Innovation & Innovators

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...do we question assumptions?

Should fever be reduced in critically ill patients?

"there were seven deaths in people getting standard treatment and only one in those allowed to have fever.....at which point the study was halted due to ethical concerns"
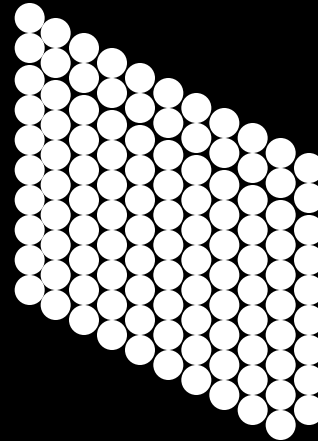
Experts & Pundits

Mckinsey : US mobile subscribers
1986 forecast for 2000

forecast

actual

yesterday's technology, tomorrow's forecast

1980's phone: **year 2000 phone:**   **2010 phone:**

300,000 available apps
7bn+ apps downloaded

the folly of predictions: tetlock study

hundreds of experts.

80,000+ "expert" forecasts & 20+ years

**results: experts about the same accuracy
as dart-throwing monkeys**

India: Land of many cell phones, fewer toilets

⊕ Enlarge   by Rafiq Maqbool, AP

In this Oct. 22, 2010 photo, a boy walks to a latrine outside his makeshift home at a slum in Mumbai, India. When U.S. President Barack Obama visits India Nov. 6, 2010, he will find a country of startlingly uneven development and perplexing disparities, where more people have cell phones than access to a toilet, according to the United Nations. (AP Photo/Rafiq Maqbool)

By Ravi Nessman, The Associated Press

MUMBAI, India — The Mumbai slum of Rafiq Nagar has no clean water for its shacks made of ripped tarp and bamboo. No garbage pickup along the rocky, pocked earth that serves as a road. No power except from haphazard cables strung overhead illegally.

And not a single toilet or latrine for its 10,000 people.

Yet nearly every destitute family in the slum has a cell phone. Some have three.

When President Barack Obama visits India Nov. 6, he will find a country of startlingly uneven development and perplexing disparities, where more people have cell phones than access to a toilet, according to the United Nations.

It is a country buoyed by a vibrant business world of call centers and software developers, but hamstrung by a bloated, corrupt government that has failed to deliver the barest of services.

Its estimated growth rate of 8.5 percent a year is among the highest in the world, but its roads are crumbling.

It offers cheap, world-class medical care to Western tourists at private hospitals, yet has some of the worst child mortality and maternal death rates outside sub-Saharan Africa.

And while tens of millions have benefited from India's rise, many more remain mired in some of the worst poverty in the world.

Businessman Mukesh Ambani, the world's fourth-richest person, is just finishing off a new $1 billion skyscraper-house in Mumbai with 27 floors and three helipads, touted as the most expensive home on earth. Yet farmers still live in shacks of mud and cow dung.

INSPIRATIONAL TWEET:

"Cynics never do the impossible, achieve the improbable, take on the inadvisable.
Hope is only path to *extraordinary* success."

TWEET?

Did not exist 5 years ago!

Today: More than 100 million users
65 million tweets are posted each day

-140 characters that millions of people follow
-Can tell the mood of a nation
-Creates an instantaneous backchannel
-Formation of a personal brand
-Promotes content

SF Giants win World Series…

Could McKinsey or an analyst have predicted Twitter?

The nine dots problem

Standard nine dots solution

13
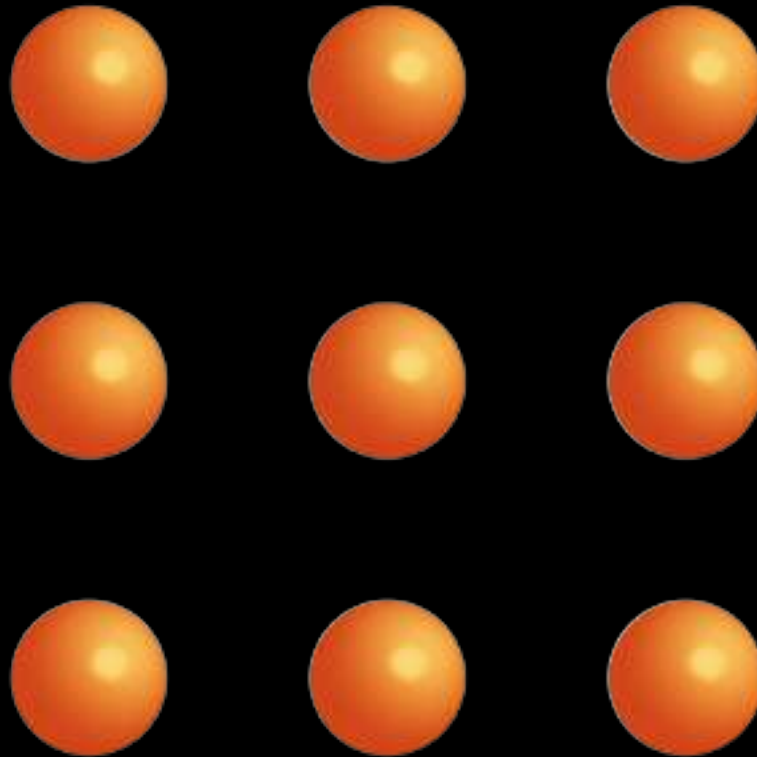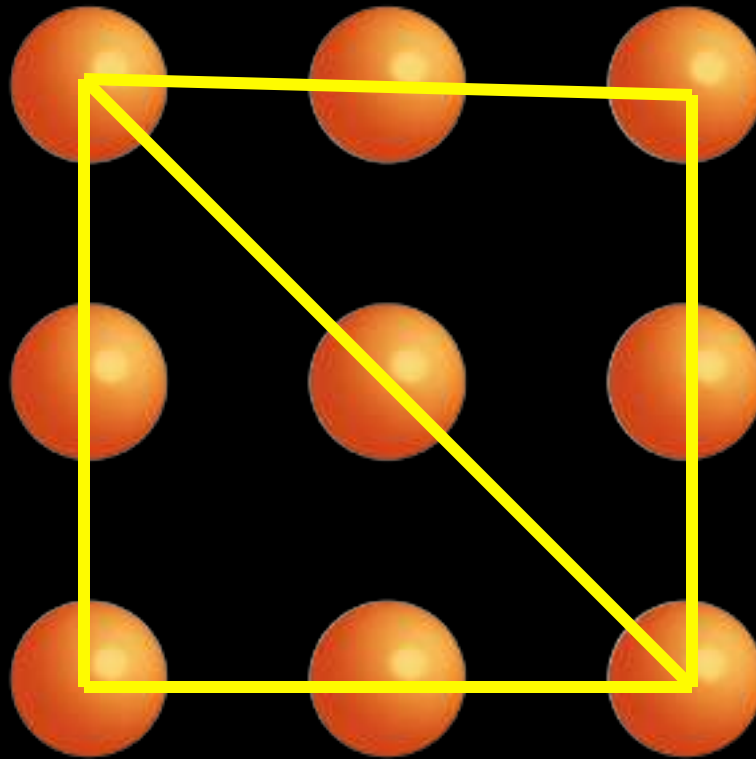
Standard nine dots solution
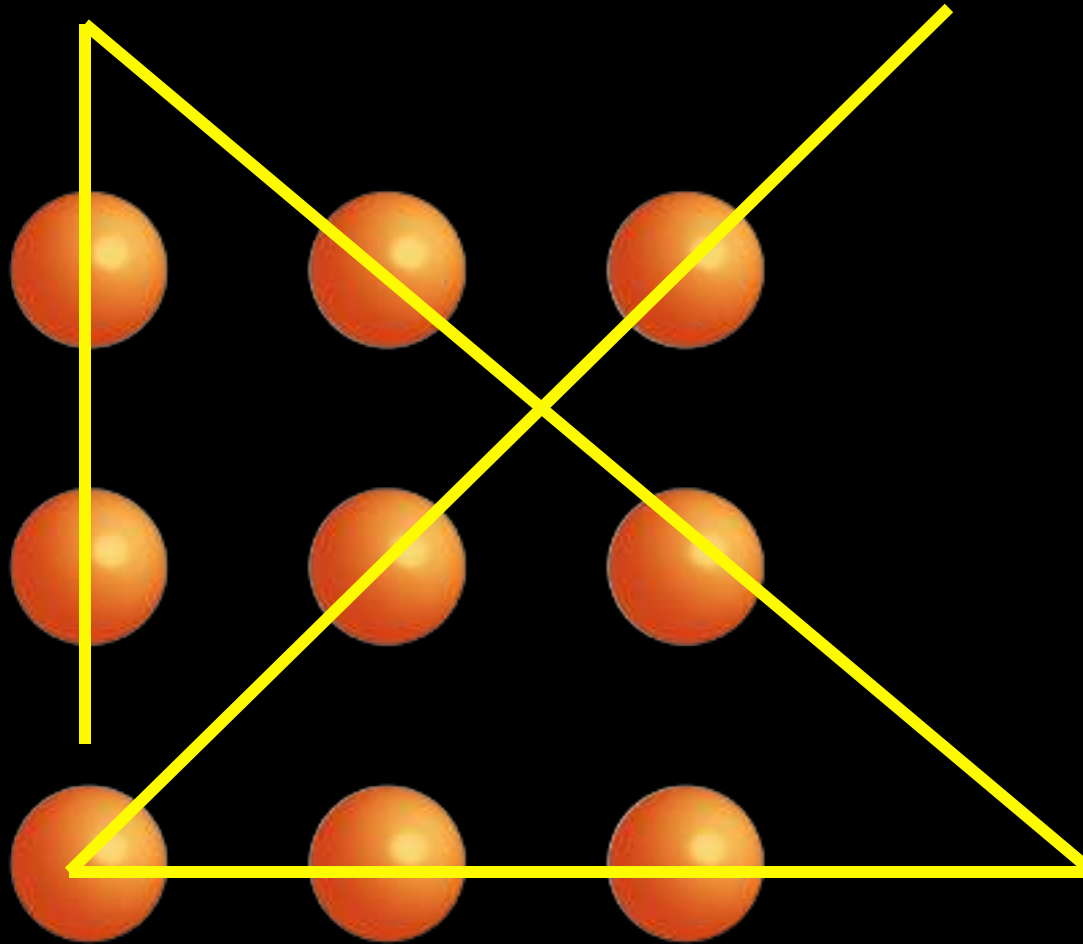
Better: use just three lines
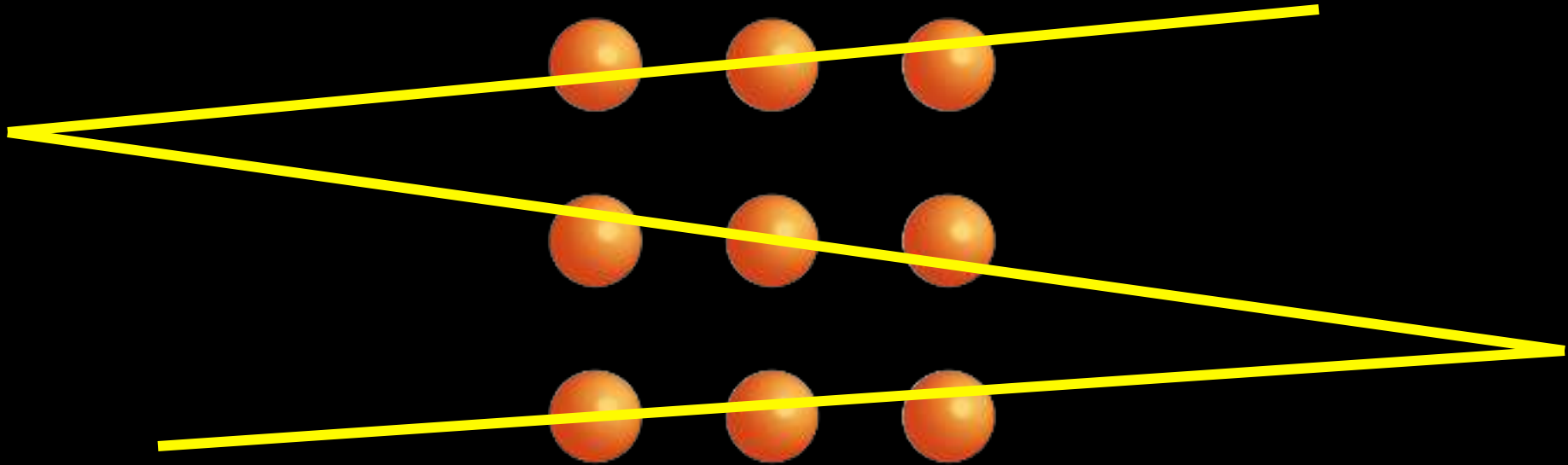
But…how about just *one* line?

Geographer's solution

16
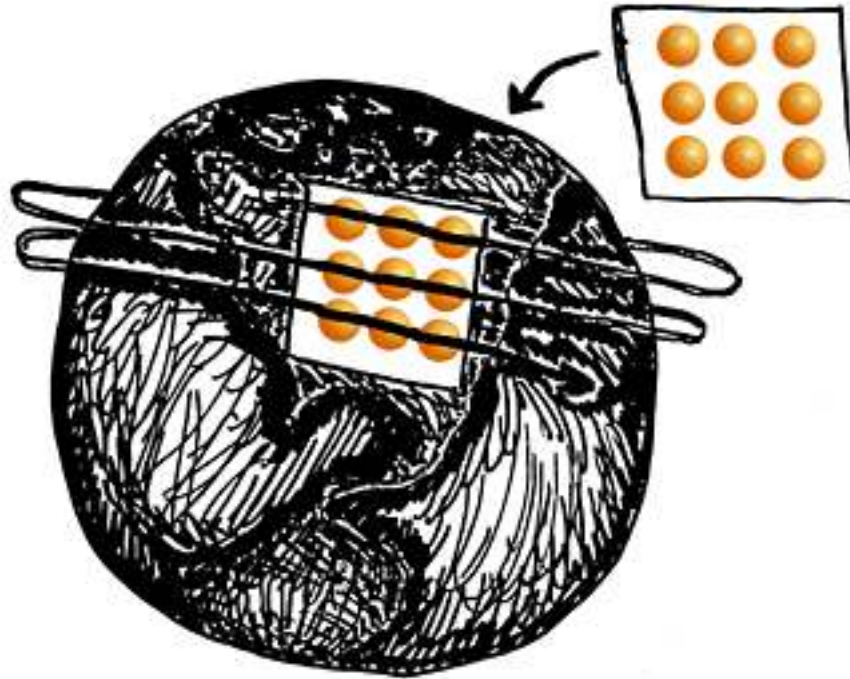
Mechanical Engineer's Solution

Wide line solution
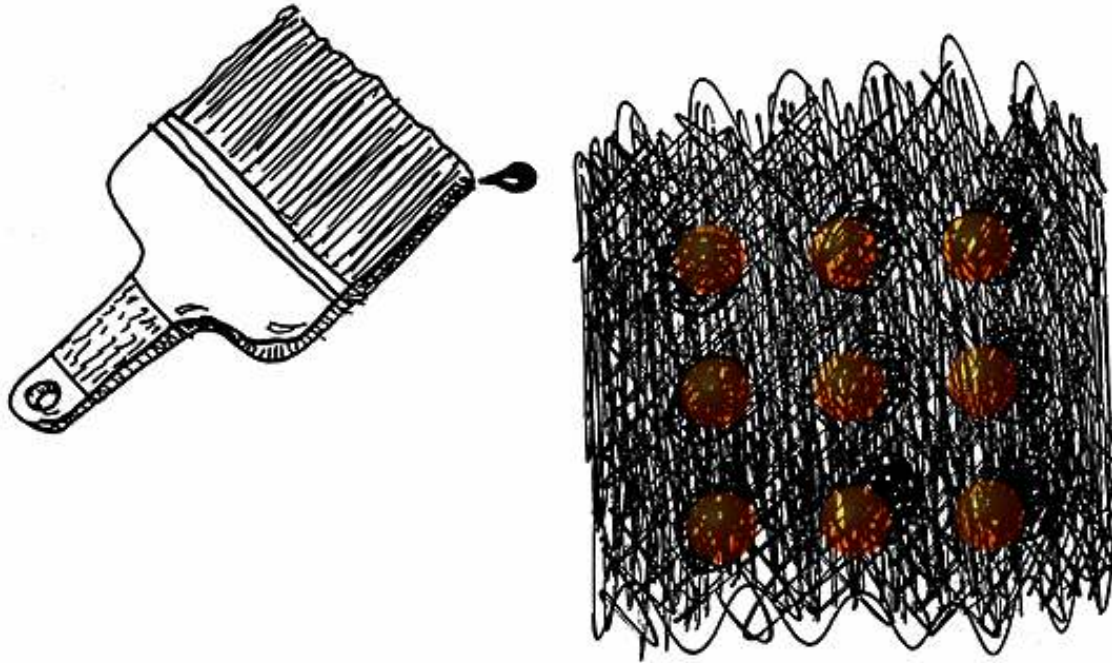
example: high oil prices

Standard solution: drill, baby, drill

Three line solution: cellulosic ethanol

One line solution: renewable crude oil

example: data center power

Standard solution: faster and more powerful servers

3 line solution: server cpu virtualization

One line solution: 80% less power *purpose built low power servers*

example: battery life

Standard solution: Make bigger batteries

3 line solution: low power wireless

One line solution: 10x more efficient "amped" wireless

…and

2004: Facebook

2006: Twitter

2007: Iphone

What else to come:
Four Square….?

2008: Smart grid

…the sources of innovation

Google, Facebook, Twitter : Fox, NBC, CBS

Amazon : Walmart

First Solar : Shell & BP Solar

Cree : GE

DNA Sequencing

disruptive innovation & disruptors

Low-End Segment Strategy	Re-invent Consumption Strategy	New-Consumption Strategy
introduce a low-end loss leader…	use design to re-invent product	a product that hasn't existed
…move up market with lower cost	Create a new experience	Create a new market…
Disrupt *the market*	**Invent** *by design*	**Invent** *the market*
Amazon.com / Netflix…	iPod / iTunes/Kindle/ Netfllix Online	Google / iPhone / iPad / Facebook Twitter…

iPhone + Android Apps – fundamental disruption

Existing static products…

- Landline phone
- Standalone radio
- Portable DVD
- Low-end Cameras/camcorders
- MP3 players
- GPS
- Portable gaming
- Voice recorders
- Translator/dictionary

→

**Iphone
Ipad
Android**

Multi-function platform just first phase of disruption?
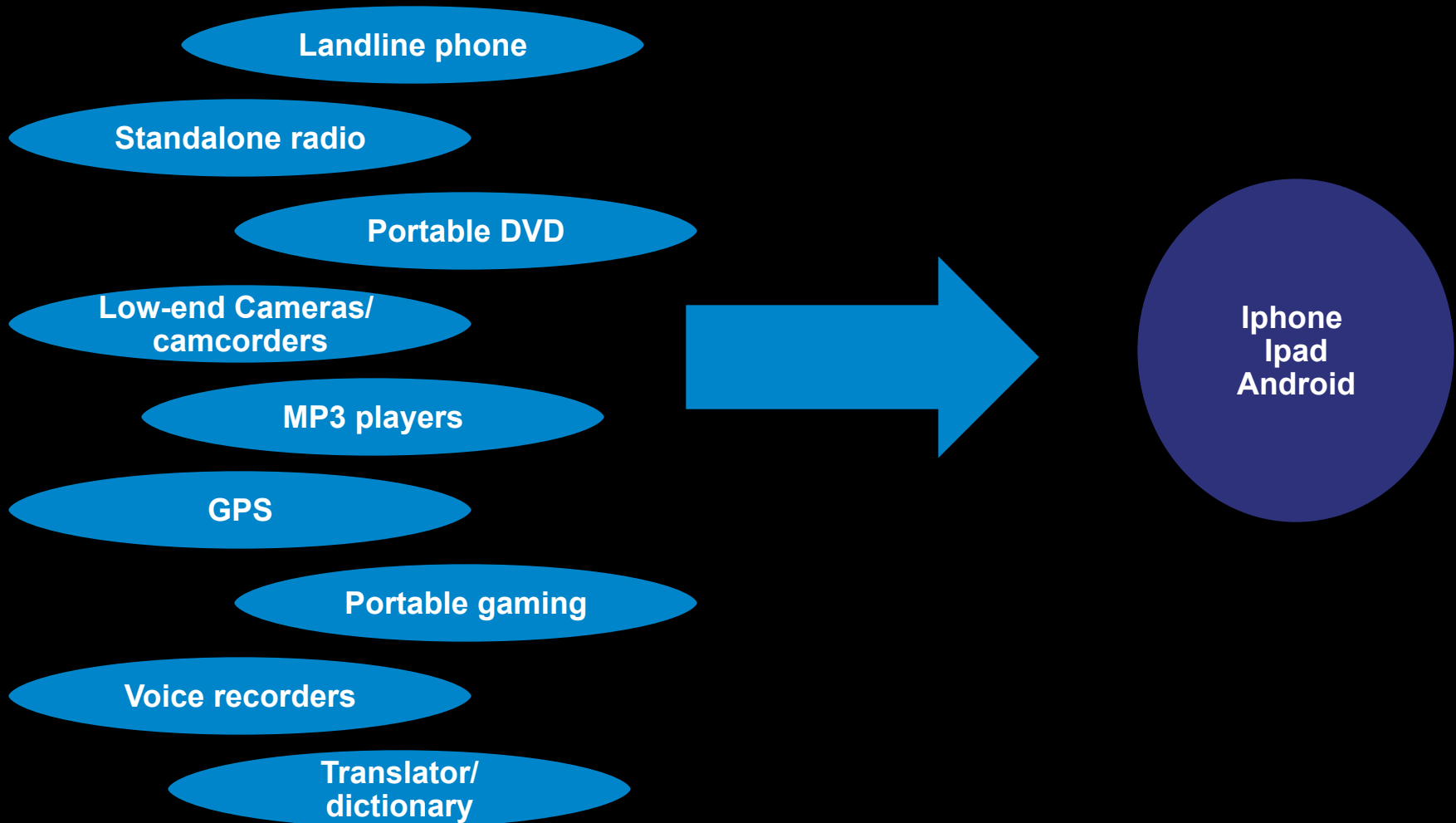
Innovators

"The fine line separating the delusional from the visionaries amongst us is often not foresight, but rather hindsight."

Ben Semel

How not to:

Financial tools:
DCF, NPV, IRR

Stage gate development

Top down market analysis

Decisions based on customer wish list

dream the dreams...

"Those who dare to dream the dreams, and then are foolish enough to try to make those dreams come true."

Attitude matters: Ecomotors (50% increase in engine efficiency)

Response when told it can't be done "everyone told me…."

1.It is not possible to convert a gasoline engine to a Diesel, using the same transfer line. I did it and it is the most successful Diesel in the world and it was copied by everybody.

2.The combustion for a high speed Diesel is not possible. I started production with a 5000 rpm Diesel with 2000 engines/day on the gasoline engine transfer line.

3.   You cannot use a rubber toothed belt to drive the camshaft and the injection pump. I did it and it is the standard solution today.

4.It is not possible to use an aluminum radiator because the corrosion will destroy the engine. I did it and it is the standard solution today.

5.It is not possible to create an "emission free" natural gas burner. I did it. It is in mass production at VIESSMANN. BUDERUS sued VIESSMANN about "emission free" and lost.

<div align="right">Dr. Peter Hofbauer, Chairman and CTO</div>

How to:

Tackle hard problems

Imagine what could be

Let technology lead market

Fail often, fail early, keep trying

Find the best people, *who disagree with you*

"It is not because things are difficult that we do not dare, it is because we do not dare that they are difficult."

- *Seneca*

"Try and fail, but don't fail to try."

- *Stephen Kaggwa*

"Courage is doing what you're afraid to do. There can be no courage unless you're scared."

- *Eddie Rickenbacker*

"Only those who dare fail greatly can achieve greatly."

- *Robert F. Kennedy*

"You will face many defeats in your life, but never let yourself be defeated."

- *Maya Angelou*

The willingness to fail gives us the freedom to succeed

Evaluating "Failures"

When did it fail?

Why did it fail?

Causal vs. experiential reasoning

Assumptions change vs. Environments change

HOW DO I DO IT BETTER NEXT TIME??

Iteration is key

"Tried that before and it doesn't work"

Accumulated experience restrains/constrains thinking

Assumptions change all the time

Reexamine everything
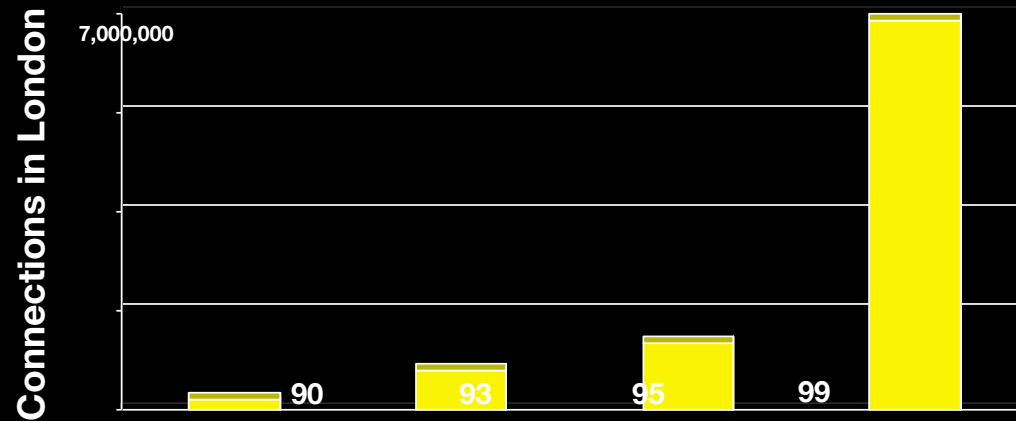
innovation culture

reward failure

plan without planning
(evolve thru iteration)

don't listen to customers too closely

ignore IRR calculations

Evaluate but don't follow input?

Connections in London

7,000,000

90   93   95   99

"In 1885, Yale students who were getting 'more light than they relished' chopped down an electric pole erected at the corner of the campus…"
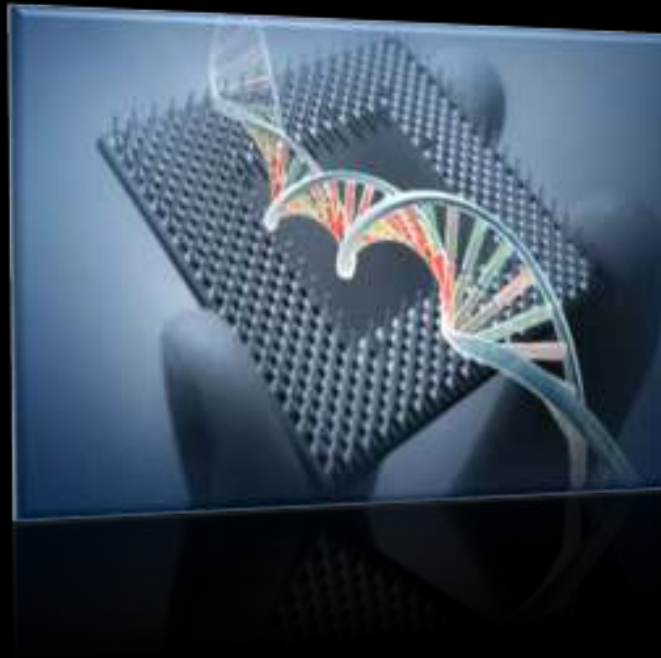
passif

"Standards-compatible 5-10x lower power Rx and Tx"

Verayo

"non-clonable zero cost ID"

Aliph

…another new applications platform

…wearable computing

square

"revolutionary point-of-sale system for all"

point source power

"Can $1M fuel cell technology become a $4 charger?"

Sakti3

"2-3x energy density SOLID STATE batteries"

soraa

"green lasers & LED"

Moka5

"Take your computing environment everywhere"

Boku

"Mobile payments, wallet not included"

sks

"can a for-profit venture do well by doing good?"

Big companies vs. innovators

Focus on Process	Focus on Vision
Existing markets	Invent new Markets/Paths
Focus on DCF, NPV, EPS	Ignore financial analysis
Careful not to fail	Constantly iterate
"Push" into the market	Create "Pull"
Incrementalism	Disruption

The Weather Forecast …

Rate of change will accelerate…

Adaptability, agility & momentum are the key to success!

Fun, fortunes & failure will be in abundance

Disruption is the order of the day...
Innovation & entrepreneurship will thrive

Avoiding the bandwagon

What assumptions are others making?

Are there scenarios where those assumptions are wrong?

Significant technical contribution

Enabling a significant new capability

Being Right is Insufficient

	Be Wrong	Be Right
Be Contrarian	✗	✔
Join Bandwagon	✗	✗

New bandwagons

Payments

Location

Power

Personal Area Networks

Analysis: Network, behavior,…

NFC

What's next?

Existing static products…

Landline phone

Standalone radio

Portable DVD

Low-end Cameras/camcorders

MP3 players

GPS

Portable gaming

Voice recorders

Translator/dictionary

Iphone Ipad Android → **??????? ???????**

55

Difficult to predict the future, when innovation is the name of the game

NFC

Advertising/Commerce

privacy & authentication

sensors

Voice recognition

social

Anticipate needs (agents)

Everything everywhere

medicine
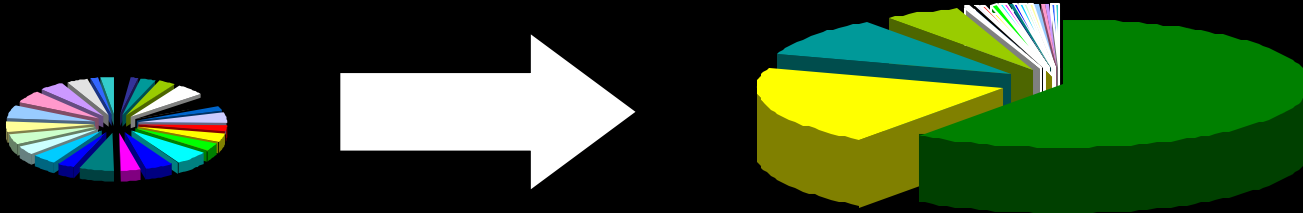
steve jobs

gadgets

Read "wellness"

personalization

payments

Group-sourced innovation

winners take (almost) all =investment viability

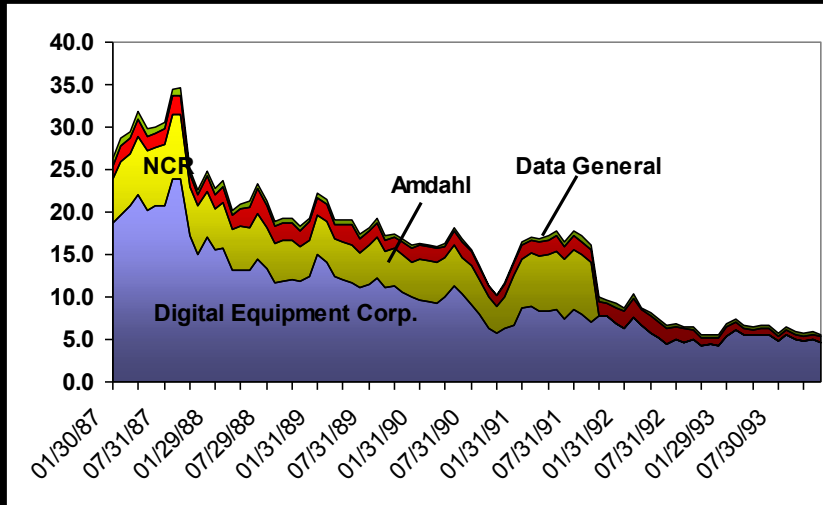**5 years out, the group's market cap has grown...**

Starting Industry Structure

But leaders far exceed the also-rans
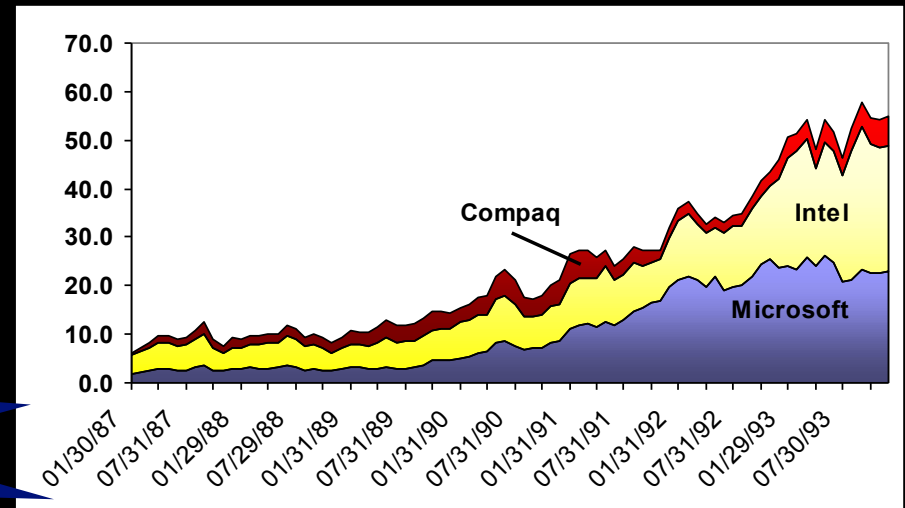
Value Transitions follow Technology Transitions
Mainframe to PC Transition

Capital fled
legacy systems

New winners emerged

This time the stakes are larger!

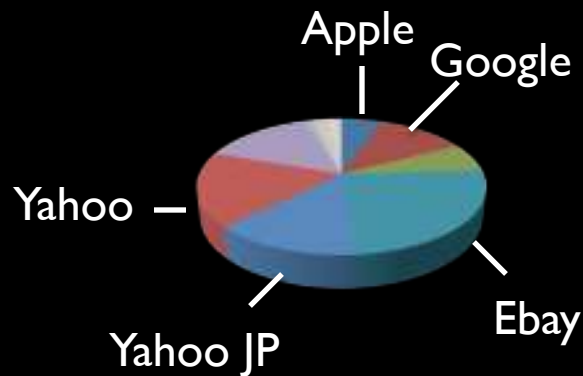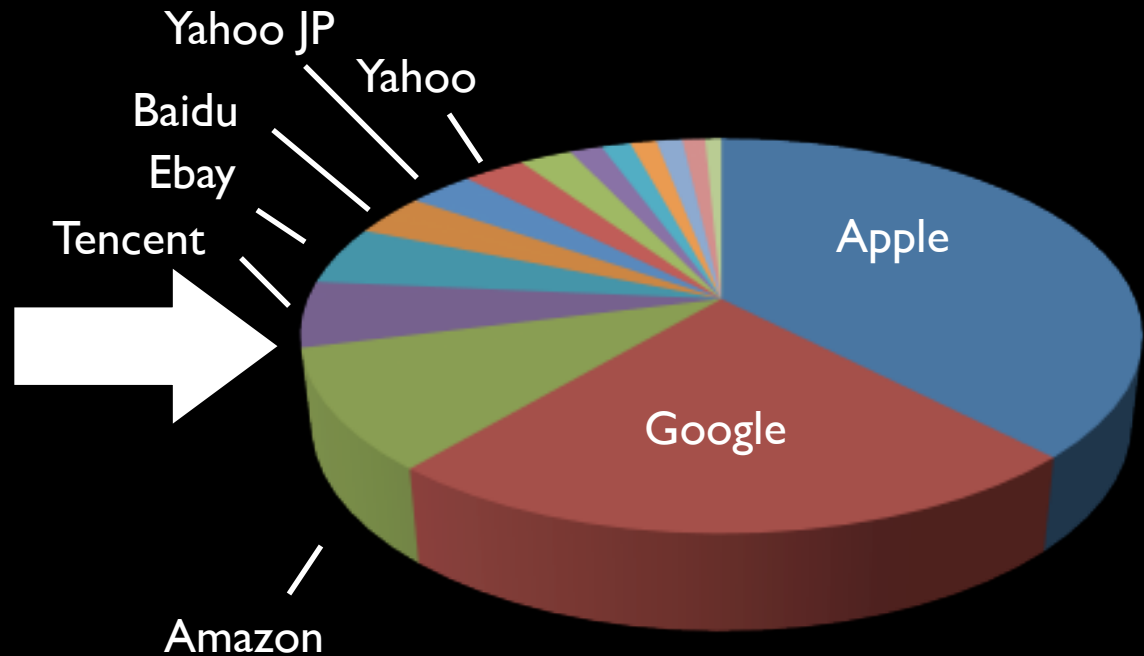Source: Thomas Weisel Partners

Things change quickly

Top Global 15 Publicly Traded Internet Companies by Market Value – 2004 vs. 2010

2004

2010

Top 15 cap: $262B

Top 15 cap: $667B

Prediction is impossible: this is only public companies…
Facebook, Twitter, Groupon & Zynga aren't even on here!

New Computing Cycle Characteristics

Computing Growth Drivers Over Time, 1960 – 2020E

Devices / Users (MM in Log Scale)

Mobile/Gadget Internet — 10000?

Desktop Internet — 1000+

PC — 100+

Minicomputer — 10+

Mainframe — 1+

1,000,000 / 100,000 / 10,000 / 1000 / 100 / 10 / 1

1960 1970 1980 1990 2000 2010 2020
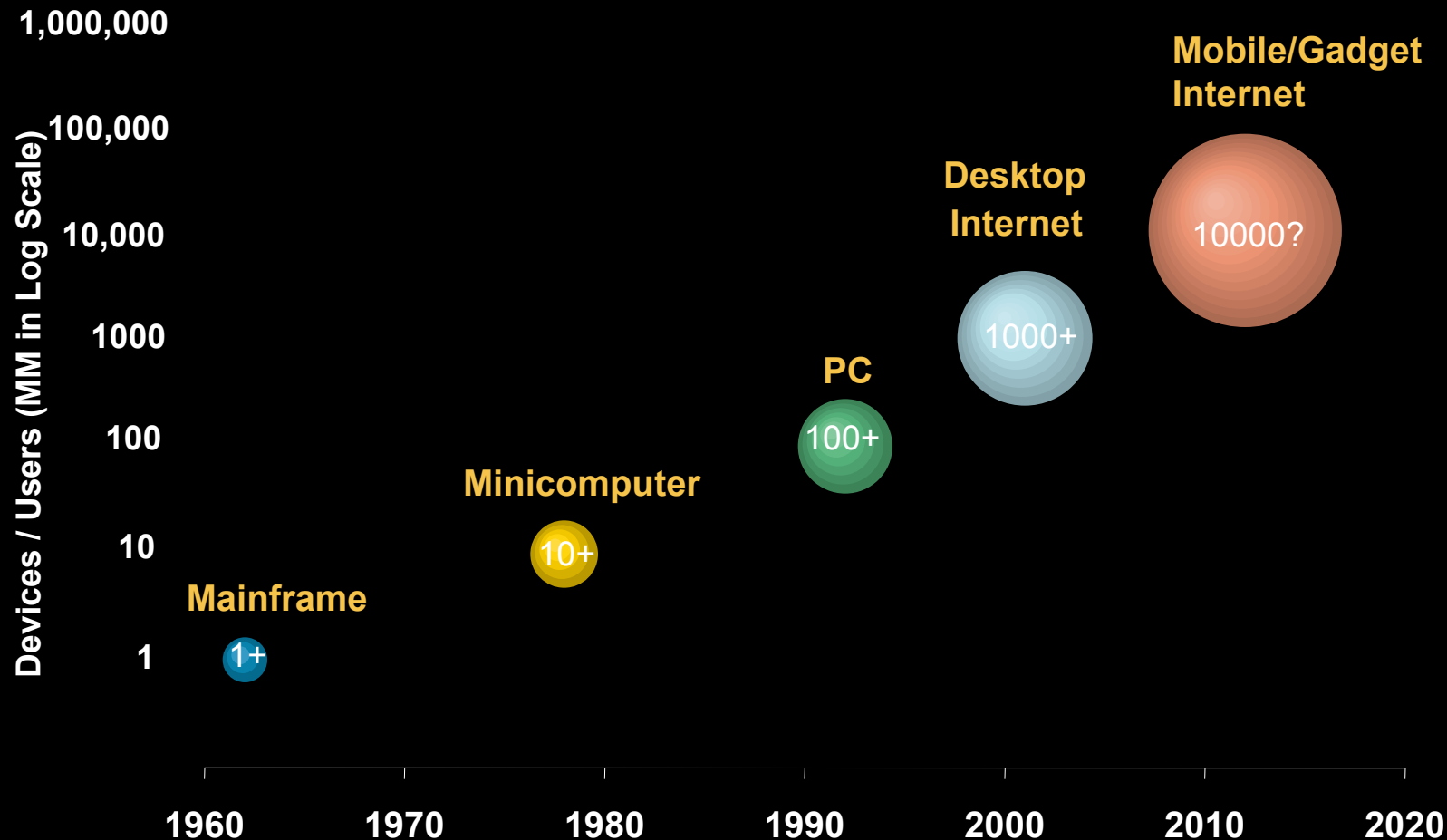
Note: PC installed base reached 100MM in 1993, cellphone / Internet users reached 1B in 2002 / 2005 respectively;
Source: ITU, Mark Lipacis, Morgan Stanley Research.

The old don't innovate – the new "create the future"

Mainframes 1960s	Mini Computing 1970s	Personal Computing 1980s	Desktop Internet Computing 1990s	Mobile Internet Computing 2000s
New Winners	**New Winners**	**New Winners**	**New Winners**	**New Winners**
IBM NCR Control Data Sperry Honeywell Burroughs	Digital Equipment Data General HP Prime Computervision Wang Labs	Microsoft Cisco Intel Apple Oracle EMC Dell Compaq	Google AOL eBay Yahoo! Amazon.com	Facebook Twitter Apple (exception?) ?? ??

Note: Winners from 1950s to 1980s based on Fortune 500 rankings (revenue-based), desktop Internet winners based on wealth created from 1995 to respective peak market capitalizations. Source: Factset, Fortune, Morgan Stanley Research.

as surely as...

1985: NOT a PC in every home

1990: NO email for grandma

1995: NOT the internet

2000: NO pervasive mobile

2005: NO facebook / iphone

2008: NO Goldman/Morgan
near bankruptcy?

2010+: reason for optimism

to predict the future,
invent it!

-Alan Kay