INVESTING IN THE IMPENDING DIGITAL QUAKE

80% JOBS/COMPANIES/RESEARCH DISRUPTED?

Stephen Ibaraki

Exploring Key Themes

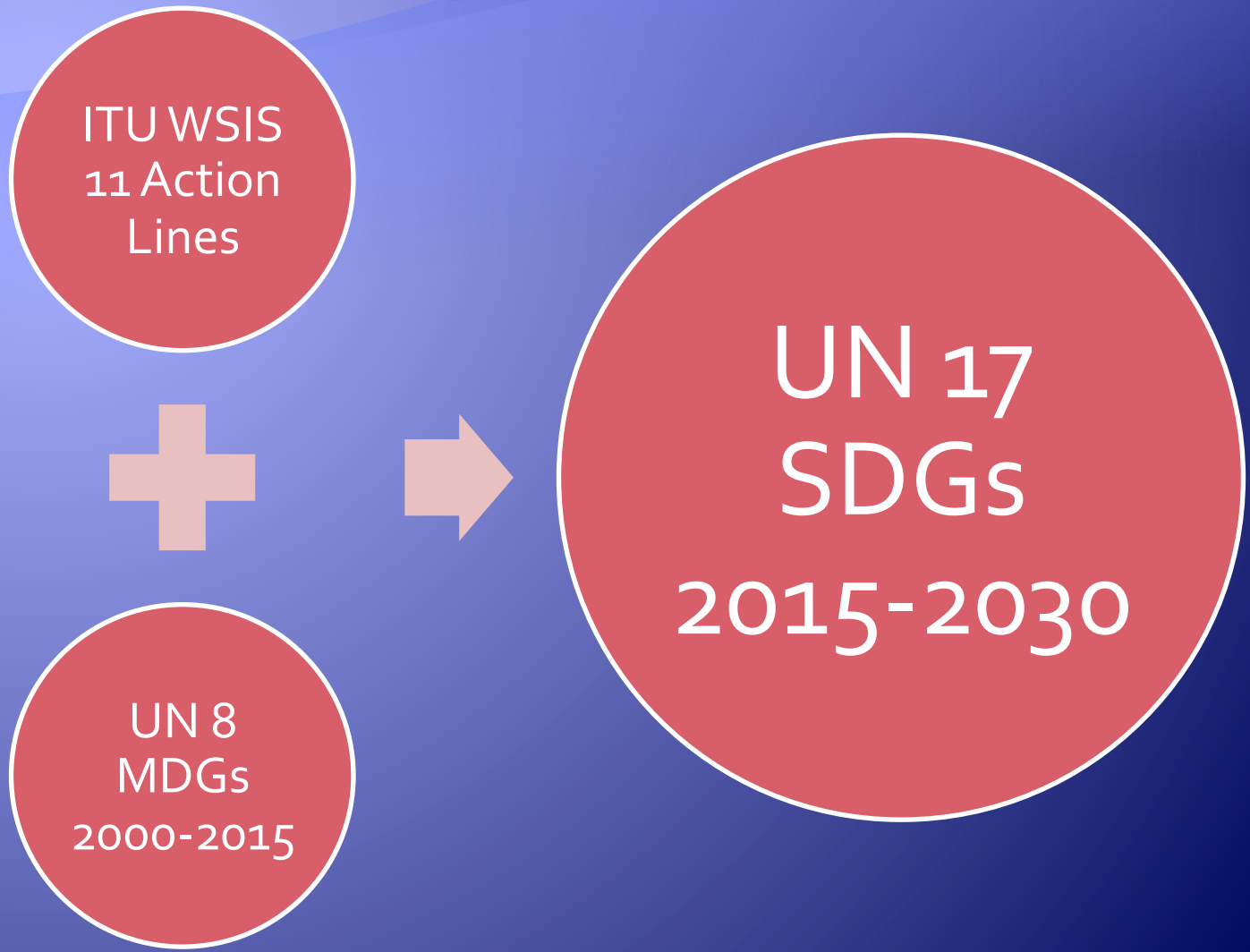
- Digital Quake–80% jobs, companies changing?
- $100B venture capital
- China government startup investment fund $337B
- Funding & 170 Unicorns
- SMART (specific, measurable, achievable, relevant, time bound) investments

http://www.businessinsider.com/chinas-startup-investment-fund-is-bigger-than-denmarks-gdp-2016-4?utm_source=feedburner&utm_medium=referral
http://fortune.com/2016/04/27/ant-financial/
CBInsights
http://www.itworldcanada.com/blog/the-next-wave-of-disruption-super-smart-cities-2020/378747

Exploring Key Themes

- Can you answer these questions:
  - Why broad understanding necessary
  - What are SDGs and WSIS and why do they matter
  - What are the global "Mega" trends
  - What is the profound disruption with CRISPR and Machine Learning and others!
  - What is the investment landscape, what are investment triggers and innovation startup attributes
  - What do CEOs and CTOs think

United Nations Sustainable Development Goals (SDGs): affordable, reliable, everywhere, safe, inclusive, fair, equal, resilient, sustainable, all ages



SRC: United Nations

United Nations Sustainable Development Goals (SDGs): affordable, reliable, everywhere, safe, inclusive, fair, equal, resilient, sustainable, all ages

1.End poverty	2.End hunger Agriculture	3.Health Well-being
4.Education Lifelong-learning	5.Gender-equality Empowerment	6.Water Sanitation
7.Energy-access	8.Economic-growth Decent work	9.Infrastructure Industrialization Innovation

United Nations Sustainable Development Goals (SDGs): affordable, reliable, everywhere, safe, inclusive, fair, equal, resilient, sustainable, all ages

10.Inequality-reduction	11.Safe cities	12.Consumption Production
13.Climate-change	14.Marine – resources Oceans/seas	15.Earth-ecosystems (forests, land, biodiversity)
16.Peace Justice Fair Institutions	17.Global Partnership: Finance, Technology, Capacity Building, Trade, Systemic Issues (policy/institutional coherence, multi-stakeholder, data, monitoring, accountability)	

SRC: United Nations

United Nations/ITU World Summit on the Information Society (WSIS) Action Lines

C1.Gov, Stake-holder promotion ICTs	C2.ICT infrastructure	C3.Access information knowledge	C4.Capacity building
C5.Confidence Security in ICT	C6.Enabling environment	*C7.Applications	C8.Cultural, language diversity, identity, local content
C9.Media	C10.Ethics	C11.Cooperation	

*C7. e-gov, e-bus, e-learn, e-health, e-employ, e-environ, e-agri, e-sci

SRC: United Nations

Megatrends (MT): "Second Machine Age"

"Second Machine Age": Erik Brynjolfsson and Andrew McAfee

- Professors from MIT "global economy is on the cusp of a dramatic growth spurt driven by smart machines that finally take full advantage of advances in computer processing, artificial intelligence, networked communication and the digitization of just about everything."
- Exponential growth: computing power, digital information, cheap IoT communicating, Big Data, unlimited speed, data recombination, ubiquity
- Evidence: Driverless cars, cell-reported traffic patterns, robots scanning and understanding environments, HoloLens, Skype language translation, computers writing reviews/resumes/ grading essays

SRC: Washington Post: Steven Pearlstein http://wapo.st/1bFeuMQ ; http://blog.instagram.com/post/104847837897/141210-300million

Megatrends (MT): "Second Machine Age"

- Instagram: 400+ million/mthly users, 100+ million photos/ videos/daily; in 18 months sold for $1B to Facebook; Kodak declares bankruptcy same month
- FB Market Value ~$315B in top 5; ~$100B bigger than Walmart; 10 times Kodak at peak; FB 7 billionaires each 10x greater wealth than George Eastman
- WhatsApp $22B, 55 employees purchased by Facebook Feb 2014; $400 million value per person; new low capital business model

  Today: WhatsApp 1B users/mthly + Messenger 900 million = 60 billion mssgs/day

  VS

  United Airlines Dec 2015 $22B market cap, 82,300 employees

SRC: Washington Post: Steven Pearlstein http://wapo.st/1bFeuMQ ;
http://blog.instagram.com/post/104847837897/141210-300million ;
http://www.dogsofthedow.com/largest-companies-by-market-cap.htm ;
http://www.thestreet.com/story/11005806/1/kodaks-bankruptcy-manufacturing-a-21st-century-rebirth.html

Megatrends (MT): "Second Machine Age"

"Second Machine Age" : Erik Brynjolfsson and Andrew McAfee

- First machine age (Kodak), rising and related together with jobs: productivity, employment and income

- Second machine age (FB), existing separately, productivity from jobs/income; with few employees, products/services for unlimited customers, at little cost

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- Future need: Driving greater demand for high-level programmers; education system focussed on skills for smart machines

SRC: Washington Post: Steven Pearlstein http://wapo.st/1bFeuMQ

Megatrends (MT): 4th Industrial Revolution

- *The Fourth Industrial Revolution*
  by Prof Klaus Schwab founder executive chairman World Economic Forum; subject UBS paper
- EXTREME automation, connectivity
- "ALL" dependent upon computing power
  - Examples:
    - CRISPR/Cas9 gene editing
      Jia Jia China, Boston Dynamics walking Robots, Hanson's Sophia

http://www.techrepublic.com/article/microsoft-envision-prepare-yourself-for-the-fourth-industrial-revolution/
https://www.weforum.org/pages/the-fourth-industrial-revolution-by-klaus-schwab/
https://www.ubs.com/global/en/about_ubs/follow_ubs/highlights/davos-2016.html
https://en.wikipedia.org/wiki/$1,000_genome

MT: 4th Industrial Revolution

- Three clusters merging in cyber-physical systems driven by AI and robots:
  - Physical (human world),
  - Digital (technosphere),
  - Biological (natural world)

http://www.techrepublic.com/article/microsoft-envision-prepare-yourself-for-the-fourth-industrial-revolution/
https://www.weforum.org/pages/the-fourth-industrial-revolution-by-klaus-schwab/
https://www.ubs.com/global/en/about_ubs/follow_ubs/highlights/davos-2016.html

MT: 4th Industrial Revolution

- **Impacts:** economic, cultural, social, … endless disruption
- **Labour** (McKinsey US 58% = 45% can be automated now, +13% NLP reaches avg human levels)
- **Cybersecurity risks** (Eurasia Group's cyber risk index of 1-100: US 77, China 88)
- **Geopolitical** (global reaction to US presidential process, populist movements, Zika virus concerns, terrorist acts, economic inequality)
- **Winning** by flexibility, mobility, and adaptability in: education, labour, infrastructure, legal IP

http://www.techrepublic.com/article/microsoft-envision-prepare-yourself-for-the-fourth-industrial-revolution/
https://www.weforum.org/pages/the-fourth-industrial-revolution-by-klaus-schwab/
https://www.ubs.com/global/en/about_ubs/follow_ubs/highlights/davos-2016.html http://techcrunch.com/2016/04/15/artificial-intelligence-and-racist/?ncid=rss

MT: 4th Industrial Revolution

- **Physical (human world):**
  - **Autonomous tech** (DARPA, Google, Tesla, Toyota,…)
  - **3D printing** of circuit boards, cells, organs, medical implants, industrial parts
    - **4D printing** products responding to environment later in time – time the 4D
  - **Advanced Robotics** (OceanOne, Jia Jia, Atlas/Boston Dynamics, Hybrid Delphi human and machine learning collaboration—Korea 4.5% GDP R&D)
  - **New Materials** (embedded electronics e-skin, self-repairing, Lotus Leaf-inspired nanotech, shape memory polymers, nanomaterials like quantum dot tech / new batteries)

http://www.techrepublic.com/article/microsoft-envision-prepare-yourself-for-the-fourth-industrial-revolution/
https://www.weforum.org/pages/the-fourth-industrial-revolution-by-klaus-schwab/
http://www.ibtimes.co.uk/sxsw-meet-sophia-female-humanoid-robot-that-says-she-wants-start-family-destroy-humans-1550695

MT: 4th Industrial Revolution

- **Biological:**
  - Genetic analysis
  - Synthetic human genome cell line (HGP-Write)
  - CRISPR/Cas9/Cpf1 for designer plants, animals, humans, embryo experimentation already happening
  - DARPA brain implants, Brain interfaces, Mind control of objects, EU Brain project, US Brain initiative, Consciousness understanding

http://www.techrepublic.com/article/microsoft-envision-prepare-yourself-for-the-fourth-industrial-revolution/
https://www.weforum.org/pages/the-fourth-industrial-revolution-by-klaus-schwab/

MT: 4th Industrial Revolution

- **Digital:**
  - Mobile growing + Sensors rising + IoT planetary nervous system + breakout of Chatbots, virtual assistants and intelligent agents, NLP = Big Data: real-time, findable, shareable, transparent, data patterns with data mining / analytics; processing costs falling, cloud rising, better user interfaces, machine learning / deep learning / recommender / prediction (problem solving)

http://www.techrepublic.com/article/microsoft-envision-prepare-yourself-for-the-fourth-industrial-revolution/
https://www.weforum.org/pages/the-fourth-industrial-revolution-by-klaus-schwab/
http://www.mckinsey.com/mgi/overview/in-the-news/by-2025-internet-of-things-applications-could-have-11-trillion-impact

MT: 4th Industrial Revolution

- **Digital:**
  - **IoT** (McKinsey 2025: $11.1 trillion per year)
    - IoT -> global digital mesh -> planetary nervous system -> ML -> Knowledge Synthesis of Everything (KSE)
  - **Smart sensors** (trillion+ 2025)
  - **Smart devices** (7B plus mobile subscriptions; 10B units; Artik chips; Maker movement-Edison, Arduino101,Curie; SOC; SOM; heterogeneous computing; $65 down to $5)
  - **Sharing Caring Economy (O to O)** and new disruptive business models (Uber, AirBnB, Alibaba, Facebook, Amazon Mechanical Turk)

http://www.techrepublic.com/article/microsoft-envision-prepare-yourself-for-the-fourth-industrial-revolution/
https://www.weforum.org/pages/the-fourth-industrial-revolution-by-klaus-schwab/
http://www.mckinsey.com/mgi/overview/in-the-news/by-2025-internet-of-things-applications-could-have-11-trillion-impact
KPCB
http://motherboard.vice.com/blog/inexpensive-small-computers-are-changing-the-maker-movement
http://www.cnet.com/news/samsung-artik-teases-smart-robots-light-switches-of-the-future/#ftag=CADf328eec

MT: 4th Industrial Revolution

- **Digital:**
  - **Blockchain** (shared distributed ledger for all kinds of transactions and registrations completed in seconds and not days, open source Hyperledger backed by 40 companies, R3 40+ banks + MS Azure & 45 "block-chain as-a-service providers", NASDAQ private companies shares tracking, tagging with BC digital fingerprints [BlockVerify] reduce $1.77 tn counterfeit goods/50% online meds with no doctor name)
  - Rise of the **digital assistants and chatbots** ("HER" is here)
  - **Augmented reality and virtual reality** (Magic Leap, HoloLens, Oculus)

http://www.techrepublic.com/article/microsoft-envision-prepare-yourself-for-the-fourth-industrial-revolution/
https://www.weforum.org/pages/the-fourth-industrial-revolution-by-klaus-schwab/
http://www.mckinsey.com/mgi/overview/in-the-news/by-2025-internet-of-things-applications-could-have-11-trillion-impact
KPCB

MT: 4th Industrial Revolution

Figure 3: Which sectors are at risk from disruption by artificial intelligence?

		Assessment relative to the plan	
		Medium	High
Productivity benefits	High	Utilities	Autos, IT services
	Medium	Insurance, banks, travel and leisure, medtech	Construction
	Low	Food retail, general retail	

Source: UBS, as of November 15, 2015.

For more detail please see the UBS Research Q-Series report entitled "How disruptive will the new dawn of artificial intelligence be?", published on 15 November 2015.

- High productivity, high disruption from AI: Autos, IT services
- Big Data winners: use, automate, secure – 44 zettabytes by 2020, 50x since 2010
- Analytics software market: $75B 2020 (~15% annual growth)
- Cybersecurity: $700B 2020 ($500B 2014)

http://www.techrepublic.com/article/microsoft-envision-prepare-yourself-for-the-fourth-industrial-revolution/
https://www.weforum.org/pages/the-fourth-industrial-revolution-by-klaus-schwab/
https://www.ubs.com/global/en/about_ubs/follow_ubs/highlights/davos-2016.html

5 Megatrends: Pedro Domingos

1.The transition from computers that are programmed by us to computers that learn on their own. This is enabled by big data, and in turn enables the personalization of everything, from medicine to shopping, and the increasing automation of every function in an organization.

2.The automation of scientific discovery. Increasingly, each step of the scientific method, from gathering data to formulating hypotheses, is carried out by computers. This enables, for example, new drugs to be discovered at a much faster rate than before.

3.The replacement of white-collar workers by machines, not just blue-collar ones. Routine intellectual work can increasingly be done by AI; what's hard to replace is physical dexterity, common sense, and integrative intelligence.

5 Megatrends: Pedro Domingos

4.The transition from deterministic to probabilistic computing. From hardware to software, rigidly deterministic computations are giving way to probabilistic ones, **enabling faster, cheaper, lower-power, larger-scale, more ubiquitous, more flexible, data-driven information systems.**

5.The rise of evidence-based X, where X includes medicine, policy-making, development aid, and ultimately all important societal decisions. Instead of guesswork and mixed results, we have randomized controlled trials that quickly weed out what doesn't work from what does.

Book: The Master Algorithm, Sept 2015
Interview: http://www.itworldcanada.com/author/sibaraki

So How Do Computers Discover New Knowledge?

1. **Symbolists**--Fill in gaps in existing knowledge
2. **Connectionists**--Emulate the brain
3. **Evolutionists**--Simulate evolution
4. **Bayesians**--Systematically reduce uncertainty
5. **Analogizers**--Notice similarities between old and new

SRC: Pedro Domingos ACM Webinar Nov 2015 http://learning.acm.org/multimedia.cfm

Combining The Five Tribes of Machine Learning: Single algorithm or Master Algorithm (UL)

Tribe	Origins	Key Algorithm
Symbolists	Logic, philosophy	Inverse deduction
Connectionists	Neuroscience	Backpropagation
Evolutionists	Evolutionary biology	Genetic programming
Bayesians	Statistics	Probabilistic inference
Analogizers	Psychology	Kernel machines

SRC: Pedro Domingos ACM Webinar Nov 2015 http://learning.acm.org/multimedia.cfm

UL: Putting the Pieces Together

- Representation
  - Probabilistic logic (e.g., Markov logic networks)
  - Weighted formulas → Distribution over states
- Evaluation
  - Posterior probability
  - User-defined objective function
- Optimization
  - Formula discovery: Genetic programming
  - Weighted learning: Backpropagation

- OpenAI Gym, public beta: https://gym.openai.com/
- IBM Watson AI XPRIZE (TED2020): http://www.xprize.org/ai

SRC: Pedro Domingos ACM Webinar Nov 2015 http://learning.acm.org/multimedia.cfm
http://www.ibtimes.co.uk/elon-musks-1bn-non-profit-launches-gym-train-ai-atari-games-1557362

CRISPR/Cas9

- CRISPR/Cas9: gene editing platform
  - clustered regularly-interspaced short palindromic repeats = from adaptive immune system in bacteria
  - Cas9 = enzyme guided by RNA programmed to locate DNA sequence; Cas9 serves as molecular scissors for DNA sequence cut-and-paste
  - Evolving with single letter DNA base-editing technique with 2/3 of genetic illness are single letter mutations; protein Cpf1 replaces Cas9 makes CRISPR simpler and more precise
  - U.S. Department of Agriculture won't regulate like GMO plants using foreign bacteria DNA

http://www.nytimes.com/2016/02/02/health/crispr-gene-editing-human-embryos-kathy-niakan-britain.html?_r=0

CRISPR/Cas9

- Created mini pet pigs, beagles with double the muscle mass
- Labs creating cures for types of late-onset Alzheimer's, breast cancer, hemophilia, cystic fibrosis, cervical cancer, blindness (retinitis pigmentosa), snip out HIV from immune cells; eliminate things like Lyme disease, Malaria and Zika virus by changing mosquitos; modifying pigs so they can act as organ donors, engineer crops that can survive in warmer climates produced by climate change, program yeast to create plastics, revive extinct species such as the Woolly Mammoth
- Create designer humans?

CRISPR/Cas9

- Cheap, versatile, precise and easy; getting more accurate
- International Summit on Human Gene Editing, US, UK, and China using viable human embryos should not be banned; altering embryos for clinical purposes unacceptable
- Experimentation on non-viable embryos conducted in China; UK approves providing no implantation

http://www.nytimes.com/2016/02/02/health/crispr-gene-editing-human-embryos-kathy-niakan-britain.html?_r=0

ML vs CRISPR/Cas9

- Will the rapid exponential pace of parallel machine evolution realized by machine learning and human evolution spurred by CRISPR/Cas9 disrupt your world?

Megatrends: ICT Usage

2014-2015:

3.2B Internet Users --+$4T Commerce

(USA: 29% e-commerce 2-1/tablet/phone)

~7B Mobile Subscriptions (10 sensors)

+81% Mobile Data Growth; video

36% Smartphones (+20% annual growth)

avg $318, -5% per year

25% Total Web Usage

+4 zettabytes data (4B TB)

34% useful, 7% tagged, 1% analyzed

*ICT ~20% GDP Growth

to 2018:

>4B Internet users (USA: 54% e-comm 2-1/tablet/ph)

+60% Smart

+50% Total Web

Smart Internet

+1B Wearables (20 sensors)

20 ZB data (NELL)

***ICT = "Super Capital" 5x productivity gain**

$1 ICT = $5 return

+10% high speed internet = up to 2% Economic Growth

SRC: KPCB, Wikipedia, UN, World Bank, IMF, ITU, ITIF, extrapolations from news releases (IDC, Gartner, Forrester,...)

MT: GIC 2020 Skills Assessment

- Changing environments:
  - **3D printing** – Driving changes in logistics management; what is intellectual property; new pricing models
  - **Data Equity** – The value of data internally, externally and the ways in which that information can be monetised. What are the right types of information and ways to get this information to enable business improvement
  - **The cloud** – The value that it can bring short term and the restrictions that it can bring longer term

SRC: GIC report http://ipthree.org/

http://www.techrepublic.com/article/how-ge-is-using-3d-printing-to-unleash-the-biggest-revolution-in-large-scale-

MT: GIC 2020 Skills Assessment

- Changing environments:
  - **Automation** – driving new self service capabilities
  - **Open source** – growing trend in providing support, customer service and consultancy
  - **Integration** – need for standards, reliable and trusted systems in healthcare integration in wearables, in car info-entertainment, smart metering, industrialising architectures, joining the supply chain together across suppliers, and buyers

SRC: GIC report http://ipthree.org/

MT: Robots, AI

- Baidu (O2O—online to offline): Medical voice-translation virtual robot, AskADoctor, knows 520 different diseases gives diagnosis with odds, links to nearby specialist
- Baidu: AI StockMaster analyses news, markets predicting sectors, stocks or markets changes
- Robot experiments shows signs of self-awareness (Rensselaer Polytechnic Institute NY)
  - 3 could speak
  - 2 muted
  - Asked to figure out who could speak; no one could solve the problem
  - Each tried to say "I do not know", one heard itself and said, "Sorry, I know now" then saying more indicating it knew it could speak.

SRC: ACM, News releases

MT: Robots, AI

- DARPA—Defense research (Defense Advanced Research Projects Agency)
  - **IBM SyNAPSE** neuromorphic chip—modelled on brains, 1 million neurons, 256 million synapses (human—100bn, 100 trn)
  - **ElectRX**—injected nano-chips acting as pacemakers to nervous system giving stimulating signals treating arthritis, mental illness, …
  - **BRAIN initiative-**-human brain modulation and recording
  - **RAM**--implantable neural device with the ability to record and stimulate neurons within the brain to help restore memory

SRC: ACM, News releases/stories

MT: Innovation: Healthcare

- Costs, up to 17% of GDP
- $660K lifetime costs: http://bit.ly/1ppFLGc
- 52% consumers want web tools
  - 62% want to use email for health concerns
- Smart wearable's: Samsung, Apple, MS, …
- mHealth or Mobile Health
- Telemedicine, Curely, JioHealth
  - http://learning.acm.org/multimedia.cfm [podcasts]
- Research: Optogenetics, Epigenetics

SRC: KPCB, Wikipedia, News Releases … see URL Links to Web Site(s)

MT: Innovation: Healthcare

- Optogenetics/optoclamp (closed loop control)—activate cells (eg. Neurons) with light signals; optimize signals from feedback with continuous real-time adjustments
- **Epigenetics**: external or environmental factors that switch genes on and off
- **Precision genetic medicine**:
  - CRISPR/Cas9 gene editing: cheap, easy, snipping gene segments and replacing them
  - CRISPR, clustered regularly interspaced palindromic repeats—matches DNA sequences
  - Cas9 enzyme cut out the matched DNA, allows replacement

SRC: KPCB, Wikipedia, News Releases … see URL Links to Web Site(s)

MT: Innovation: Healthcare

- **Neuroscience:**
  - Neuroticism linked to creative genius
  - Insect brains controlling robots
  - Brain-to-brain networks (BRAIN-NETS) in primates, rodents working together for tasks, predict weather (better than working alone)
  - Transplanted embryonic GABA-expressing neurons increasing plasticity in the brains of adult mice, allowing for extensive rewiring and the creation of new neural connections -- comparable to that which occurs during important stages of brain development

SRC: KPCB, Wikipedia, News Releases/stories, news360, … see URL Links to Web Site(s)

MT: Innovation: Healthcare

- **Neuroscience:**
  - Passive frame theory—Consciousness—passive conduit rather than an active force that exerts control; more reflexive and less purposeful interpreter presenting information but is not the one making any arguments or acting upon the knowledge that is shared; "free will" "decider" does not exist, consciousness only relays information to control "voluntary" action, or goal-oriented movement involving the skeletal muscle system
  - Algorithm for Simplifying the Brain's Deep Complexity--Machine learning dimensionality reduction, interprets large-scale neural recordings
  - Brain signature predicts human emotions—90+% accuracy, neural activation pattern across brain, found by machine learning with neural imaging

SRC: KPCB, Wikipedia, News Releases/stories, news360, … see URL Links to Web Site(s)

MT Innovation: Blue Sky

EmDrive—electromagnetic space propulsion technology

Fusion—Lockheed announces compact design; prototype in under 10 years

D-Wave 2X 1,000+ qubits—quantum computing 100 million times faster (Nasa, Google, Lockheed, Los Alamos National Laboratory).
IBM Quantum Experience

Nanomaterials—nanorobots in medicine, extra capacity/life batteries, quantum dot solar windows, …

No limits

SRC: KPCB, Forbes, Wikipedia, News Releases/stories … see URL Links to Web Site

MT: Big Questions?

The Reality:

- Unlimited computational resources and connections
- Pervasive computational thinking
- Whatever the future, it will depend on computing
- Everything is recorded, nothing is forgotten
- Organizational, geographical boundaries disappearing
- Moving towards a master algorithm—universal learner

Digital quake – 2030 80% companies and jobs change?
What are the economic implications?
What is the social impact?
What will the world look like?
What are the intended and unintended consequences?
Is there a need for ICT accountability, ethical conduct, credentialing which EQUALS professionalism?

Inspired / adapted from assertions from Grady Booch keynote, NSF PACE Workshop August 21, 2014, Washington DC

MT Innovation: Entrepreneurship

- Steve Blank (customer development), Eric Ries (Lean Start-up), Alexander Osterwalder (business model canvas)
- Jump-start Our Business Start-ups – April 2012
  - US: JOBS Act Model (Regulated crowdfunding)
  - Regulations May 16, 2016
  - $100B Crowdfunding 2017 > VC:
    Reward, Donation, Debt, Equity, Lending, Royalty
    http://bit.ly/10Sab81

SRC: KPCB, Wikipedia, News Releases/stories, cb Insights, … see URL Links to Web Site
http://www.theepochtimes.com/n3/2032949-crowdfunding-2-0-even-you-can-invest-in-the-next-high-growth-startup/
http://blogs.worldbank.org/psd/crowdfunding-development-recommendations-vs-reality

MT Innovation: Entrepreneurship

- Harvard Business Review (Jeff Dyer, Hal Gregersen, Clay Christensen): 6 yr study, 25 successful innovators, 3000 executives, 500 who started innovative companies/invented new products
  - Innovative entrepreneurs spend 50% more time on 5 skills
  - Innovator's DNA—can be cultivated
  - QOEAN: Questioning, observing, experimenting, associating, networking

SRC: KPCB, Forbes, Wikipedia, News Releases … see URL Links to Web Site

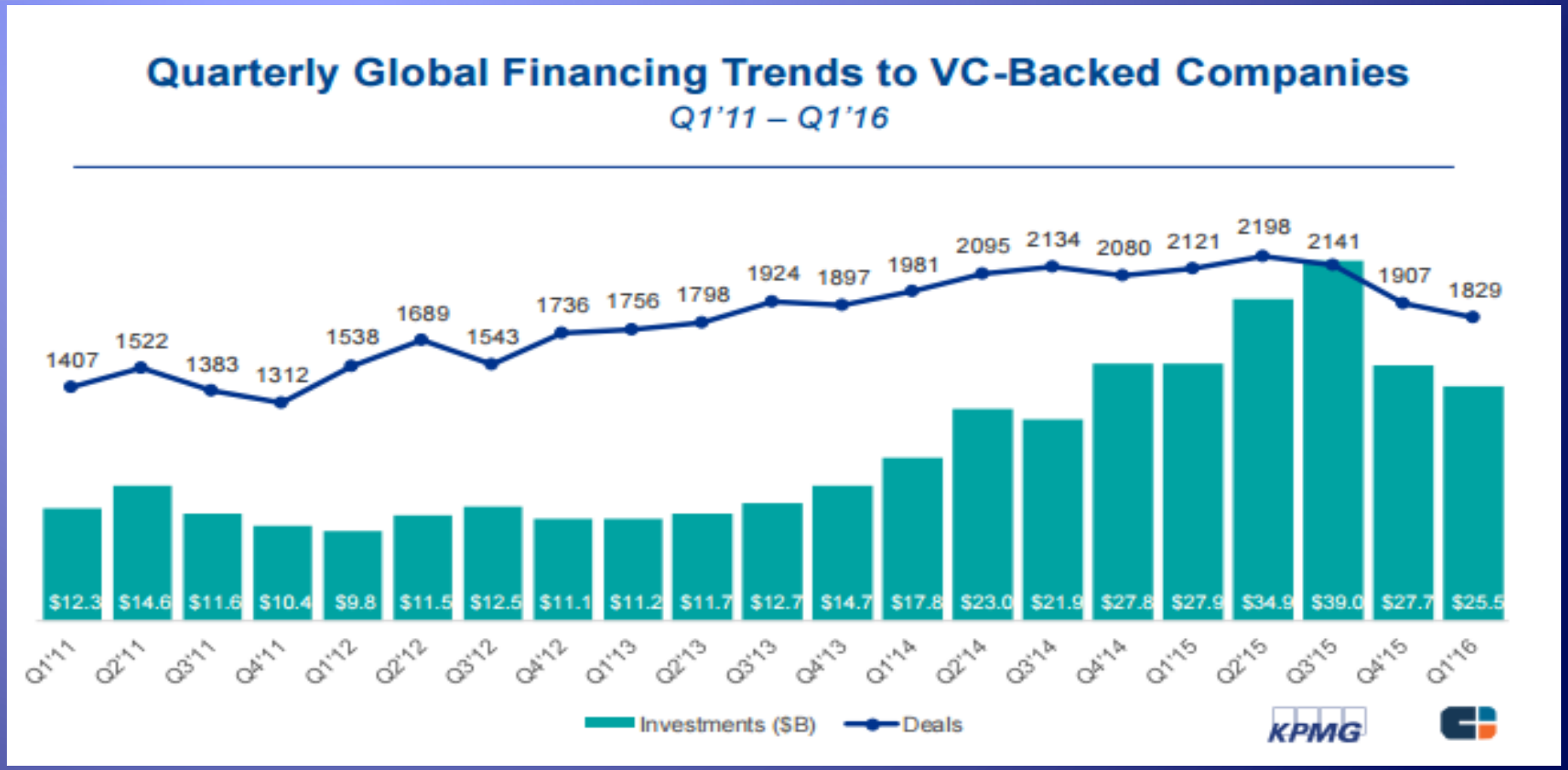
MT Innovation: Entrepreneurship

- Forbes (Michael Simmons): No 1 predictor of success; 50% of career success due to Open Networks (links with diverse people clusters)
  - Better — forecasters, first movers, connectors
  - More — disruptive innovations
    - Millions of studies: top research studies (eg. citations)— 90% typical references, 10% diverse

SRC: KPCB, Forbes, Wikipedia, News Releases … see URL Links to Web Site

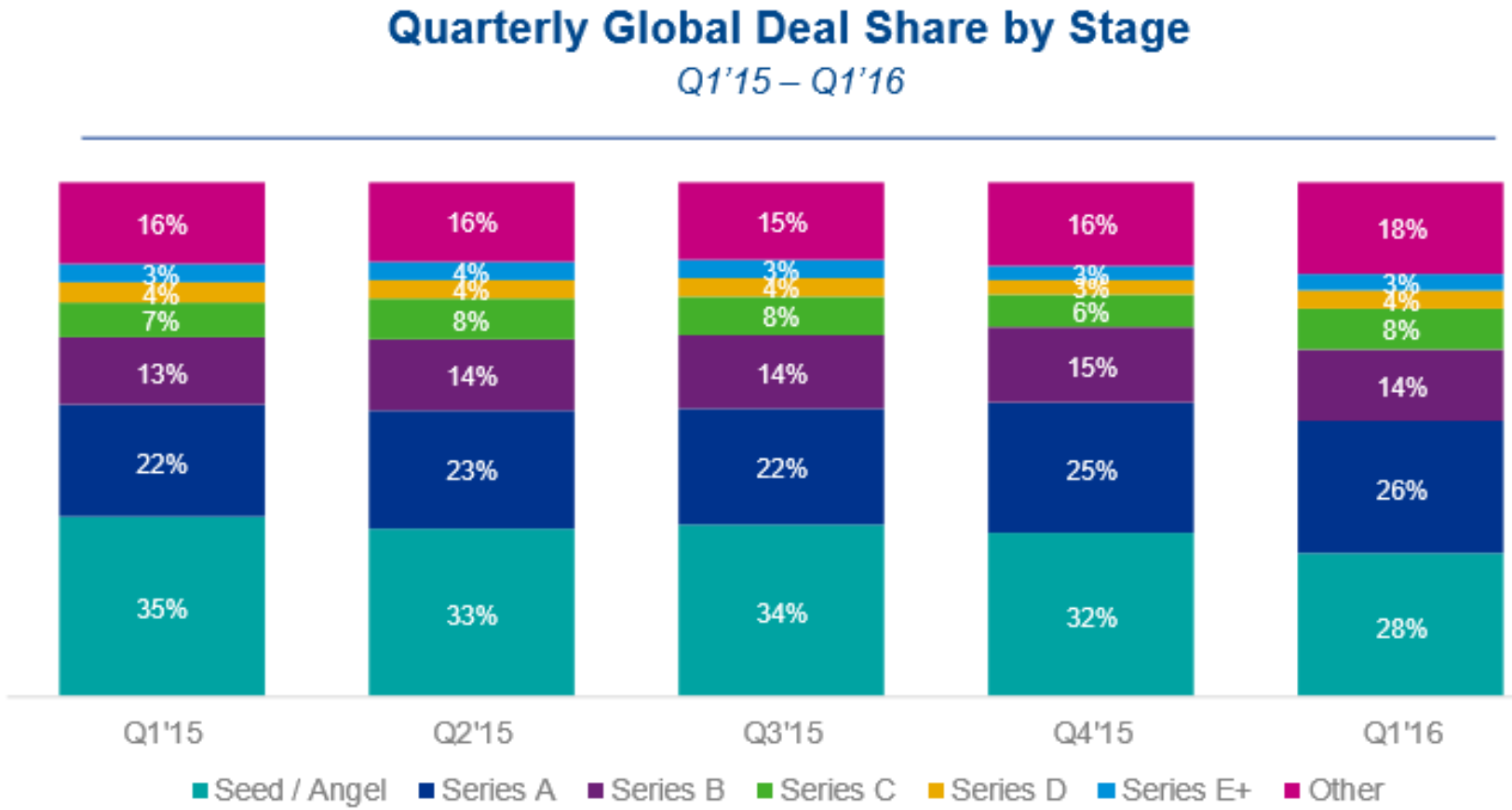
CBINSIGHTS VC FINANCING TRENDS

2011 ~$50B (5600) | 2012 44.8B | 2013 50.3B | 2014 90.5B | **2015 ~$130B (8300)**



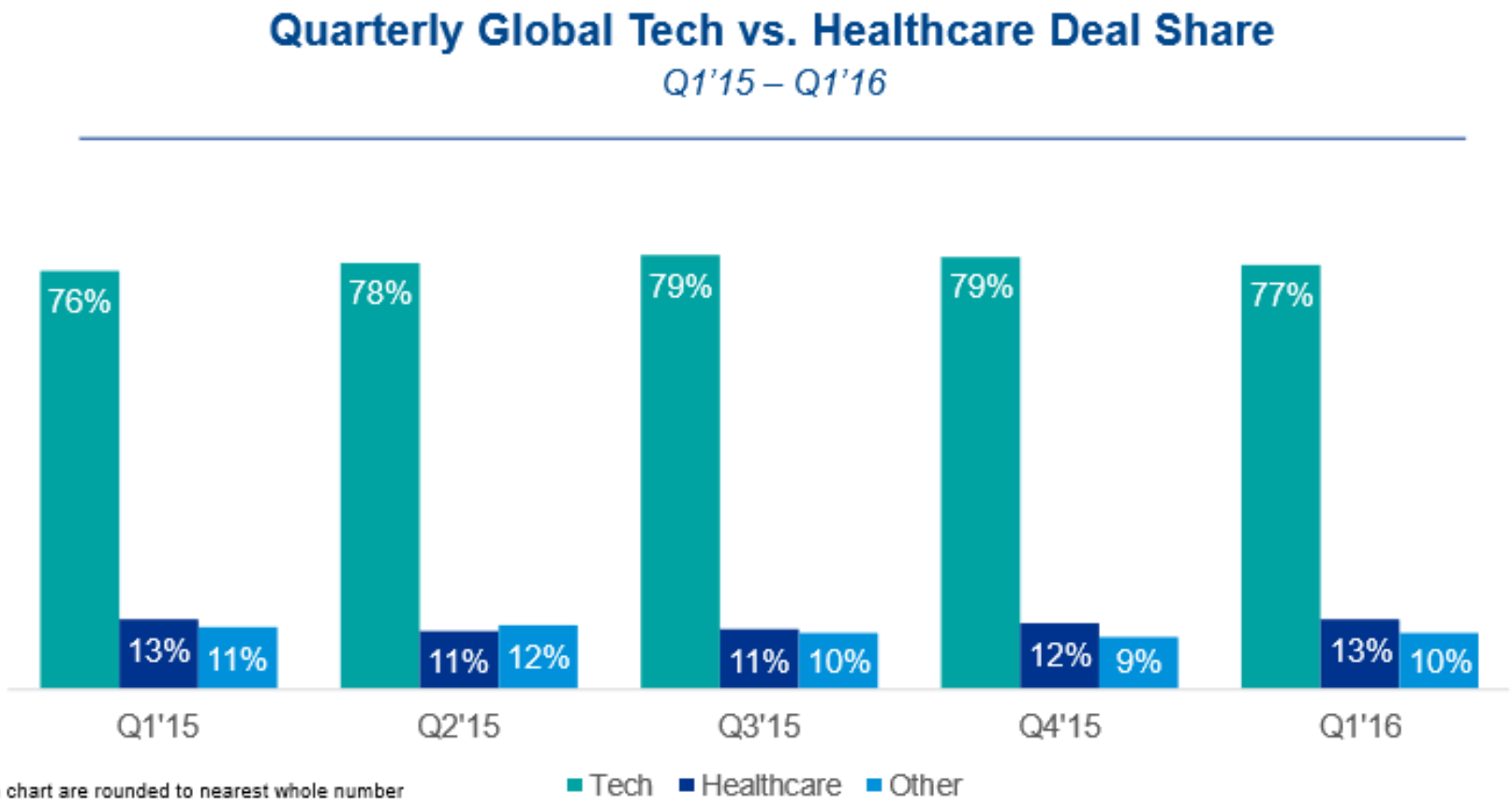
Chat with Anand Sanwal CEO: http://bit.ly/1WvJICe

CBINSIGHTS FUNDING BY INVESTMENT STAGE
SEED 30+%, SERIES A 20+%
$1.9m Q1'15 -- $2.7m Q1'16



Source: Venture Pulse, Q1'16, Global Analysis of Venture Funding, KPMG International and CB Insights (data provided by CB Insights) April 13th, 2016.

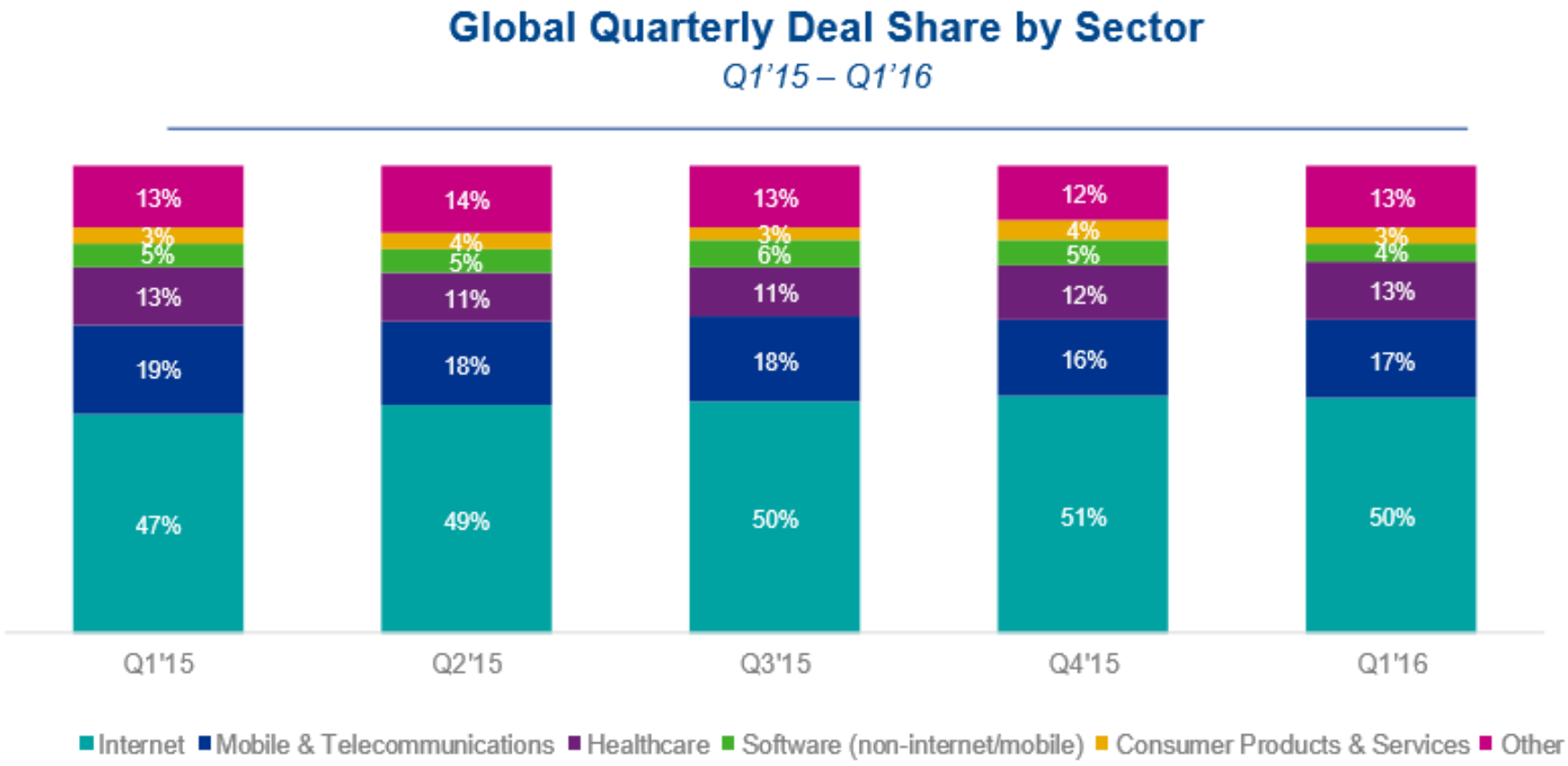
CBINSIGHTS DEAL SHARE: TECH BIGGEST 75+%, HEATHCARE 12%



*percentages in chart are rounded to nearest whole number

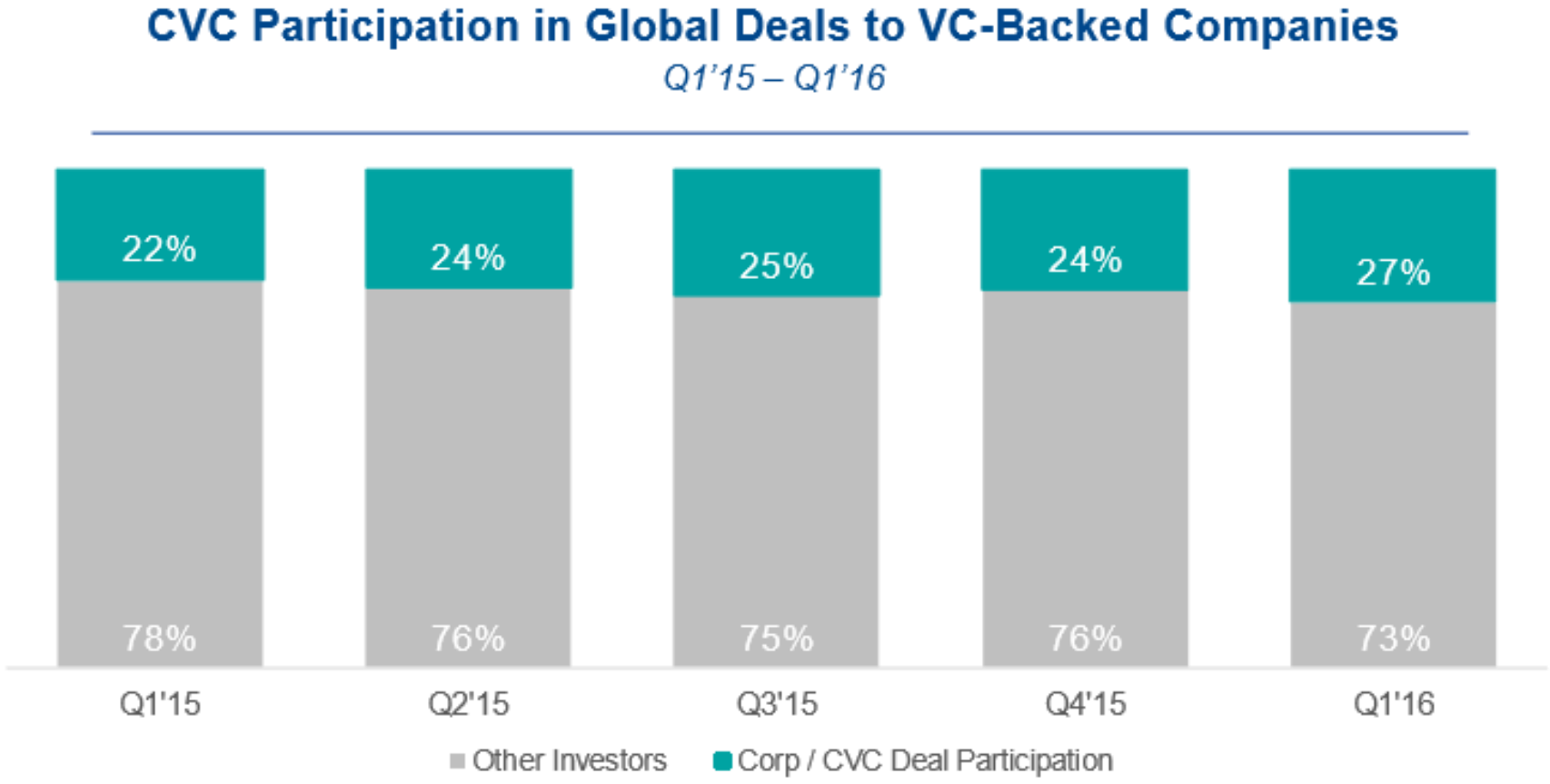
Source: Venture Pulse, Q1'16, Global Analysis of Venture Funding, KPMG International and CB Insights (data provided by CB Insights) April 13th, 2016.

CBINSIGHTS DEAL SHARE BIGGEST: INTERNET 50%, MOBILE 17%



Source: Venture Pulse, Q1'16, Global Analysis of Venture Funding, KPMG International and CB Insights (data provided by CB Insights) April 13th, 2016.

CBINSIGHTS CVC
CORP GROWING 22% to 27% -- DEFENSE



Source: Venture Pulse, Q1'16, Global Analysis of Venture Funding, KPMG International and CB Insights (data provided by CB Insights) April 13th, 2016.

http://news.lenovo.com/news-releases/corporate/lenovo-capital-and-incubator-group-created-to-advance-core-technology-investments-1.htm

Types of Innovation vs. Development Phases Matrix

	Development Phases →					
Types of Innovation ↓	Concept	Research & Development (R&D)	Transfer	Production & Deployment	Usage	*Key:* *8 Internet, IoT* *4 iPhone* *2 smartphone upgrade*
Products	8,4	8,4	8,2,4	8,2,4	8,2,4	10 Master Algorithm
Services	8	8	8	8,4	8,4	
Process	8	8	8	8,4	8,4	
Organization Model	8	8	8	8,4	8,4	
Business Model or 9 areas of the Business Model Canvas	8	8	8	8,4	8,4	
Social-mediated	8	8	8	8,4	8,4	
Machine-learning	8	8	8	8	8	

SRC: adapted from IT Innovation Foundation and OECD

Investment Triggers
Steve Blank (John Selep): Investment Readiness Level (IRL)

- IRL 1/9: Initial pass Alex Osterwalder Business Model Canvas identifying 9 areas: Key Partners, Key Activities, Key Resources, Value proposition(s), Customer relations, Customer segments, Channels, Cost structure, Revenue streams.
- IRL 2/9: Market size and competitive analysis
- IRL 3/9: Problem / Solution fit validation (real proof)
- IRL 4/9: Prototype first low-fidelity MVP (minimum viable product)

https://en.wikipedia.org/wiki/Business_Model_Canvas
https://steveblank.com/2014/07/01/how-investors-make-better-decisions-the-investment-readiness-level/
http://www.huffingtonpost.com/steve-blank/is-this-startup-ready-for_b_4853875.html

Investment Triggers
Steve Blank: Investment Readiness Level

- IRL 5/9: Product/market fit validation (real proof)
- IRL 6/9: Revenue model validation i.e. paying customers where revenue exceeds costs (proven revenue model)
- IRL 7/9: Quality high-fidelity MVP (minimum viable product)
- IRL 8/9: Value delivery validation i.e. full proof delivering unique value that customers will pay for, with profit, and that will also profitably scale.
- IRL 9/9: Validate SMART business metrics that matter i.e. measures of real traction and revenue/customer commitment – not "vanity metrics"

https://en.wikipedia.org/wiki/Business_Model_Canvas
https://steveblank.com/2014/07/01/how-investors-make-better-decisions-the-investment-readiness-level/
http://www.huffingtonpost.com/steve-blank/is-this-startup-ready-for_b_4853875.html

Success Attributes

- Creative and innovative
- Determined, high self-control, persistent, independent, risk taker
- Confident and listens intently
- Focused on measurable business gains
- Thirsty for knowledge
- High social abilities

Startup Failures and Success Attributes

- Top 20 reasons startup fail (CBInsights): **no market need, ran out of cash, not the right team, got outcompeted, pricing/ cost issues, poor product, lack business model**, poor marketing, ignore customers, product mistimed, lose focus, disharmony on team investors, pivot gone bad, lack passion, bad location, no investor interest, burn out, failure to pivot
- REDDS VIP compilation: female co-founder, technical and business co-founders, repeat founders, experience with top companies, avoid premature scaling, have good mentors, track metrics, experience in pivoting

SRC: Startup Genome (now Compass) Premature Scaling

Connecting with CTOs and CEOs

- Financial Services Roundtable (FSR)
  - FinTech Ideas Festival (FIF)
- CIONET (6000 CDOs) and federation (20,000 CTOs/CIOs)
  - CIOCITY, yearly collaboration and sharing
- Young Presidents Organization (YPO) and World Presidents' Organization (WPO)
  - Yearly summit with Singularity University

SRC: KPCB, Forbes, Wikipedia, News Releases … see URL Links to Web Site

Insights from FSR FIF Future Summit

- FIF (Financial Services summit) – top 150 experts and CEOs
- Global industry $14 Trillion, 18% global GDP
- 10-20 years into the future
- Spotlighted trends being explored:
  - The Future of FinTech
  - Financial Inclusion
  - Big Data & Internet of Things
  - Artificial Intelligence
  - Biometrics, the Imminent Future
  - Blockchain, Cryptocurrencies, & Distributed Ledger
  - Cybersecurity
  - The Future of the FinTech Workforce

Thank you

Resources—discussions with over 1000 experts, most here: **http://bit.ly/1mbO2MG**

Computing Educators Oral History Project
http://www.southwestern.edu/departments/mathcompsci/OHProject/other-ohprojects.html

Questions

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