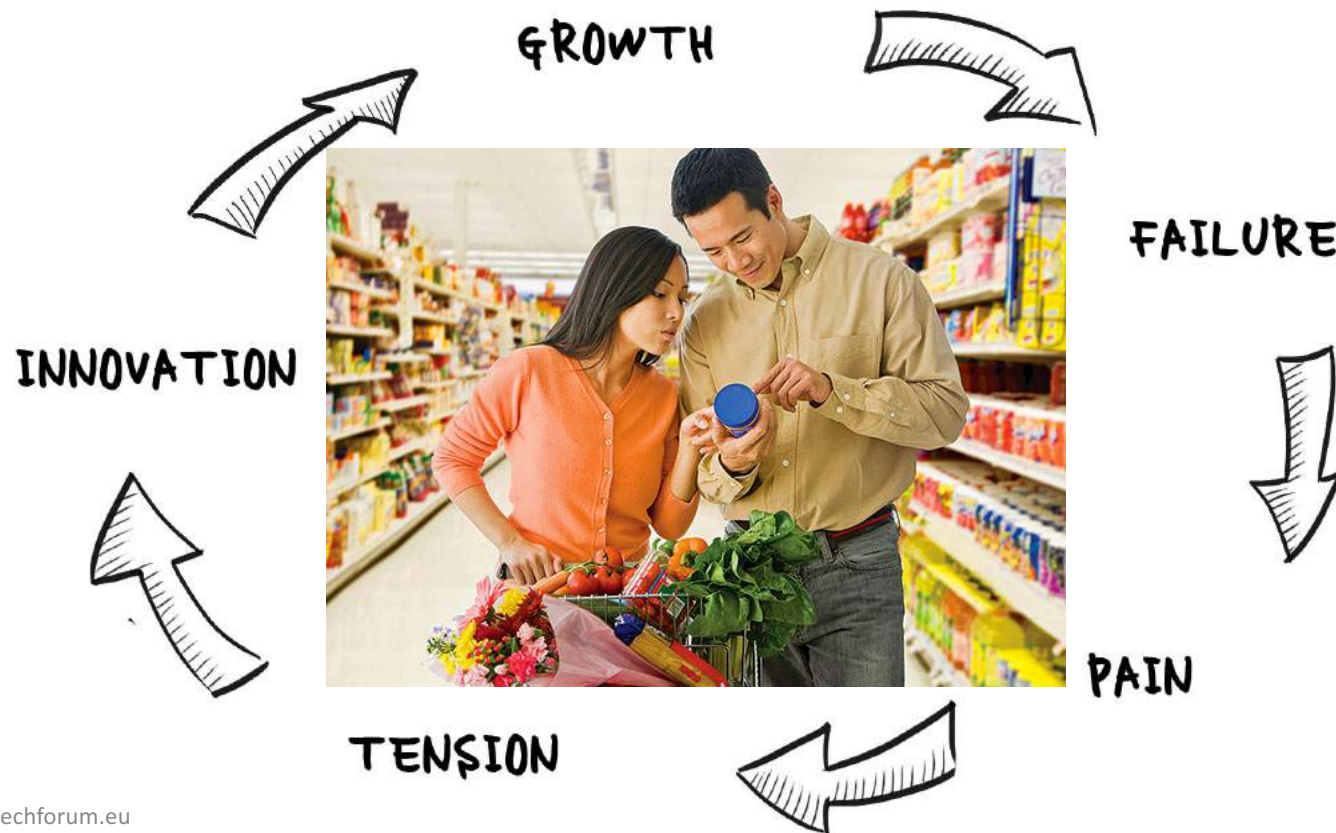
Money Tension – Requires new business models

Clinicians and health systems will only adopt Digital Health if they can make more money;

yet the primary value of Digital Health is to improve the triple aim: better outcomes, greater access, affordable care (lower costs).

Money Tension

Billable online medical evaluations ("e-visits")

"E-visits" are defined in the CPT manual, and their billing and coding requirements can be found there. They are billable by primary care physicians (PCPs).

- **99444**, Online medical evaluation - physician non-face-to-face E&M service to patient/guardian or health care provider not originating from a related E&M service provided within the previous 7 days.

Billable visits

The CPT manual defines billing and coding requirements for both the physician and the non-physician qualified health care provider* (QHP) telephone visit.

PCP codes

- **99441**, Telephone evaluation and management service by a physician or other qualified health care professional who may report E&M services provided to an established patient, parent or guardian not originating from a related assessment and management service provided within the previous 7 days nor leading to an assessment and management service or procedure within the next 24 hours or soonest available appointment; 5-10 minutes of medical discussion
- **99442**, Telephone services (see above), 11-20 minutes of medical discussion
- **99443**, Telephone services (see above), 21-30 minutes of medical discussion

Practice Tension – abandoning analog, outmoded pratices

Digital Health must drive creative destruction of medicine and transform the practice of healthcare to one that uses fewer clinicians;

Pharma, medtech, payers and providers must lead this transformation by embedding workflow into their Digital Health solutions.

Practice Tension

Roche, Qualcomm partner to monitor patients on blood thinners

By: Jonah Comstock | Jan 29, 2015

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Tags: anticoagulation meters | blood thinners | Qualcomm | Qualcomm Life | Qualcomm Life 2net | Roche | Roche Diagnostics | warfarin |

Less than a month after **announcing its partnership with Novartis**, Qualcomm is adding another big pharmaceutical company to its list of 2net partners: Roche, who will use Qualcomm Life's 2net platform to capture patient data from connected devices, starting with anti-coagulation meters.

"This collaboration marks a significant milestone for Roche as we launch a new generation of point-of-care solutions that enable healthcare professionals to better keep in touch remotely with patients, whenever and wherever they are," Jeremy Moss, senior vice president of Point of Care at Roche Professional Diagnostics said in a statement. "By combining Qualcomm Life's leadership in powering connected health solutions with our point-of-care expertise, we are taking an important step forward to realize our connected care strategy; ultimately enabling physicians to improve the overall quality of life for patients."

Engagement Tension – engaged in personal health behvaiors

Consumers/patients need to be more engaged in making healthy decisions but less engaged in the health system;

Digital Health provides the platforms to enable new and better forms of engagement.

61

Engagement Tension

Engagement Tension

400 Students
100 judges
81 universities
14 countries

$64,000 prize money

63
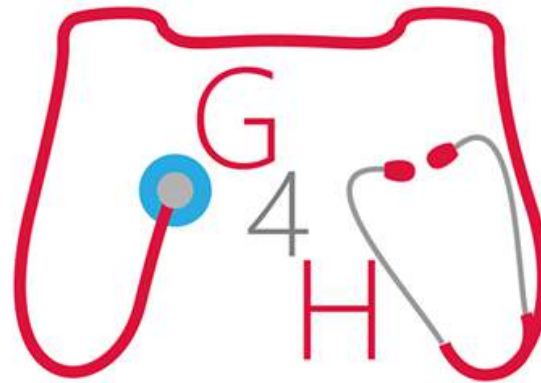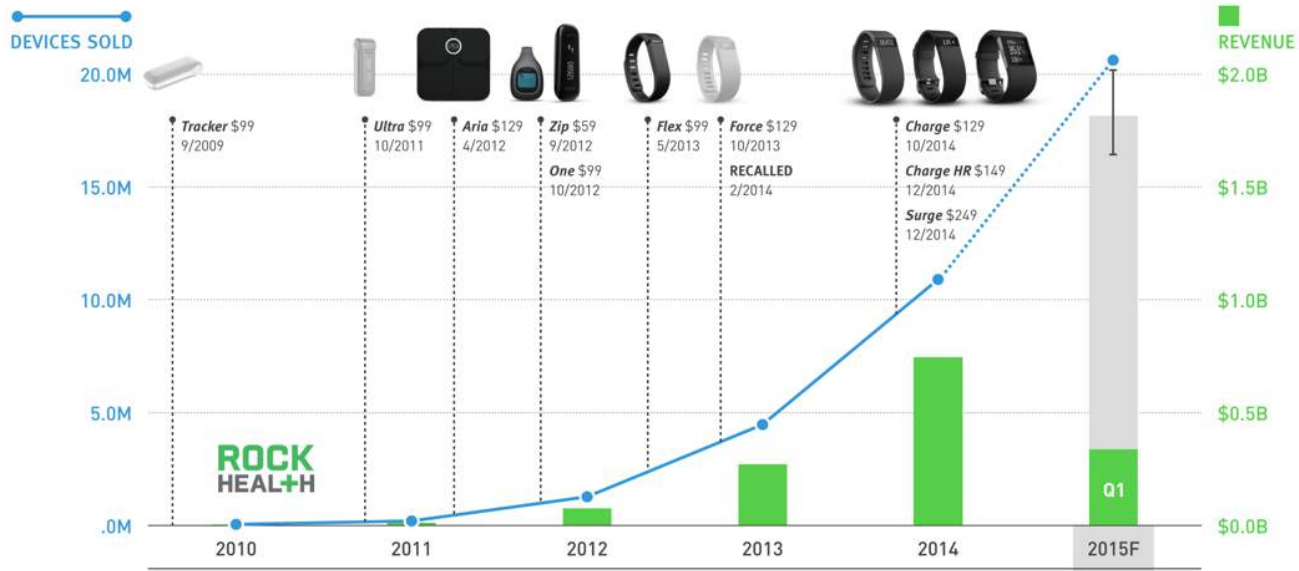
Adoption Tension – focus on those who are early adopters

Those that need Digital Healthcare the least are the most likely and willing to adopt it the fastest, while those that need it the most will be slow adopters;

Early adopters provide great tests cases to drive innovation and increase adoption among those with chronic disease.

64

Adoption Tension

FITBIT REVENUE AND DEVICES SOLD
2010-2015 (forecasted)

DEVICES SOLD

	Tracker $99 9/2009	Ultra $99 10/2011	Aria $129 4/2012	Zip $59 9/2012 / One $99 10/2012	Flex $99 5/2013	Force $129 10/2013 RECALLED 2/2014	Charge $129 10/2014 Charge HR $149 12/2014 Surge $249 12/2014	

	2010	2011	2012	2013	2014	2015F
Revenue growth YoY	179%	428%	255%	175%	143%	
Device growth YoY	259%	515%	250%	144%	91%	
Device ASP	$69.49	$59.71	$60.56	$68.36	$87.11	

Sources: Fitbit S-1, Rock Health analysis/forecasts

Technology Tension – its NOT about technology but work flow

We have an over abundance of technologies but an unwillingness and inability of clinicians to use them;

Technology adoption must become as simple as writing a drug script and require no more thinking and effort from clinicians.

Technology Tension

67
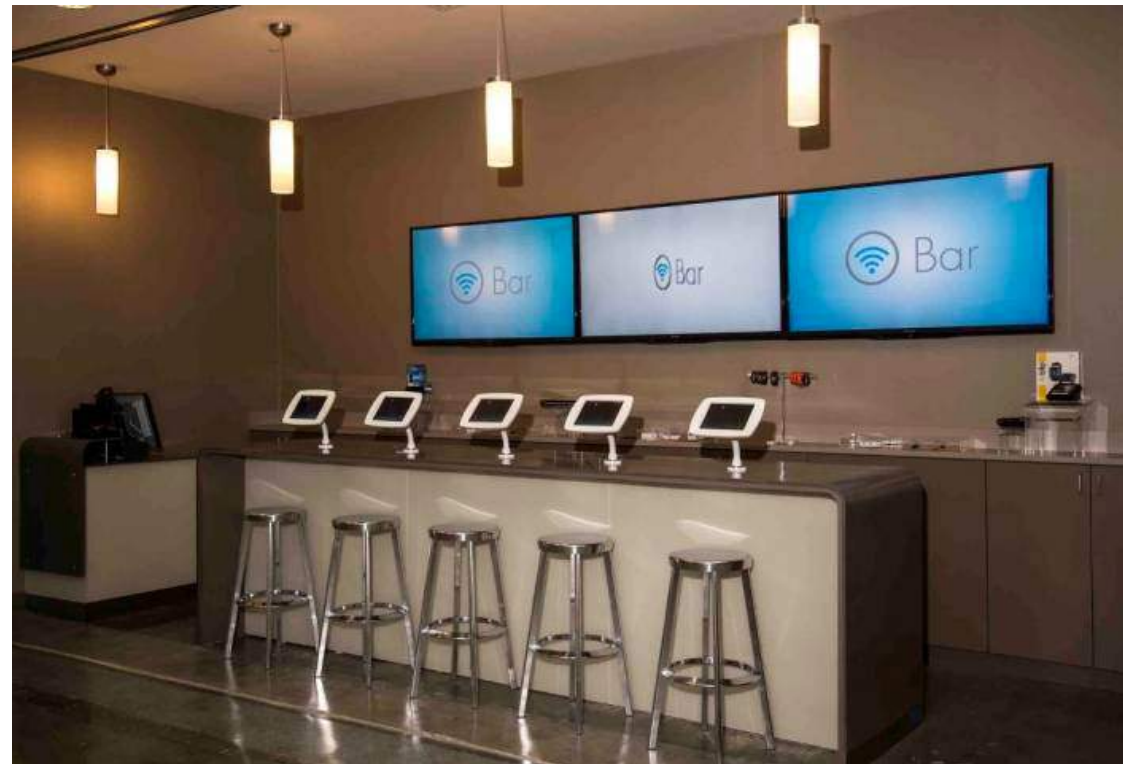
Satisfaction Tension – consumers are demanding digital

Nearly every study and survey on Digital Health shows 70-85%+ consumer/patient satisfaction due to significantly better outcomes (shorter hospitalization, fewer admissions and readmissions);

Consumers must become the outspoken revolutionaries demanding Digital Health solutions.

Satisfaction Tension

1
Cost

20% (20%) reduction in hospital admissions

25% (14%) reduction in bed days of care

2
Convenience

86% patient satisfaction

UK NHS Whole System Demonstrator

Why isn't it malpractice to not use Digital Health?

3
Confidence

20-57% reduction in chronic disease care

46% reduction in mortality

4
Compensation

85+% reduction in cost of care, $1600 vs $13K PCP, $77K SNF

69

Feedback Tension – admit there is NO feedback loop today

There currently is virtually no feedback loop in healthcare for the vast majority of consumers/patients;

Digital Health enables real time feedback, but rarely by the human clinician.

Feedback Tension

## Utilization Tension – increase productivity not activity

Nearly all studies of Digital Health show 20-40% reductions in health system utilization yet health systems in developed countries can't figure out how to turn that into economic value

Emerging markets and consumer driven systems are creating new Digital Health systems to leapfrog developed markets.

Utilization Tension
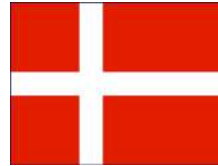
Modernized hospital structure...
..........from appx. 80 to 50 units

2007   2020
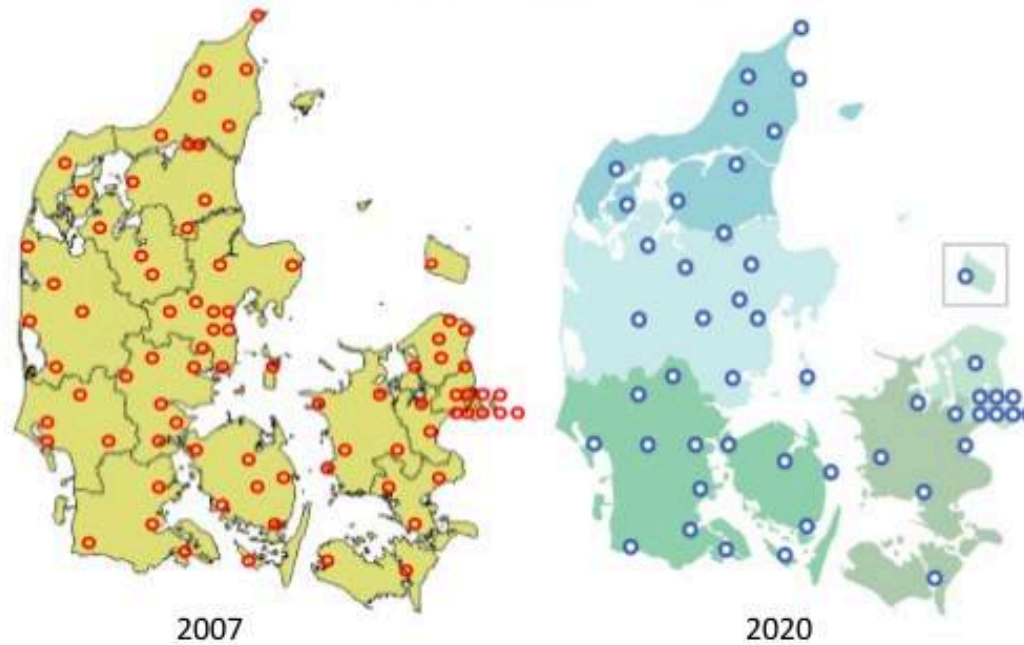
Validation Tension – don't wait for 10 years and everybody else

Despite a plethora of pilots and studies of Digital Health applications and use cases, we lack a systematic way to evaluate and validate which ones work and how effective they are;

we need social and crowd sourced mechanisms to rapidly test and share Digital Health solutions and avoid **Pilotitis**.
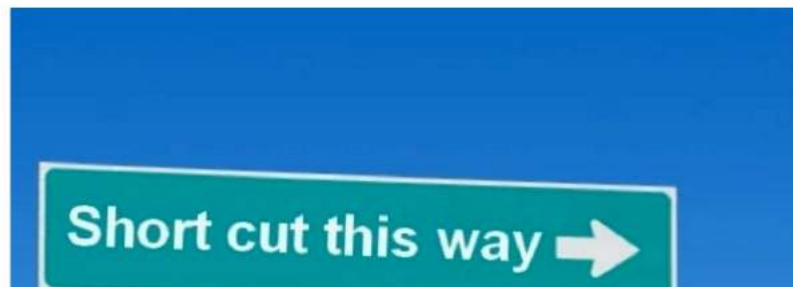
74

Validation Tension

The cHealth Blog

PARTNERS HEALTHCARE | CONNECTED HEALTH

Musings on Connected Health by Joseph Kvedar, MD

Home   About Me

Headlines, Heuristics and Subtlety in Interpreting Connected Health Studies

MARCH 28, 2016

tags: adherence, connected health, consumer health, engagement, mHealth, mobile health, remote monitoring, smart phones, technology

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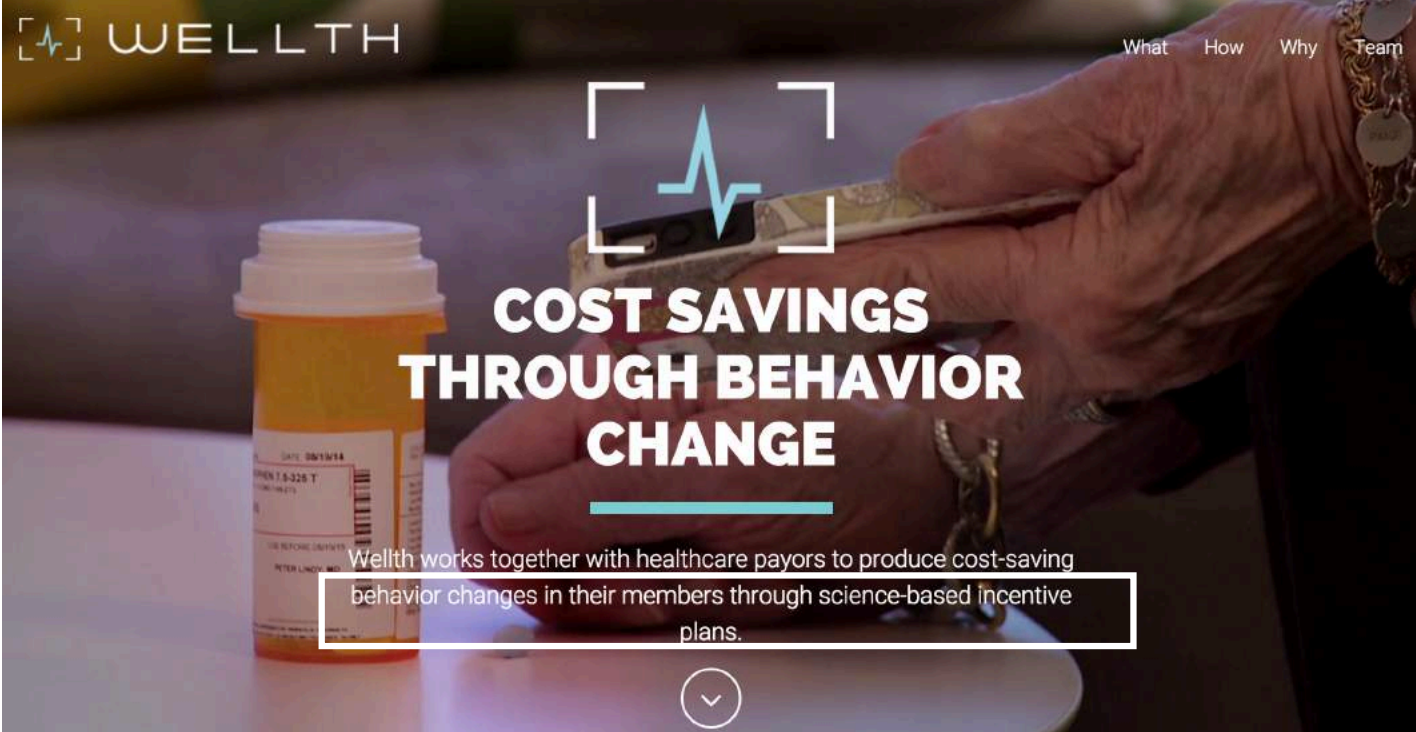
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75

Behavior Change Tension – consumers have right digital behaviors

Digital Health's value only really accrues by changing consumer/patient and clinician behaviors, yet clinicians lack any training in behavioral psychology, economics and change;

Digital Health vendors must incorporate behavior change science into their solutions just as Google, Amazon, Facebook and Apple do in digital technology solutions.

Behavior Change Tension

Would this create tension in your organization? Could it be a creative tension? Could it be transformational?

How do we "Own the Disease" and increase market share by 5X, triple profits, and radically improve outcomes in five years?

5th place with 10% market share, **-10%** margins, ready to such down the business – Growth Hormone Therapy

Could we own the disease?

A digital health feedback loop dramatically improved results – willing to take risk
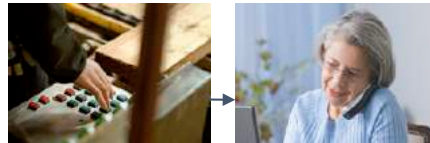
Innovation in the new healthcare paradigm

Wireless Easypod injection device records dosage data and transmits to clinicians

Nurse call center intervenes when notified by device of patient non-compliance

Molecular diagnostic mitigate risk, enabled greater risk taking and value creation through digital health

Innovation in the new healthcare paradigm

Molecular Dx screening IDs patients who would benefit from treatment

Wireless Easypod injection device records dosage data and transmits to clinicians

Nurse call center intervenes when notified by device of patient non-compliance

Nurses assisting practices provide better risk management with analog care to complement digital care – enhance clinician workflow

Innovation in the new healthcare paradigm

Molecular Dx screening IDs patients who would benefit from treatment

Wireless Easypod injection device records dosage data and transmits to clinicians

Nurse call center intervenes when notified by device of patient non-compliance

Clinical nurses in physician's office assist in treating patient

Electronic medical records ensured digital health data capture, improved analytics, and measures of value creation

Innovation in the new healthcare paradigm

| *Molecular Dx screening IDs patients who would benefit from treatment* | *Wireless Easypod injection device records dosage data and transmits to clinicians* | *Nurse call center intervenes when notified by device of patient non-compliance* | *Clinical nurses in physician's office assist in treating patient* | *EHR Integrates patient information* |

Owning the Disease through digital health enabled value-based payment and success

Innovation in the new healthcare paradigm

Molecular Dx screening IDs patients who would benefit from treatment

Wireless Easypod injection device records dosage data and transmits to clinicians

Nurse call center intervenes when notified by device of patient non-compliance

Clinical nurses in physician's office assist in treating patient

EHR Integrates patient information

Value-based reporting to NHS demonstrates compliance and improved outcomes

Personalized	Digital System-based	Value driven

Market Share: 10% → 50%   Profits: -10% → 20%   Sales force: 20 → 0

84

Would this create tension in your organization? Could it be a creative tension? Could it be transformational?

How do we eliminate 50% of all clinical visits within 5 years?

Doctors Adamson and Bachman have shown the way in their 2010 research

MAYO CLINIC

Pilot Study of Providing Online Care in a Primary Care Setting

STEVEN C. ADAMSON, MD, AND JOHN W. BACHMAN, MD

OBJECTIVE: To study the use of e-visits in a primary care setting.

PATIENTS AND METHODS: A pilot study of using the Internet for online care ("e-visits") was conducted in the Department of Family Medicine at Mayo Clinic in Rochester, MN. Patients in the department preregistered for the service, and then were able to use the online portal for consultations with their primary care physician. Use of the online portal was monitored and data were collected from November 1, 2007, through October 31, 2009.

RESULTS: During the 2-year period, 4282 patients were registered for the service. Patients made 2531 online visits, and billings were made for 1159 patients. E-visits were submitted primarily by women during working hours and involved 294 different conditions. Of the 2531 e-visits, 62 (2%) included uploaded photographs, and 411 (16%) replaced nonbillable telephone protocols with billable encounters. The e-visits made office visits unnecessary in 1012 cases (40%); in 324 cases (13%), the patient was asked to schedule an appointment for a face-to-face encounter.

CONCLUSION: Although limited in scope, to our knowledge this is the largest study of online visits in primary care using a structured history, allowing the patient to enter any problem, and billing the patient when appropriate. The extent of conditions possible for treatment by online care was far-ranging and was managed with a minimum of message exchanges by using structured histories. Processes previously given as a free service or by nurse triage and subject to malpractice (protocols) were now documented and billed.

Mayo Clin Proc. 2010;85(8):704-710

regulatory issues, and concerns over security, privacy, and confidentiality."[21] Also, electronic consultations to date have generally used online forms or secure e-mail. The information in these formats is unstructured and often lacks sufficient information, prompting the clinician to respond to the patient to request further information, which results in delays.[22] Furthermore, the lack of organization in an e-mail makes it difficult to code complexity; consequently, the same fee is often charged for all online consultations, regardless of complexity.[23]

For editorial comment, see page 701

Isolated reports of the use of online consultations have been disappointing. For example, despite indications that electronic communication could decrease health care costs[24] and provide reimbursement from patients,[25,26] Fairview Health System has reported only 10 e-visits per week in a system with 400 physicians,[27] and Blue Cross of Minnesota processed about 30 e-visits per month in July 2008 and 90 e-visits per month in July 2009 (D. Hiza, MD, written communication, February 2010).

Studies have not described a portal for online patient consultations that has a structured medical history. Structured computerized histories were first described in the 1960s by

Largest study of its kind to test the idea of pushing more care to the home

2 years (2007-2009)

4,300 patients

56 clinicians in 4 locations

24 hour turn around

Portal technology

2,531 online visits
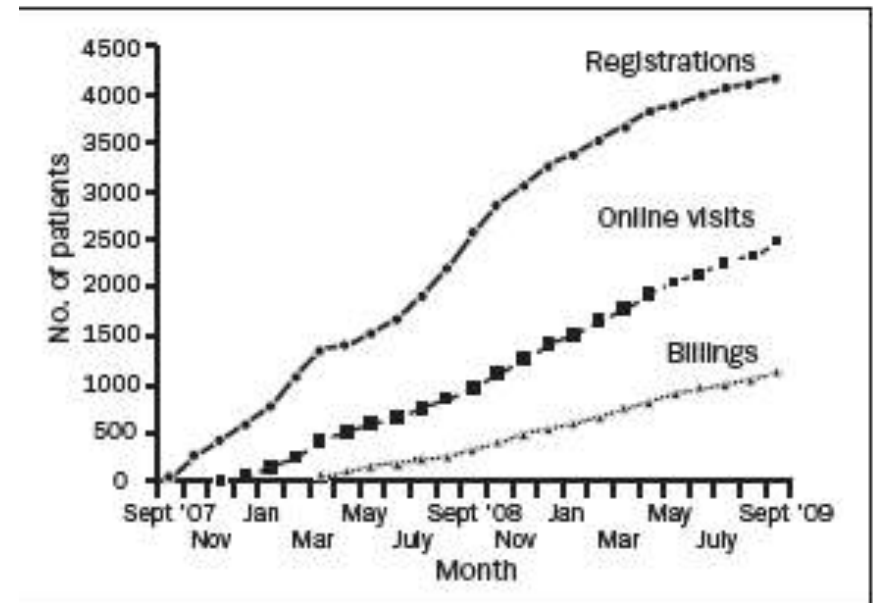
1,159 were billed

No marketing or promotion

FIGURE 2. Cumulative totals of patient registrations, online visits, and billings at each month during the study period.

There were two primary personas among these online patients, young moms and older daughters

71% women
Monday 25%
Weekend 5%
8 AM to 4 PM

Working Mom
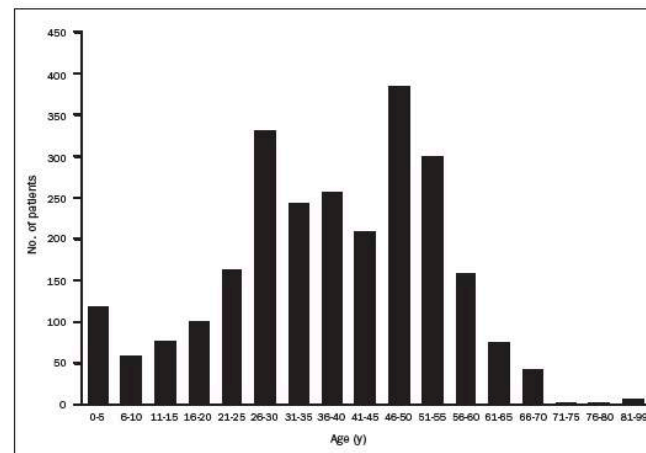
Working Daughter

FIGURE 3. Ages of patients receiving online consultations.

40% of all problems were address WITHOUT an office visit – this was conservative – could easily have been 50%

TABLE 1. The 20 Most Frequent Reasons for e-Visits[a]

Reported problem	No. (%) of visits[b]
Sinusitis	218 (8.6)
Depression	134 (5.3)
Back pain	121 (4.8)
Cough	77 (3.0)
Anxiety	75 (3.0)
Hypertension	67 (2.6)
Abdominal pain	66 (2.6)
Headache	65 (2.6)
Urinary tract infection	63 (2.5)
Influenza	62 (2.4)
Allergic rhinitis	57 (2.3)
Dermatitis	55 (2.2)
ADHD	53 (2.1)
GERD	50 (2.0)
Vaginitis	47 (1.9)
URI	45 (1.8)
Insomnia	40 (1.6)
Asthma	39 (1.5)
Contraception	36 (1.4)
Hyperlipidemia	32 (1.3)
Total	1402 (55)

[a] ADHD = attention deficit hyperactivity disorder; GERD = gastroesoph-ageal reflux disease; URI = upper respiratory tract infection.
[b] Of 2531 total visits.

Pie chart:
- New Prescription 45%
- Refill Prescription 10%
- Radiographs 10%
- Labs 5%
- Bypass nurse 16%
- Other 14%
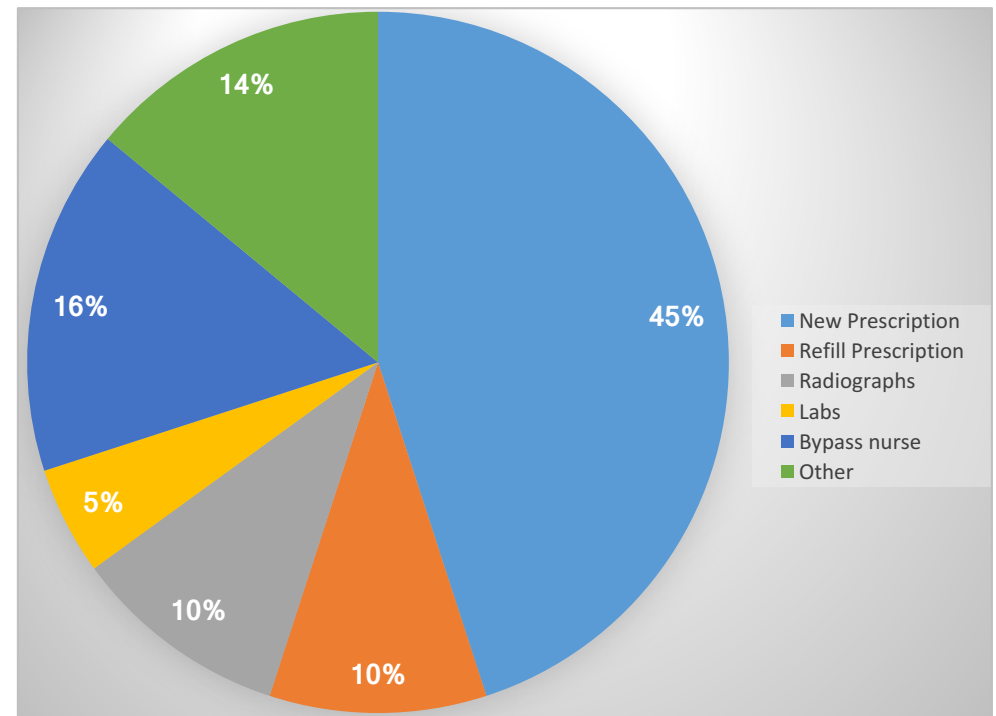
… but did it make money?

11% just prescription refill
14% sent to the office for an appointment
Many seen in the office previous week or regular follow ups
What is the value of being able to see more patients in office?

TABLE 2. Billings for Patients Without Mayo Clinic Insurance (n=448)

Billed	No. (%)
None	236 (52.7)
Insurance/patient	145 (32.4)
Medicare	
Not billed	29 (6.5)
Billed	14 (3.1)
Medicaid	24 (5.4)

90

Dr. Erin Clark in Maternal and Fetal Medicine at the University of Utah wants to cut maternal visits by 50%

For nearly 30 years we have been trying to cut the number of visits in half

1989: U.S. Department of Health and Human Services

Caring for our Future: The Content of Prenatal Care Report of the Public Health Expert Panel on the Content of Prenatal Care

Proposed reduced frequency prenatal schedule for low-risk parous women based on the timing of specific events and tests that occur in pregnancy.

➔ **Reduced recommended visits from 14 to 8.**

Dr. Clark ran a clinical study with 200 women to test the idea of cutting visits by 50%

ENROLLMENT

Eligible Patients
Approached, n=466

Declined participation, n=266 (57%)

Randomized, n=200

ALLOCATION

Allocated to Traditional
Prenatal Care, n=100

Allocated to Remote Prenatal
Care Arm, n=100

Withdrawn, n=4
- Switched insurance/provider, n=3
- Pregnancy loss prior to 16 weeks, n=1

Withdrawn, n=9
- Technical issues, n=4
- Switched insurance/provider, n=4
- Pregnancy loss prior to 16 weeks, n=1

ANALYSIS

Analyzed, n=96

Analyzed, n=91

She used digital health devices and applications

94
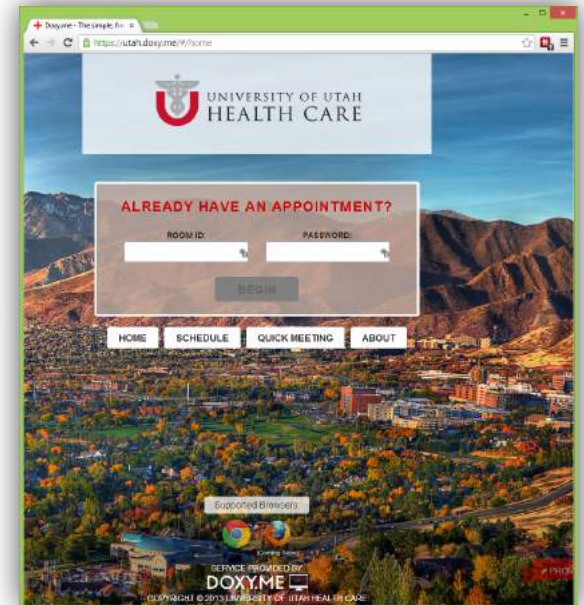
She found no meaningful difference in outcomes

	Traditional (N=96)	Remote (N=91)
Gestational Age at Delivery, wks	39.4	39.4
Preterm Birth	7 (7.3%)	4 (4.4%)
Induction of Labor	39 (40.6%)	41 (45.1%)
Cesarean Delivery	12 (12.5%)	9 (9.9%)
Birth Weight, gms	3427	3345
IUGR	3 (3.1%)	1 (1.1%)
Fetal Demise	1 (1%)	1 (1.1%)

She found patients were just as satisfied
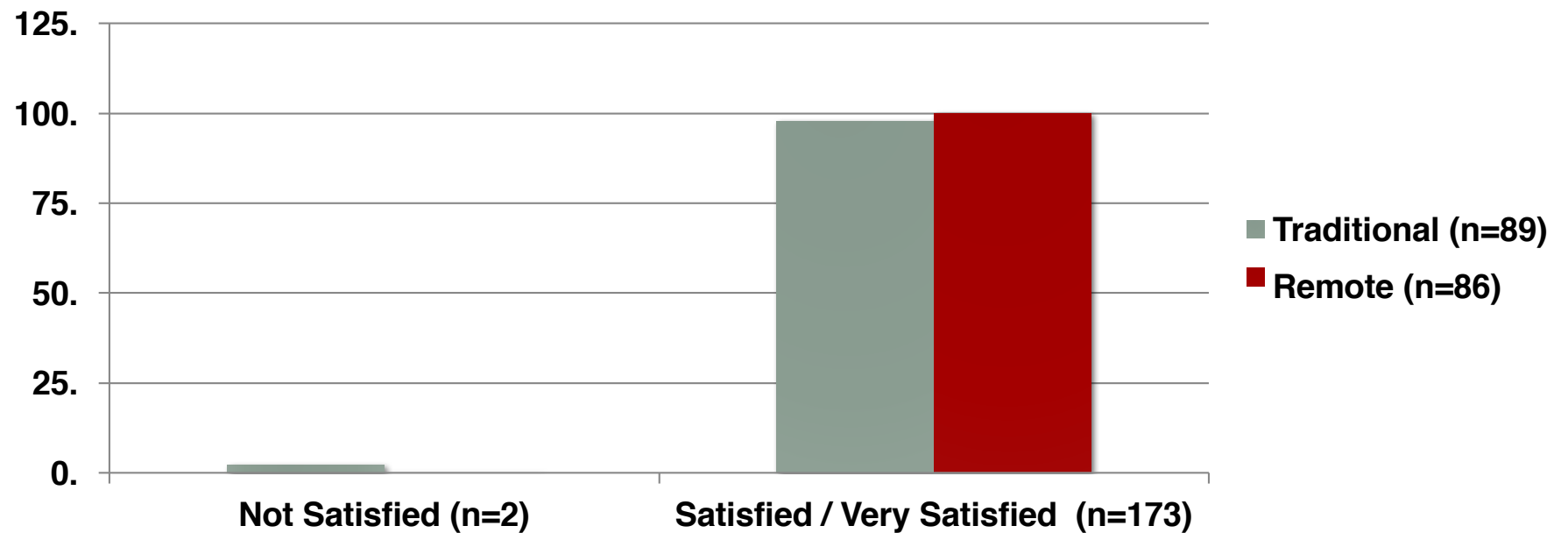
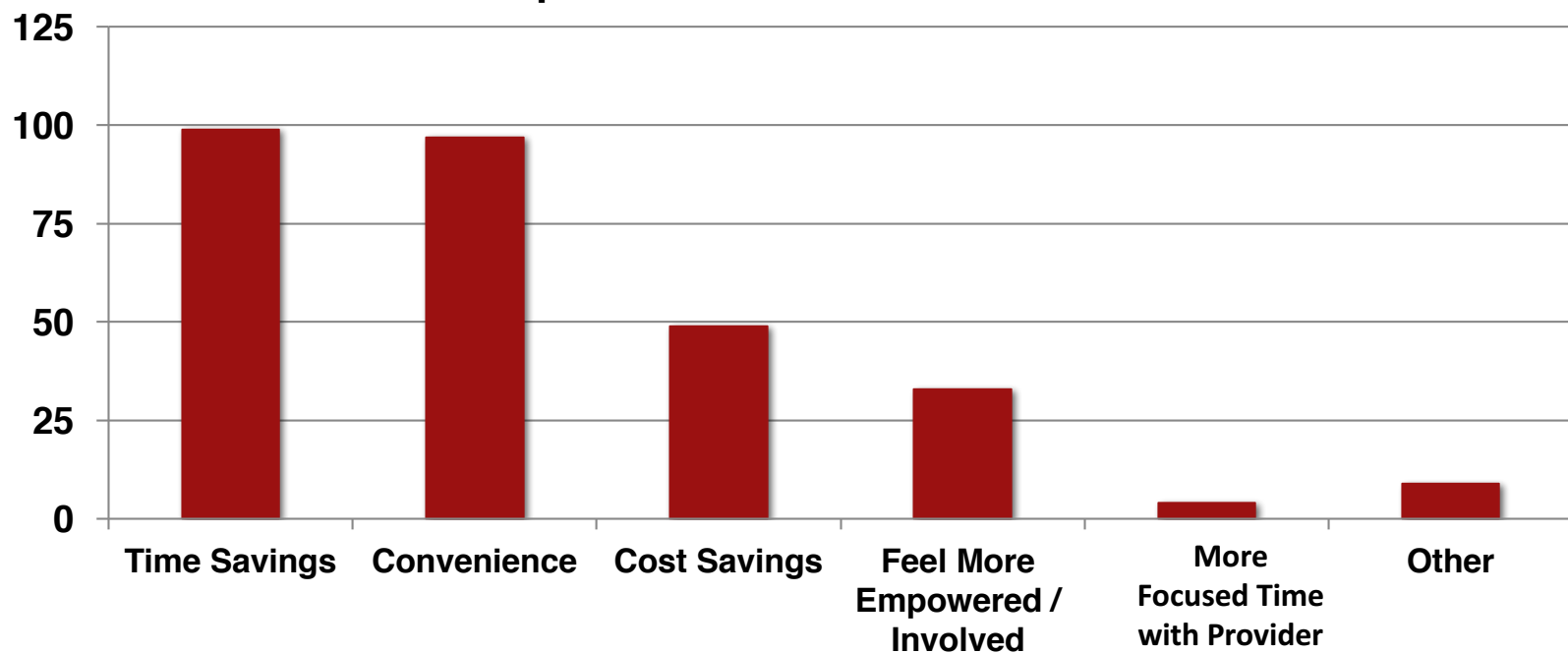# Patients were very happy with digital health remote monitoring

I am satisfied with remote prenatal care for monitoring my health during pregnancy.
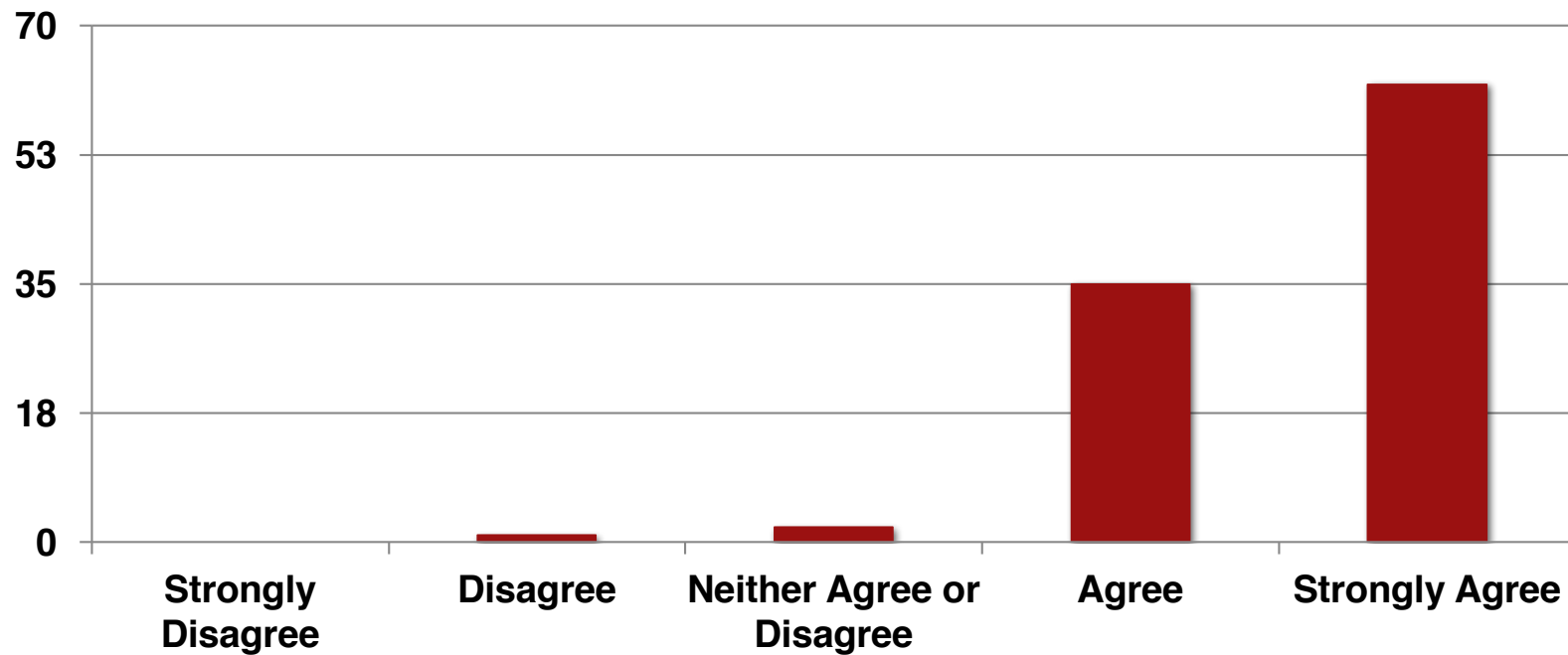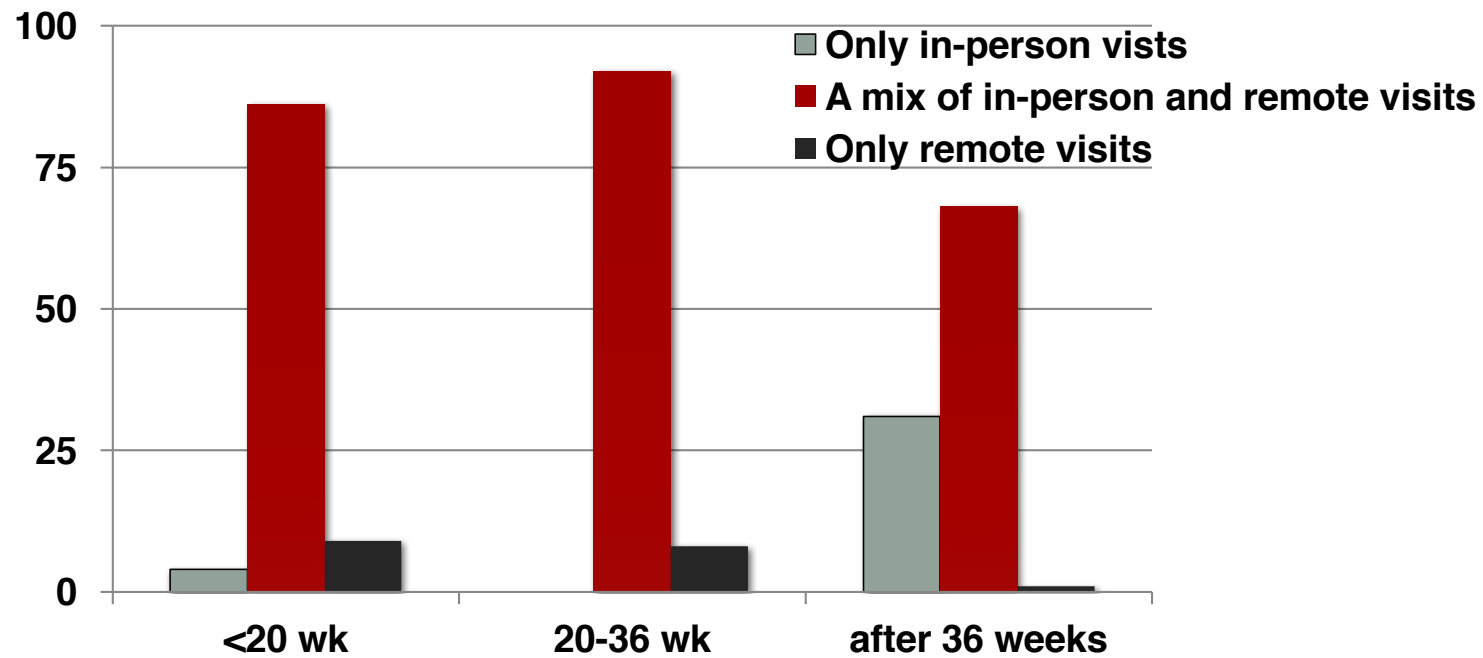
There were many reasons they liked and preferred it to traditional prenatal care

What are the 3 most important reasons you liked receiving remote prenatal care?

Time Savings	Convenience	Cost Savings	Feel More Empowered / Involved	More Focused Time with Provider	Other
~99	~97	~49	~33	~4	~9

They nearly all preferred a mix of digital and analog health

What happens if you harness creative tension to Own the Disease or cut visits by 50% in 5 years?
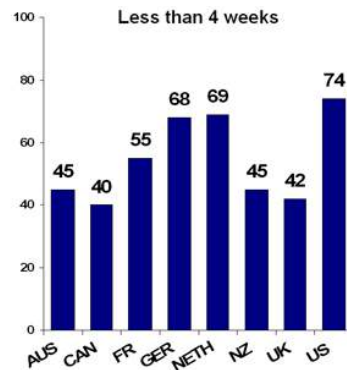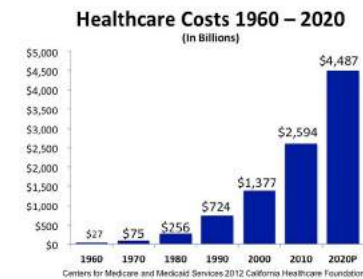

Clinician Shortages

Patient Access

Quality Outcomes

Health Costs

By applying Complexity Science to innovate you enable spontaneous order to emerge!

Our focus on high reliability and medical practices of the past are causing us to fail to innovate and adapt in a turbulent market

1 Innovation research highlights the central role of tension

2 Innovator are ambidextrous leaders who harness tension

3 We have the greatest tension for innovation in world history

4 Ambidextrous leaders must create and harness tensions
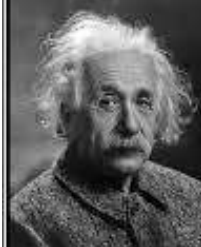
We must apply Complexity Science to overcome our failure to innovate!

I thought of that while I was riding my bicycle.

Albert Einstein, on coming up with the Theory of Relativity

Sorenson Center
for Discovery & Innovation
THE UNIVERSITY OF UTAH
A Division of the David Eccles School of Business

Physics has struggled to unify the world of the big and the small ... much like organizations do today

If quantum mechanics hasn't profoundly shocked you, you haven't understood it yet.

(Niels Bohr)

izquotes.com

Quantum mechanics is very worthy of regard. But an inner voice tells me that this is not yet the right track. The theory yields much, but it hardly brings us closer to the Old One's secrets. I, in any case, am convinced that He does not play dice.
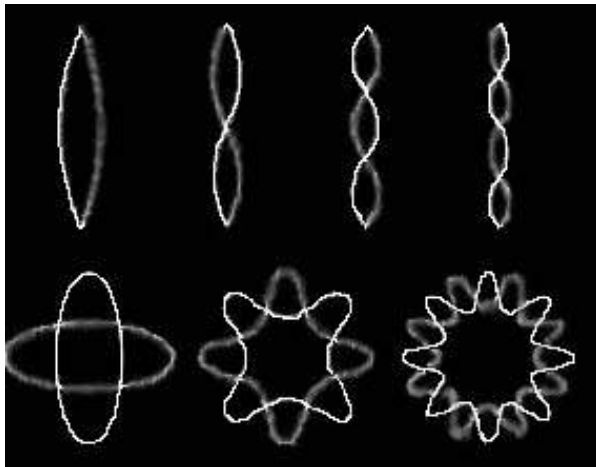
(Albert Einstein)

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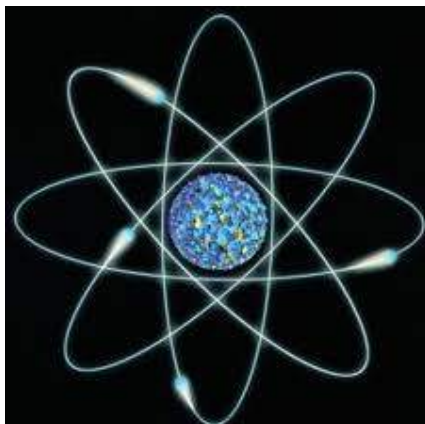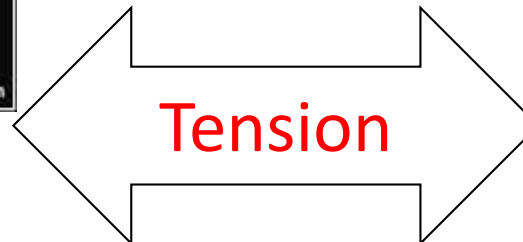
Tension

small
probable
uncertain
free will
radical

BIG
PREDICTABLE
CERTAIN
CONSTRAINED
INCREMENTAL

103

String theory has emerged as a crazy idea of how harnessing tension unifies both big and small in Complex Adaptive Systems

Vibrating strings at various tensions to deliver specific frequencies look to be the foundation for all existence and unify General Relativity and Quantum Physics

| Strings | Quarks Leptons Hadrons | Electrons Protons Neutrons | Atoms | Molecules |
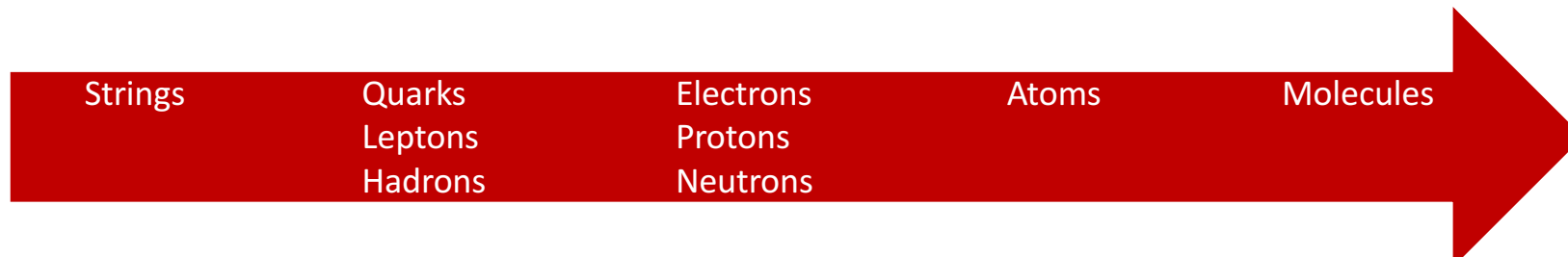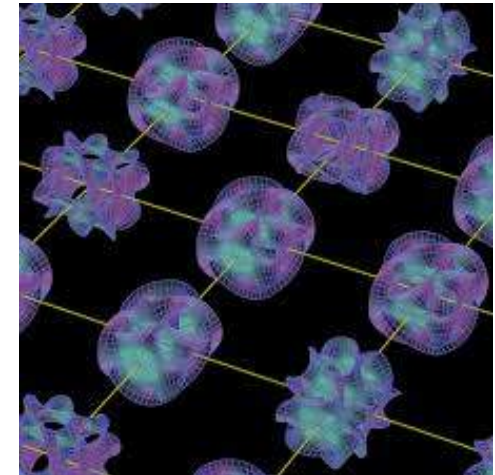
Is a theory of tensions and complexity crazy enough?

"We are all agreed that your theory is crazy. The question that divides us is whether it is crazy enough to have a chance of being correct."

Niels Bohr

"*Tension* contains very practical wisdom to guide leaders to move towards, and embrace, creative tension."
ED CATMULL Co-founder of Pixar Animation Studios, President, Walt Disney and Pixar Animation Studios and New York Times bestselling author of *Creativity, Inc.*

TENSION

THE ENERGY OF **INNOVATION**

HOW HARNESSING TENSION ACCELERATES INNOVATION AND FUELS YOUR CREATIVE GENIUS

Chris Wasden, EdD   Mitch Wasden, EdD