

# Technology and Industry/Business

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Talk about your career objective and your interest of technology and industry!

What do we want to  
learn and share here!

# Grading

- Attendance (10%)
- Case Reading and Discussion (50%)
- Case Research Presentation and Report (40%)
  - Presentation (15%)
  - Research report (25%)
- Bonus Points ! (in-class discussion or additional case study, )



# Lifestyle and Technology

# Outline

- What does it take to reach our current lifestyle and dream!
- Coffee and Mobile Device Industries and Business
- Similarities and Dissimilarities between Coffee Business and Mobile Device Business
- Technology in Coffee and Mobile Device Businesses
- Future Trend

# Ingredients of Lifestyle

- Hobby
- Daily
- Internet
- Social Network

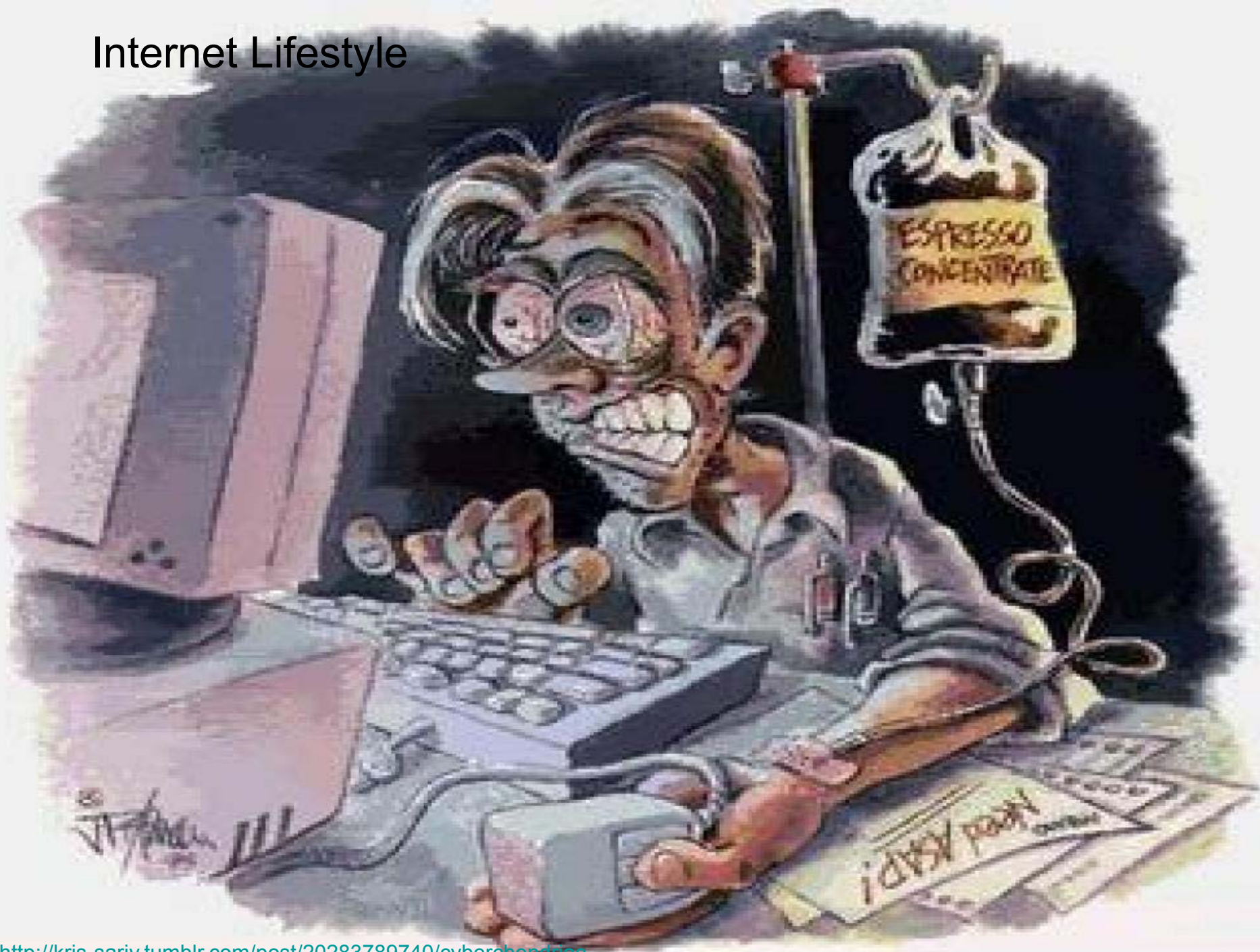
# Hobby and Casual Lifestyle



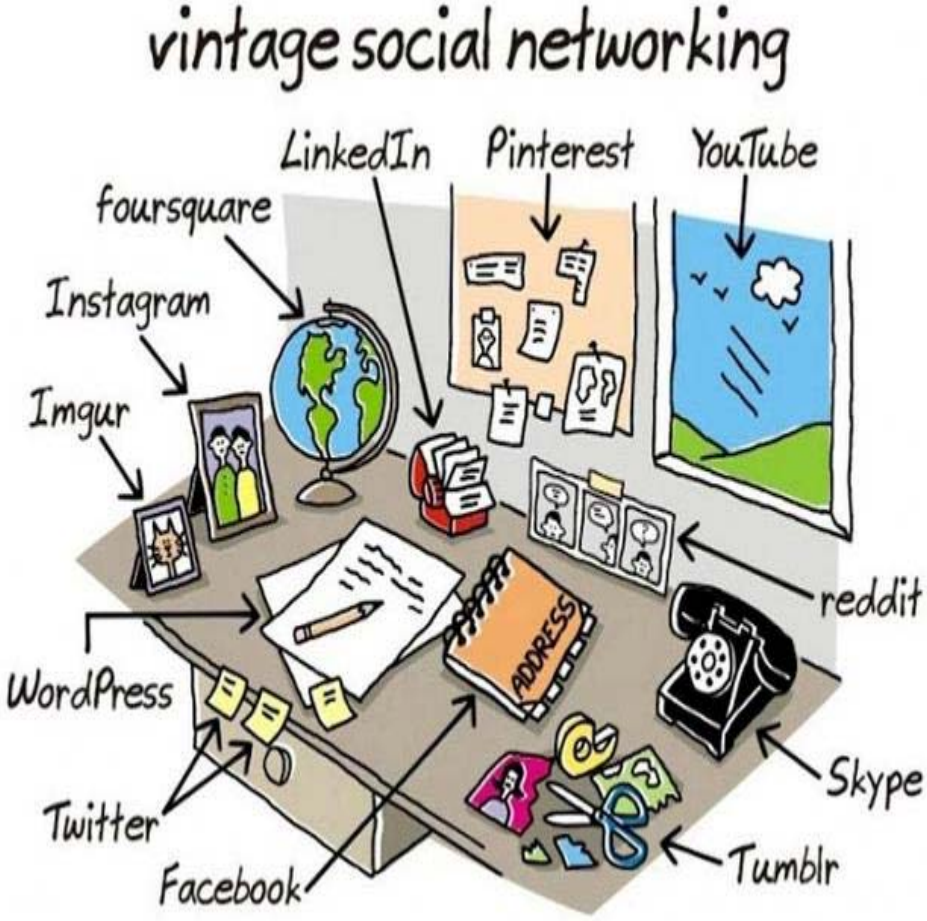
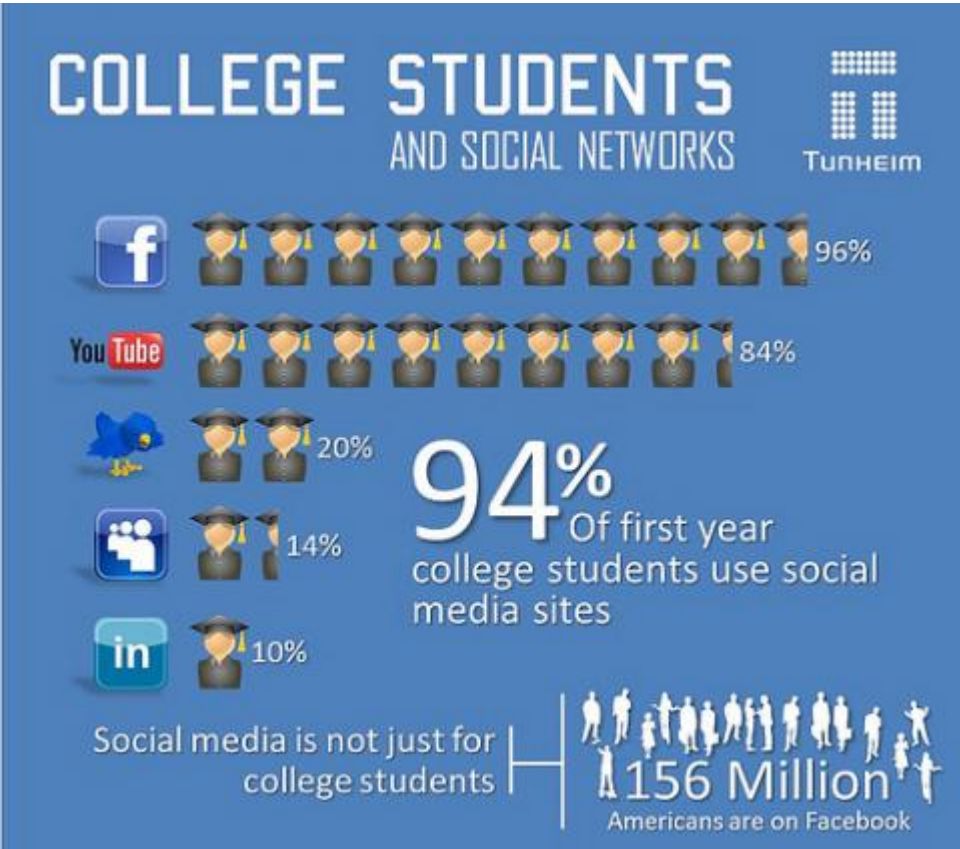




# Internet Lifestyle

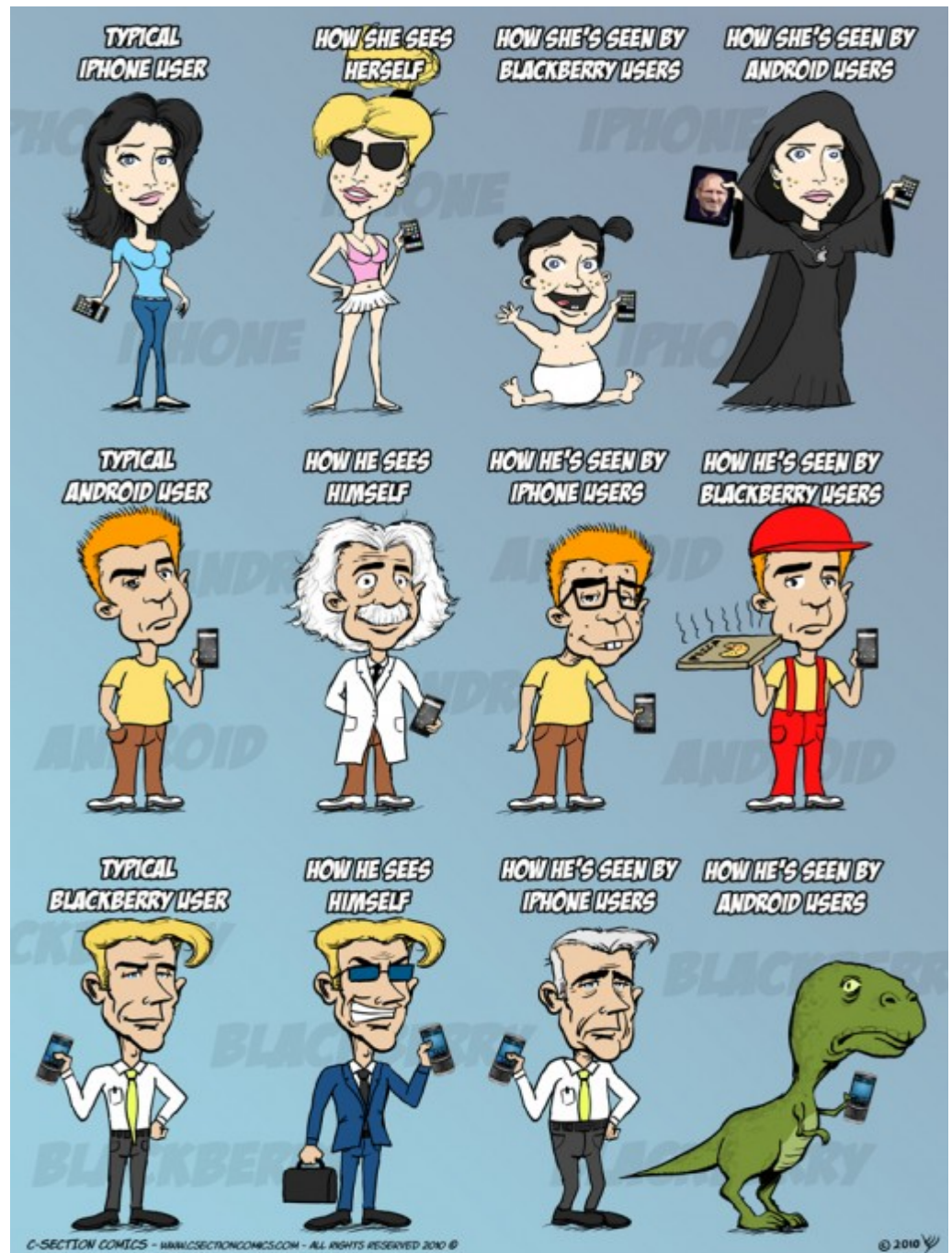


# Internet Social Network Lifestyle





# Smartphone Lifestyle



<http://androidandme.com/2010/11/news/how-smartphone-users-see-each-other-android-vs-blackberry-vs-iphone-comic/>



# Mobile Internet Addiction



# Coffee Industry and Business

- Ecosystem and Value Chain
- Brewing Ecosystem
- Single-Serve-Coffee

# Did you know?

- **Coffee statistics** show that coffee is the most popular beverage worldwide with over **400 billion cups** consumed each year.
- Coffee is the **2<sup>nd</sup>. largest commodity** next to crude oil; The total global production of green coffee is above 134.16 million bags (60 kg capacity) with a retail sales value in excess of \$22.7 billion during 2010-11 in the world market.
- Coffee industry statistics show that only **20% of harvested coffee beans** are considered to be a premium bean of the highest quality.
- Coffee market statistics show that coffee is grown commercially in **over 80 countries** around the world.
- Coffee trade statistics show that over **5 million** people in Brazil are employed by the coffee trade and more than **100 million** people in the coffee growing areas worldwide derive their income directly or indirectly from the produce of this crop.
- Those employed in the coffee industry are involved mostly with the cultivation and harvesting of more than **3 billion coffee plants**.
- Coffee consumption statistics show that coffee represents **75% of all the caffeine** consumed in the United States.

# Coffee Ecosystem



**Coffee Consumers**

**Wholesalers and Retailers**

- Supermarkets
- Big Box Retailers
- Coffee Shops
- Wal-Mart
- Shaws
- BJ Clubs
- Costco
- Retailers
- Gas Stations
- Convenience Stores
- Carts
- Restaurants

**Suppliers**

- Conventional Equipment
- Chemicals
- Consultants
- Components

**Manufacturers and Roasters**

- Specialty
- Sara Lee
- Starbucks
- Kraft Foods
- Nestlé
- J.M. Smucker
- Dunkin Donuts

- Independents
- Green Mountain
- Peet's
- Diedrich
- Farmers Brothers

**Social Activists, Religious Groups NGO's (Non Government Organizations)  
World Coffee Markets**

- Certification Organizations (FTC)
- Traders Importing Countries
- Small Traders
- Government Agencies



- Certification Organizations (FTC)
- Traders Importing Countries
- Small Traders
- Government Agencies

**Farmer Cooperatives**

- Farmers
- Farm Families
- Workers



## The Coffee Value Chain



- A. This is divided between the farmer, the local middleman, the local mill and transporters to town.**
- B. This covers exporter's transport and insurance costs as well as profits.**
- C. This covers importer's freight and insurance costs as well as profits.**
- D. This covers the freeze-drying or roasting and grinding process, packaging and distribution to supermarkets.**
- SOURCE: OXFAM

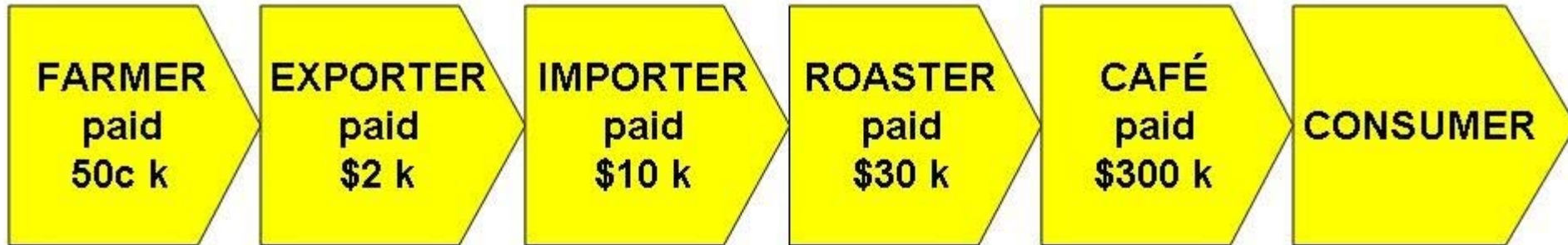
	Initial Proportion	Negotiated Proportion (First)	Final proportion	Actual proportion
Farmer	\$1.26	\$0.75	\$0.54	\$0.06
Exporters	\$1.30	\$0.75	\$0.34	\$0.11
Shippers	\$1.50	\$1.50	\$1.04	\$0.23
Roasters	\$2.30	\$1.20	\$1.04	\$2.45
Retailers	\$2.50	\$1.50	\$0.84	\$0.95
<b>Total</b>	<b>\$8.86</b>	<b>\$5.70(\$1.90 less )</b>	<b>\$3.80</b>	<b>\$3.80</b>

Results of our exercise on the profit share of a 100 gram bag of branded instant coffee sold at \$3.80 (do euros if you like)



## Current distribution chain

Farmer get <2% of market value!



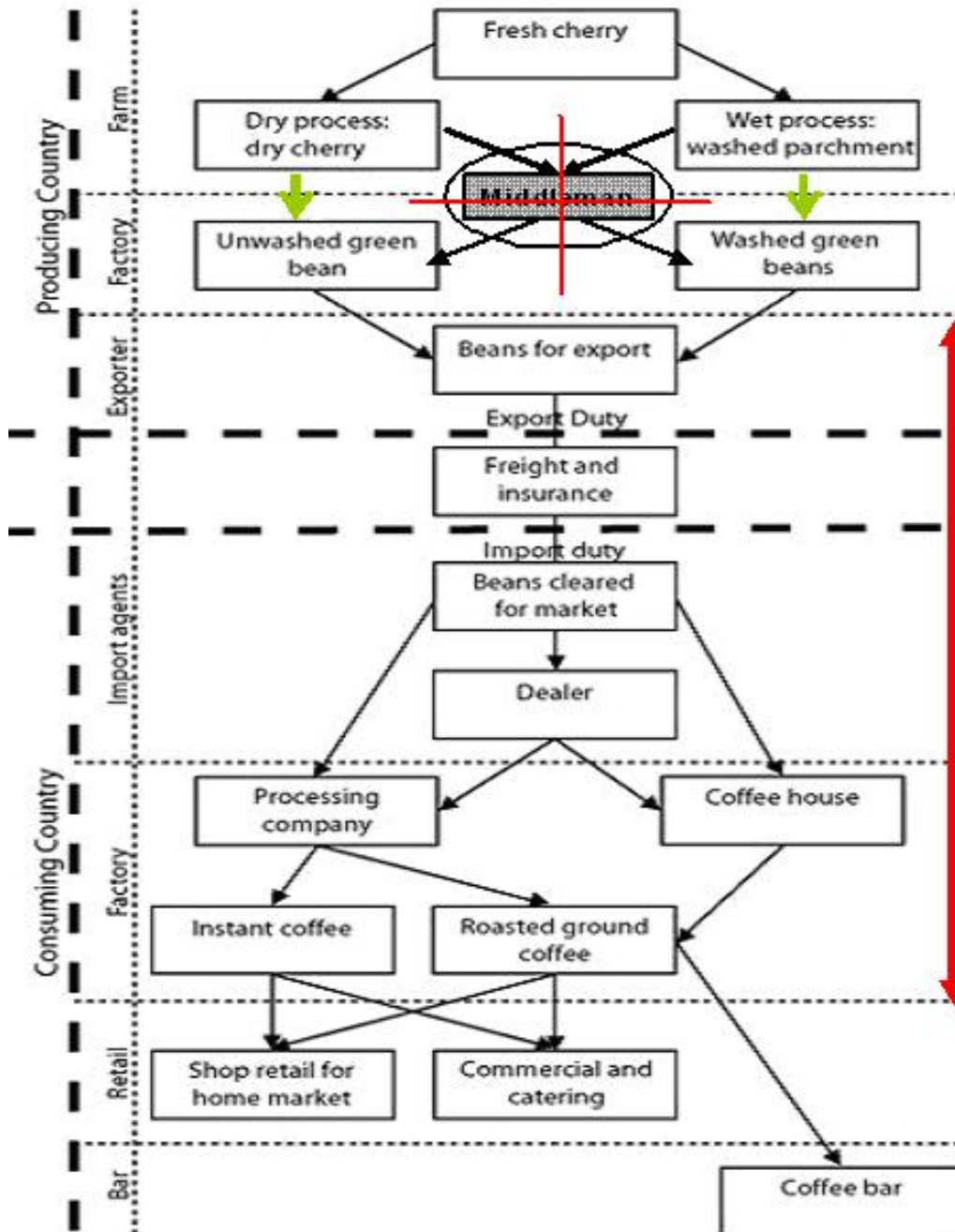
## Initial distribution chain – Beachhead strategy



## Future distribution chain – market acceptance + bulk



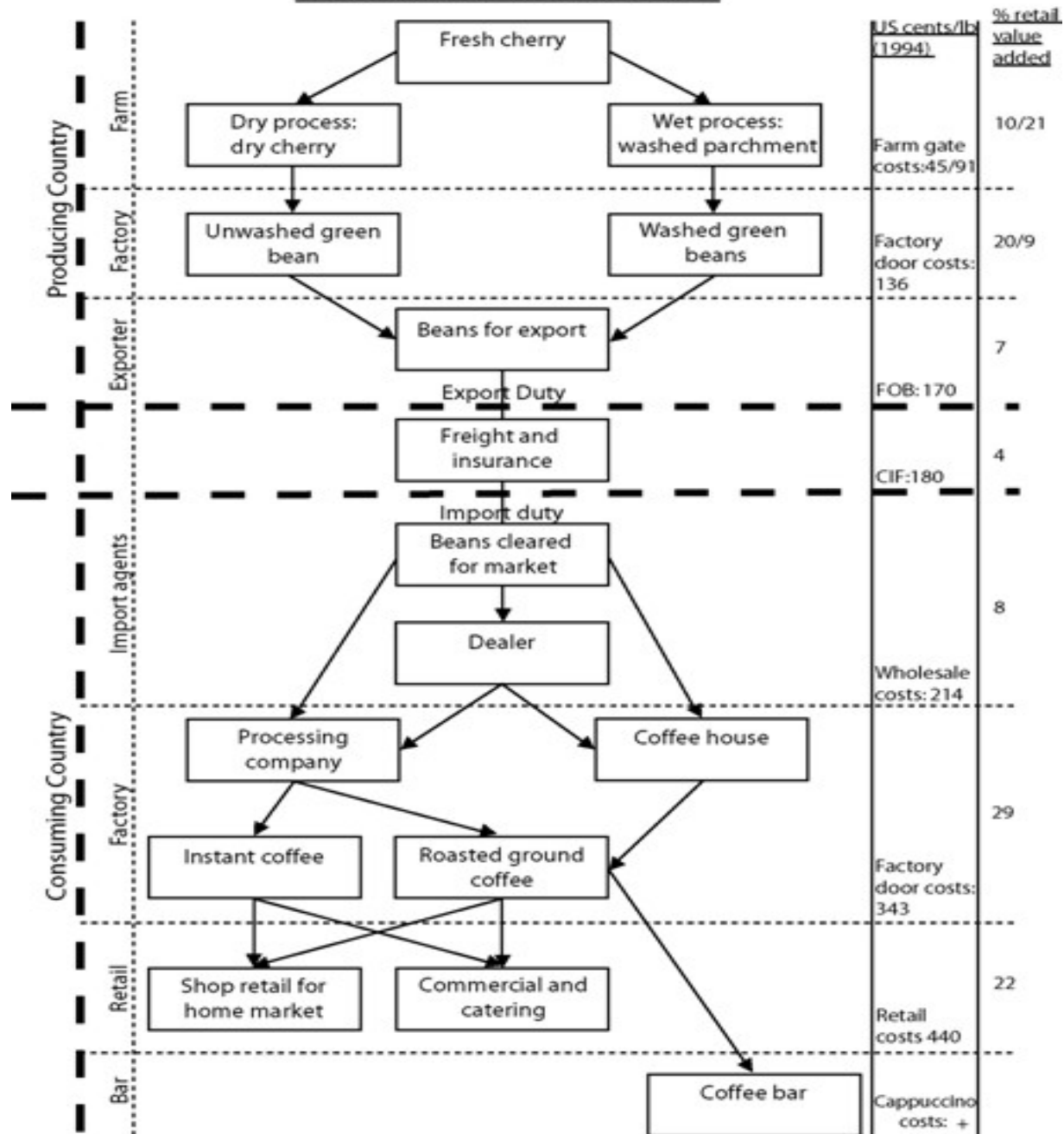
# The Coffee Value Chain



**The export/import process is managed and conducted by Fairtrade partners**

<http://www.munich-business-school.de/intercultural/index.php/Fairtrade> - an analysis of the coffee market, the advantages and disadvantages and the case study Starbucks

# The Coffee Value Chain



+ Costs variable but very high. Include: overheads, advertising, other products (i.e. milk), and the 'experience' of the coffee bar. (see breakdown of the price of a cup of coffee)



Coffee brewing ecosystem and its taxonomy-- sustainability



Consumption: >23 billions cup-of-coffee per day



<http://www.fastcodesign.com/1670599/infographic-how-to-make-every-coffee-drink-you-ever-wanted#7>

# K-CUP BRANDS

## Single-Serve-Coffee



As K-cups have demonstrated, people are willing to pay handsomely US\$1.0-0.6/cup for convenience and control over their coffee experience.





# K-Cup Economics

- K-Cup pricing pushing higher
  - Green Mountain moved from \$0.30-0.40 per cup closer to \$0.60-0.70 per cup on average at most retailers
    - (Costco lowest per cup at \$0.40-50)
  - Dunkin Donuts K-Cups: \$0.85 (only in Dunkin stores)
  - Starbucks: ~\$1.00 (~\$0.65 at Costco)
- Mainstream coffee: ~\$0.05-\$0.10 per cup
- Premium: ~\$0.20-\$0.30 per cup
- K-Cups generate ~30-40% margin for retailers
  - Mainstream: 10-20% margin (or less)
  - Premium: 20-30%





# Starbucks coffeehouse nearby you!

Starbucks is the largest [coffeehouse](#) company in the world, with 20,891 stores in 62 countries, including 13,279 in the United States, 1,324 in Canada, 989 in Japan, 851 in China, 806 in the United Kingdom, 556 in South Korea, 377 in Mexico, 291 in Taiwan, 206 in the Philippines, 179 in Turkey, 171 in Thailand, and 167 in Germany

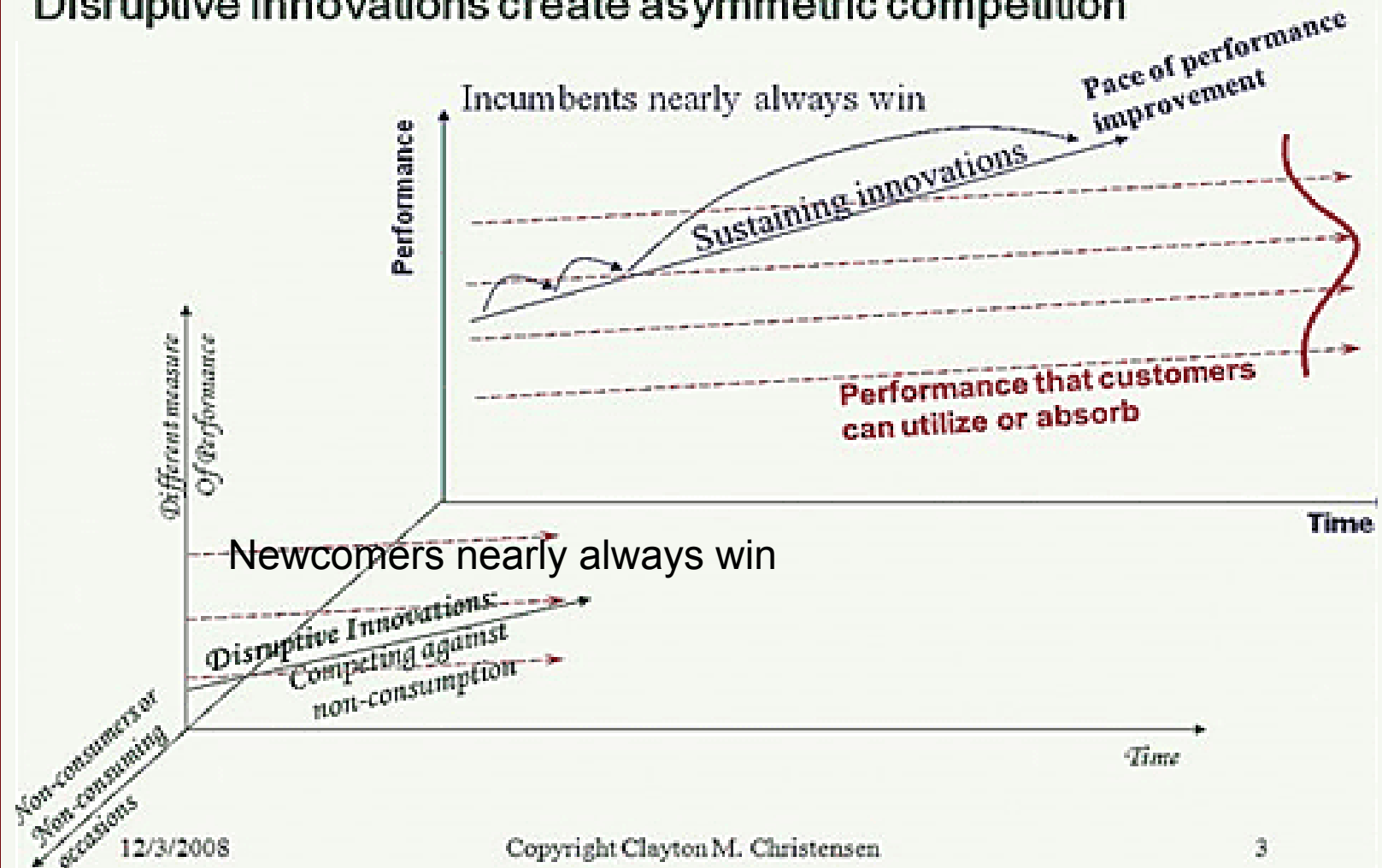


## Starbucks Economy

Revenue	US\$ 13.29 billion (2012)
<a href="#"><u>Operating income</u></a>	US\$ 1.99 billion (2012)
<a href="#"><u>Net income</u></a>	US\$ 1.38 billion (2012)
<a href="#"><u>Total assets</u></a>	US\$ 8.21 billion (2012)
<a href="#"><u>Total equity</u></a>	US\$ 5.10 billion (2012)
Employees	149,000 (2011)

Is Keurig K-Cup disruptive?  
Home/Office/Retail/Shop?

# Disruptive Innovations create asymmetric competition





- The company began moving into the **home market** in 2004, and sales took off. K-Cups now come in more than 200 flavors and sell for about 50 cents apiece. That's 10 times the cost per cup of coffee brewed by traditional methods, but consumers are willing to pay for the speed and convenience: In 2012 U.S. sales of Keurig coffeemakers and pods exceeded \$3.8 billion, and the coffeemakers had a dollar market share of more than 40%.

# THE K-CUP DEBATE

what convenience is really costing you



## #1: What K-cups are costing your wallet

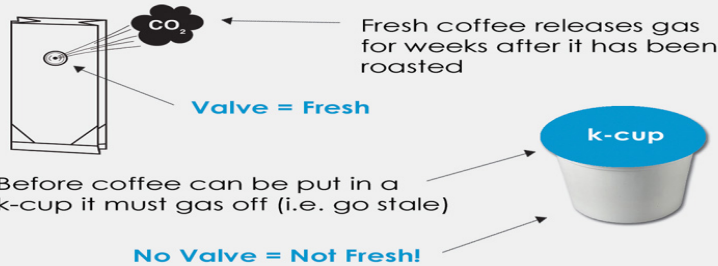


## #2: What K-cups are costing the environment



## #3: What K-cups are costing you in quality

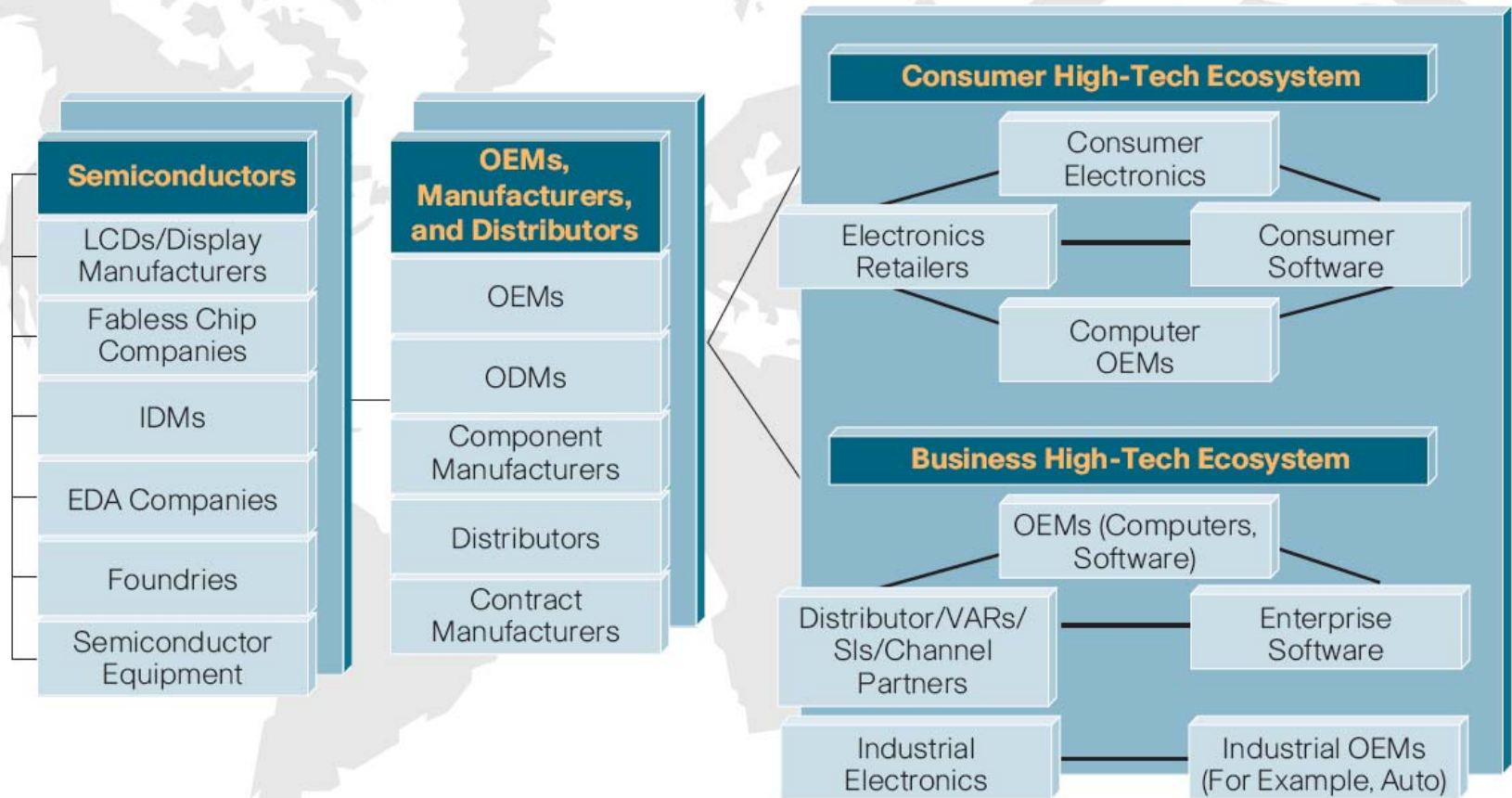
You can have the best beans on earth, but if they are not fresh they won't taste the best.



# Mobile Industry and Business

- Ecosystem and Value Chain
- Open Ecosystem(Android vs Apple vs MS vs others)

# Typical High-Tech Ecosystem



# Open Mobile Ecosystem

- Ecosystem is the set of players who come together to deliver the experience or product to consumer in any industry.
- An open mobile ecosystem allows a consumer to access any application and content on a device of its choice without binding them to any single network.
- Typically, the key actors in the value chain are operators, handset vendors, content owners, developers, publishers, aggregators, content distributors, advertising platform owners, advertisers, mobile platform owners and regulators.



### Mobile Industry Atlas

The Mobile Industry Atlas is a visual map of who's who in the mobile handset industry. This comprehensive map showcases 400+ leading companies in 30 market sectors, spanning all major players involved from handset design through retailing including development and delivery of hardware, software, SIM cards, services and content.

The Mobile Industry Atlas maps the players involved in the core value chain framed by those who participate in the pre-load and post-load phases of the handset lifecycle.

- Core value chain: the vendors who form the backbone of the handset lifecycle, from industrial design houses to distributors and retailers.
- Pre-load actors: the vendors involved in providing software, hardware and services to the core value chain during the design and development of the handset, and before the software is embedded onto the handset.
- Post-load actors: the vendors involved in providing content, services and delivering services after the handset has left the factory.

The map also depicts the stage where companies are involved along the handset lifecycle, from product planning through design, implementation, sale and in-life use.

For more information visit [www.visionmobile.com/research](http://www.visionmobile.com/research)

For enquiries write to us at [research@visionmobile.com](mailto:research@visionmobile.com)

### About Market-How Maps

VisionMobile Market-How maps are highly visual industry who's who maps that clarify the positioning of solution vendors in the mobile ecosystem. Market-How maps distill the noise within the chaos of the mobile telecoms marketplace into clear market sense.

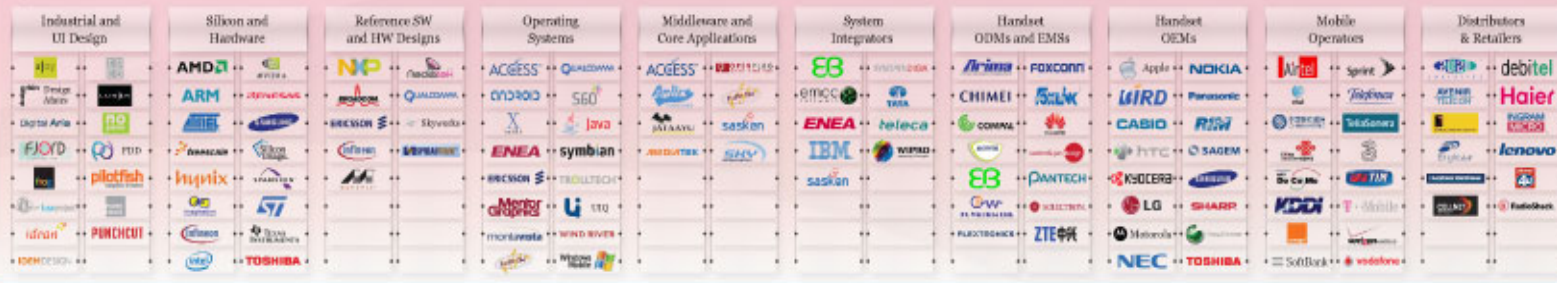
### About VisionMobile

VisionMobile is a market analysis and strategic advisory firm in the wireless sector. We offer research, workshops and advisory services on under-the-radar market sectors and emerging technologies.

### Pre-load actors



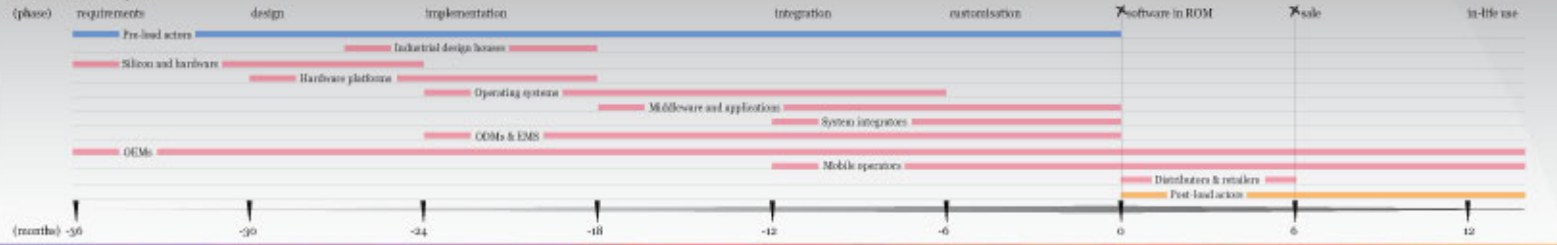
### Core value chain



### Post-load actors



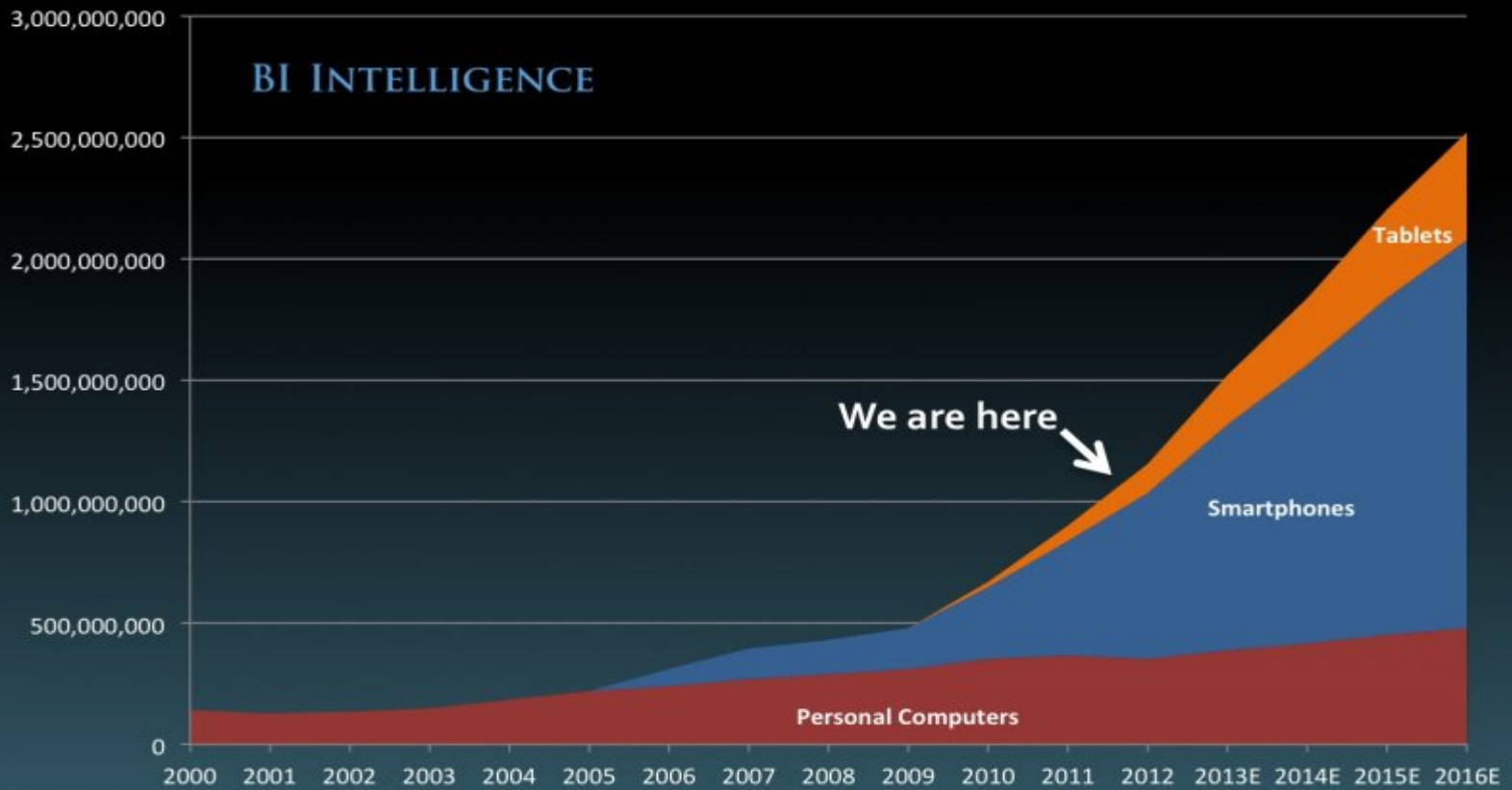
### Handset Lifecycle



# Exponential Growth of Major Internet Devices

And the disparity will only grow

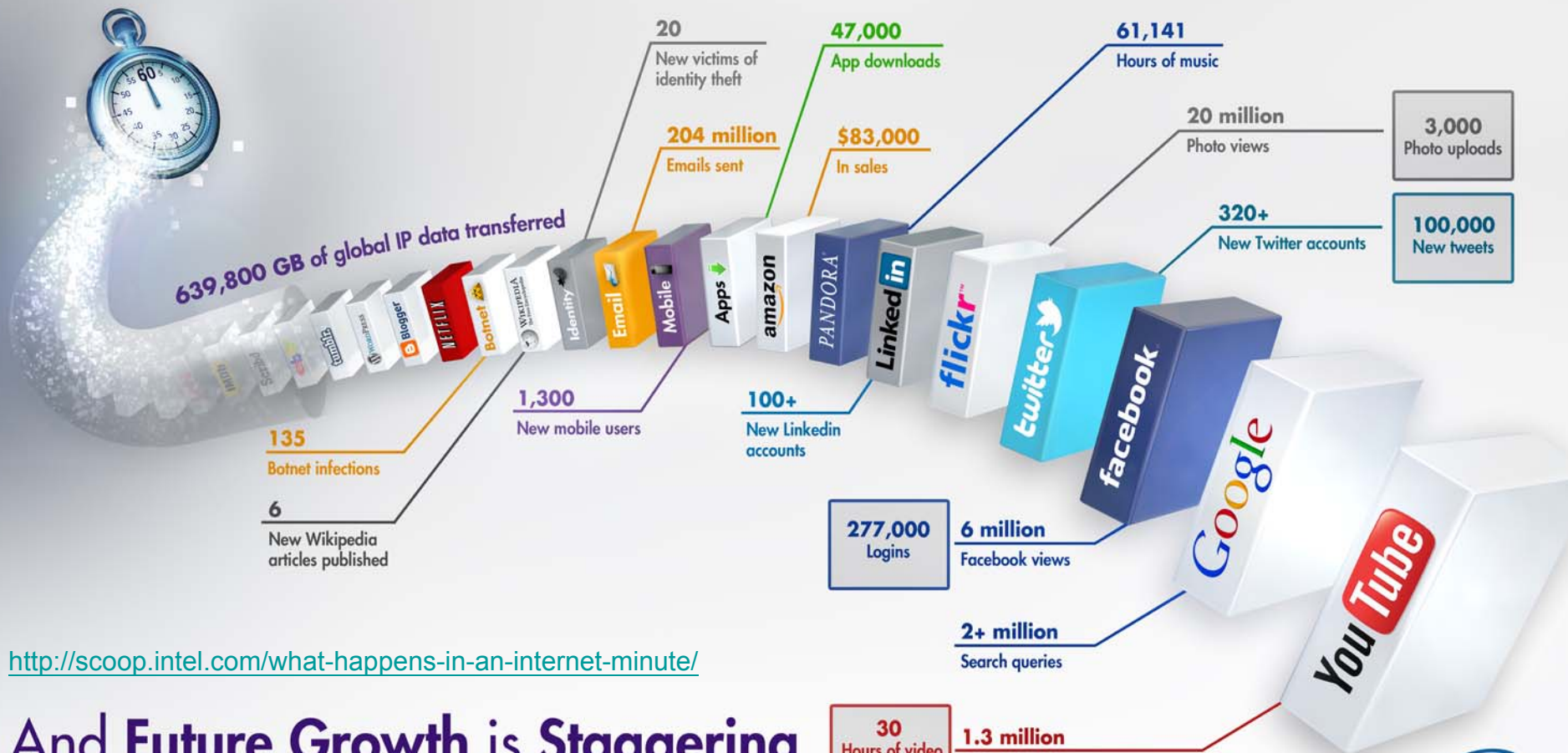
## Global Internet Device Shipments Forecast



Source: Gartner, IDC, Strategy Analytics, company filings, BI Intelligence estimates



# What Happens in an Internet Minute?



<http://scoop.intel.com/what-happens-in-an-internet-minute/>

## And Future Growth is Staggering



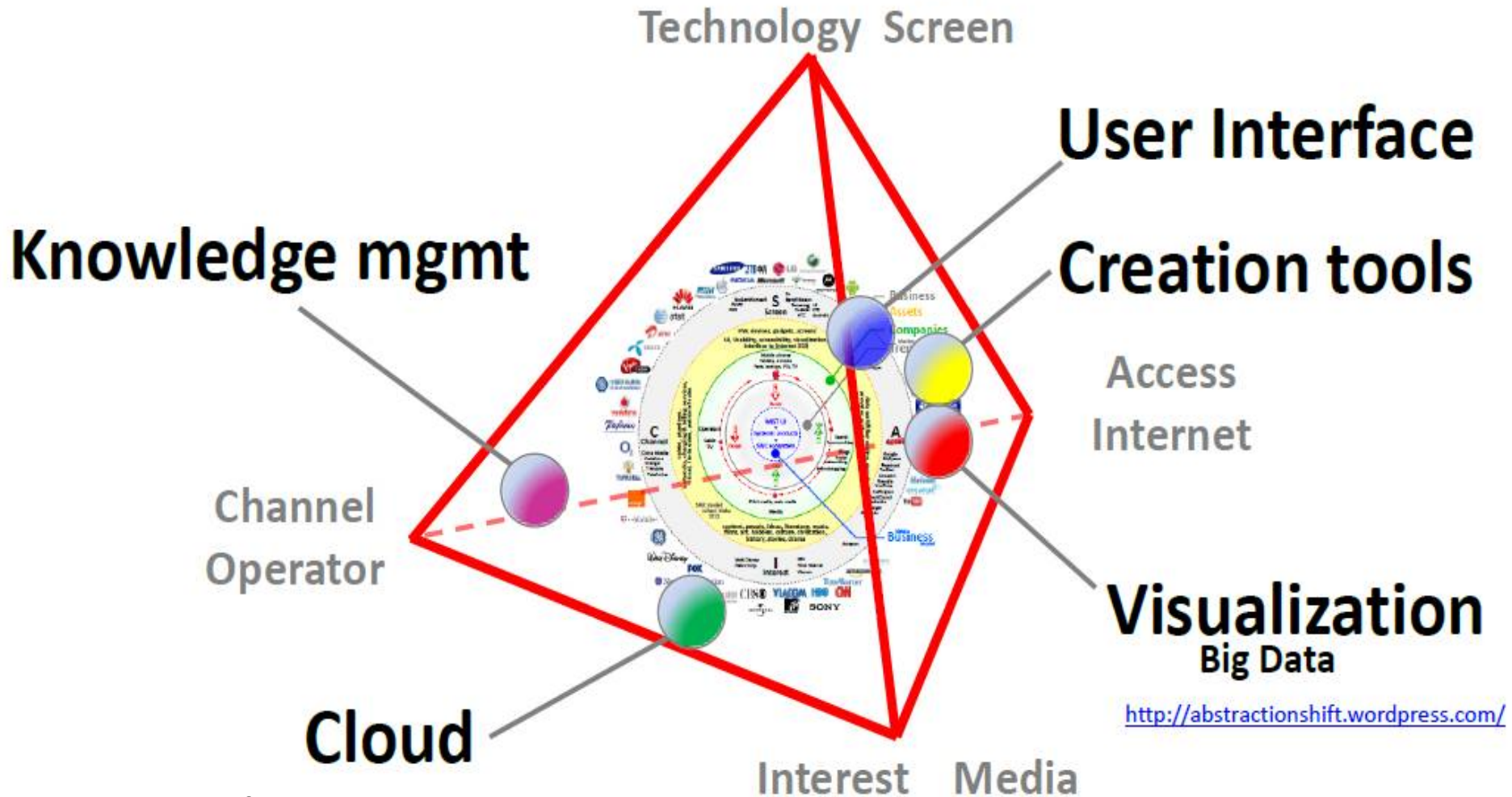




# Technology – Access – Interest - Channel

Screen – Internet – Media - Operator

## Software & Technology needs



<http://abstractionshift.wordpress.com/>

[http://kritiikkiblogi.files.wordpress.com/2011/11/11\\_juhani\\_risku\\_architect\\_nokia\\_ivalo\\_design\\_sw-tech-media-channel-visualization.jpg](http://kritiikkiblogi.files.wordpress.com/2011/11/11_juhani_risku_architect_nokia_ivalo_design_sw-tech-media-channel-visualization.jpg)



# Technology – Access – Interest – Channel

Screen – Internet – Media – Operator

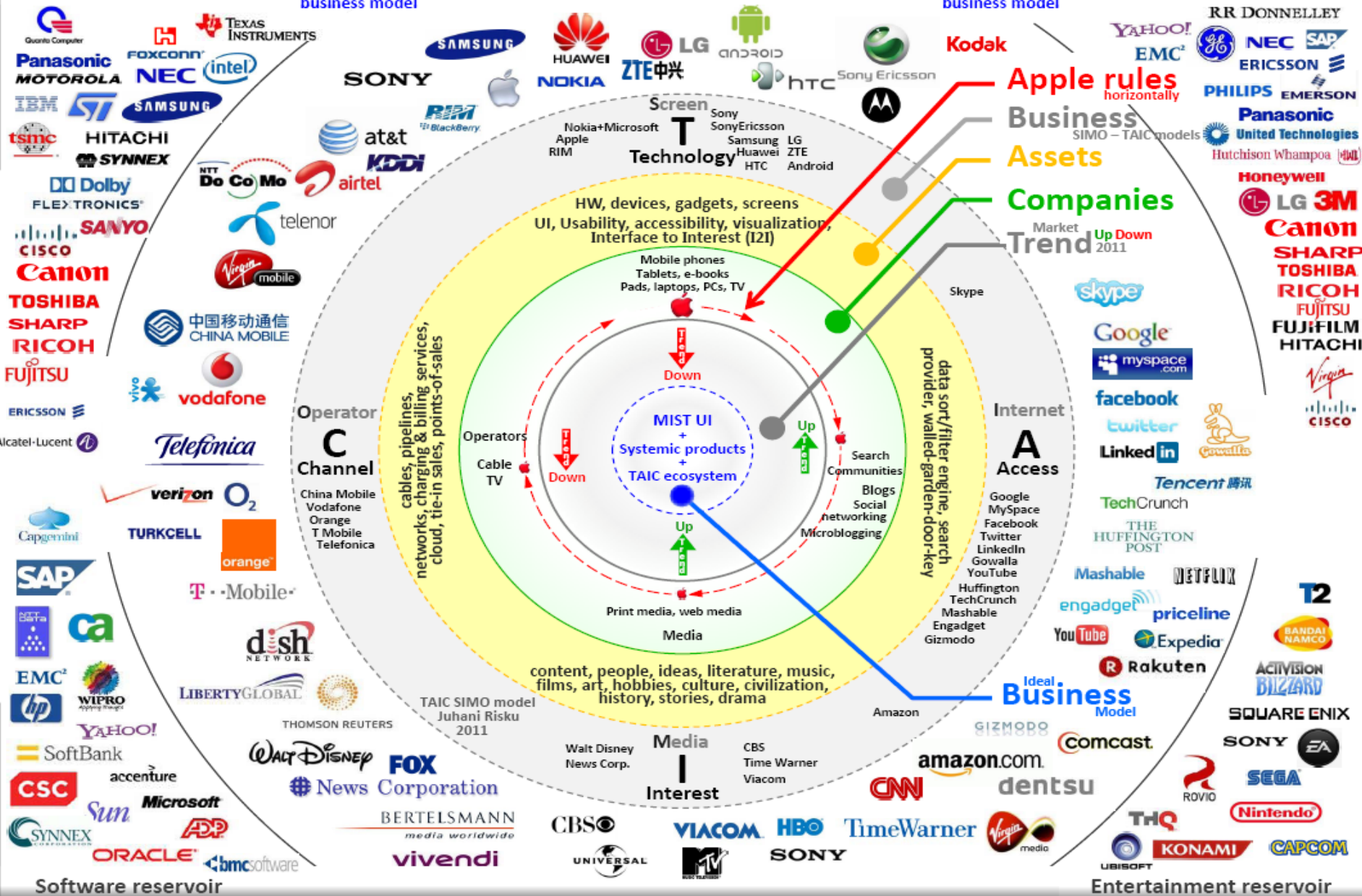
Juhani Risku 2011

Technology reservoir

SIMO business model  
Screen – Internet – Media – Operator

TAIC business model  
Technology – Access – Interest – Channel

Black Horse reservoir



Any similarity between Coffee and  
Mobile Device Industries?

# Coffee vs Mobile Device Industries: Commons (Similarities)

- 2<sup>nd</sup>. biggest commodity vs the most popular electronics devices ever
- Ubiquitous
- Affordable to everyone!
- Easy use and entertained
- A variety of choices for both
- Brand is the “King”
- Customer Experience: End-user’s addiction is critical
- Social drinks vs social networking
- Globalization

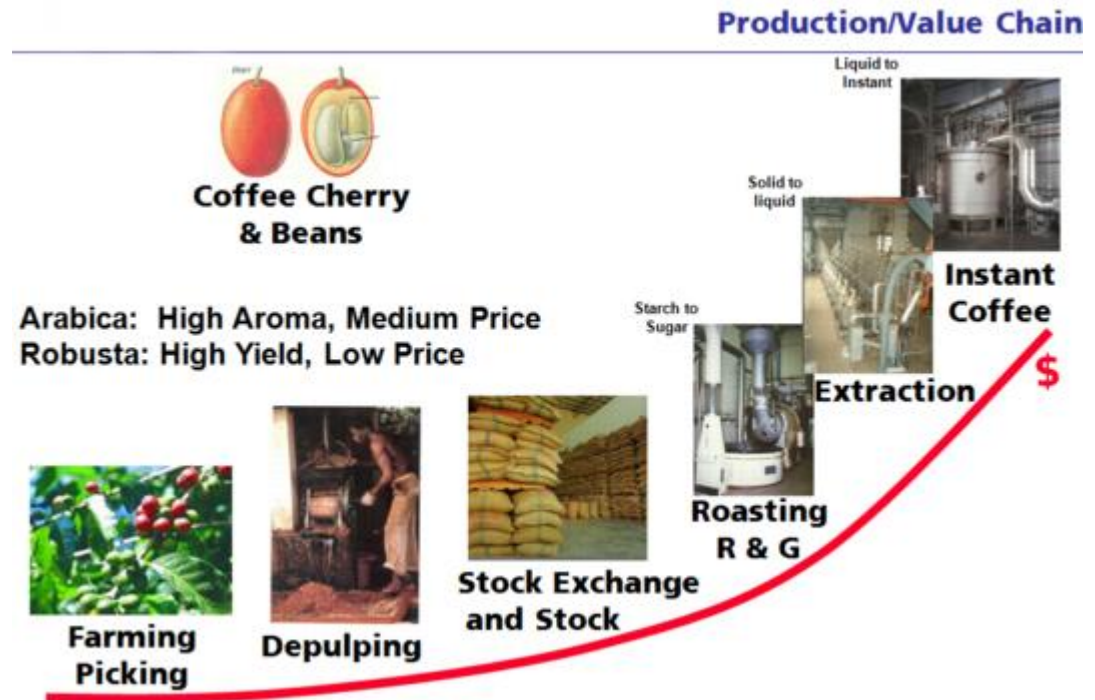
# Coffee vs Mobile Device Industries: Dissimilarities

- Customer Experience
- Competitive Landscape
  - Regional vs Worldwide
  - Oligopoly vs Perfect Competition
  - Sustaining Innovation (incumbents near always win) vs Disruptive Innovation (entrants near always win)
- Business Model
  - Vertical Integration vs Horizontal Integration vs Mixes
  - Value Chain Integration
  - Supply Chain Configuration
  - Knowledge Management



# Technology in Coffee Industry

- Agriculture
- Processing
- Brewing
- Packaging(single serving-cup-coffee)
- Service





**Green Bean Treatment**

*Solutions for cleaning, blending and storage using technology from selected partners*



**Roasting**

*Batch mode or continuous operation using technology from selected partners*



**Roast Bean Treatment**

*Solutions for storage, grinding and conditioning of the roasted product using technology from selected partners*



**Extraction**

*Batch mode or continuous operation*



**Extract Treatment**

*Clarification, storage and aroma recovery from the coffee extract*



**Concentration**

*Freeze and thermal concentration, membrane filtration*



**Freeze Drying/Spray Drying**

*The full range of solutions – only from GEA Niro*



**Agglomeration**

*For dustless powder and customized granules*



**Packing**

*Powder: Packed in bulk or retail quantities  
Liquid: Supplied in cans or drums*



**Instant Coffee**

# HOW THE K-CUP WORKS

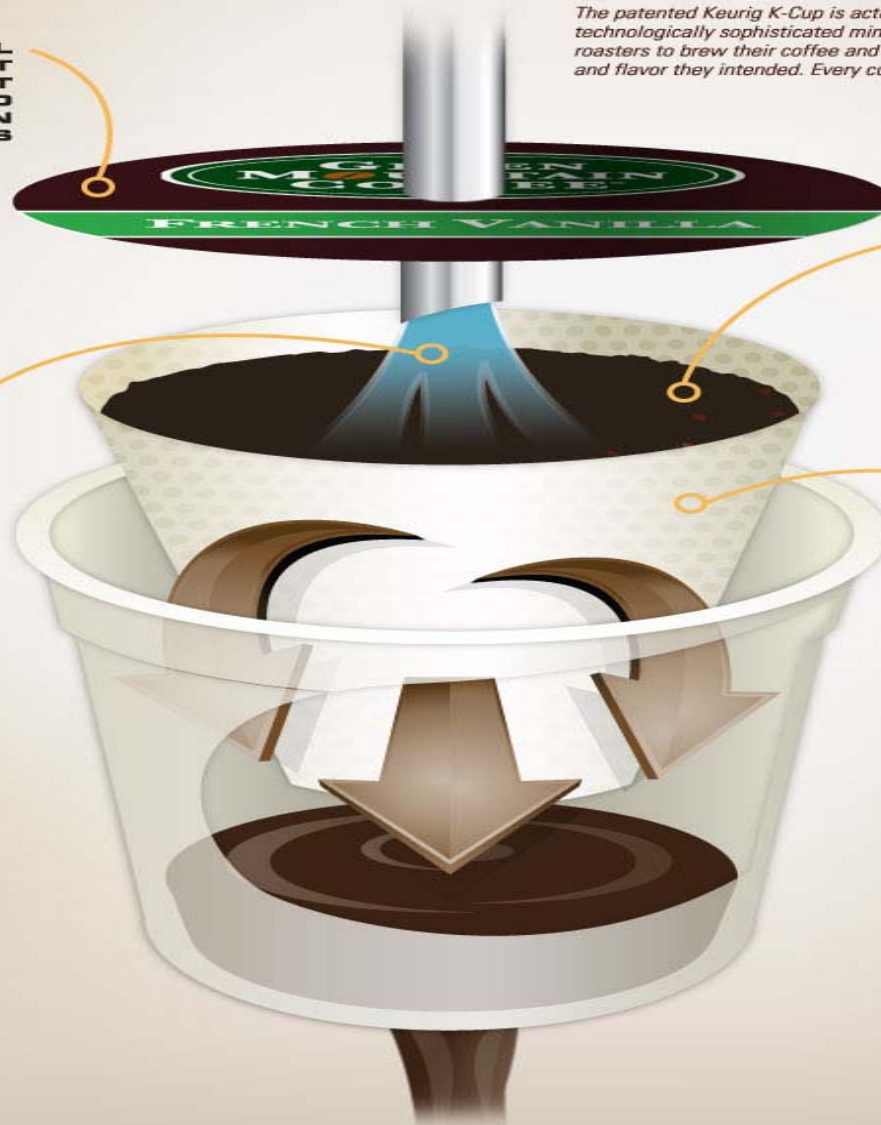
*The patented Keurig K-Cup is actually a highly-engineered, technologically sophisticated mini-brewer. Trusted by the world's best roasters to brew their coffee and tea varieties with the precise quality and flavor they intended. Every cup, every time.*

**AIR-TIGHT SEAL TO LOCK OUT OXYGEN, LIGHT AND HUMIDITY, AND LOCK IN FRESHNESS**

**THE IDEAL GRIND MEASURE OF THE COFFEE OR TEA YOU CHOOSE**

**PRESSURIZED HOT WATER FLOWS THROUGH AT THE IDEAL TEMPERATURE AND PRESSURE**

**TECHNICALLY ADVANCED FILTER FOR MAXIMUM FLAVOR EXTRACTION**





## HOW THE K-CUP MAGIC WORKS

Our patented K-Cup portion pack is actually a sophisticated mini-brewer, trusted by the world's best roasters to brew their coffee, tea and hot cocoa varieties with the precise quality and flavor they intended. This brewer features Keurig's advanced brewing technology. This newly developed brewing system evenly distributes water through the K-Cup®, resulting in a richer, more flavorful brew. Every cup. Every time.

An air-tight lid and cup lock out oxygen, light and humidity. And lock in freshness and flavor.



Enhanced delivery system more evenly distributes pressurized hot water at the ideal temperature.

The ideal grind and measure of fresh 100% Arabica Gourmet Beans for the coffee variety you choose.

An internal filter assures superior brewing results.

Freshly brewed inside the K-Cup means no taste left behind in the Brewer to taint your next brew.

# User friendly service with RFID technology

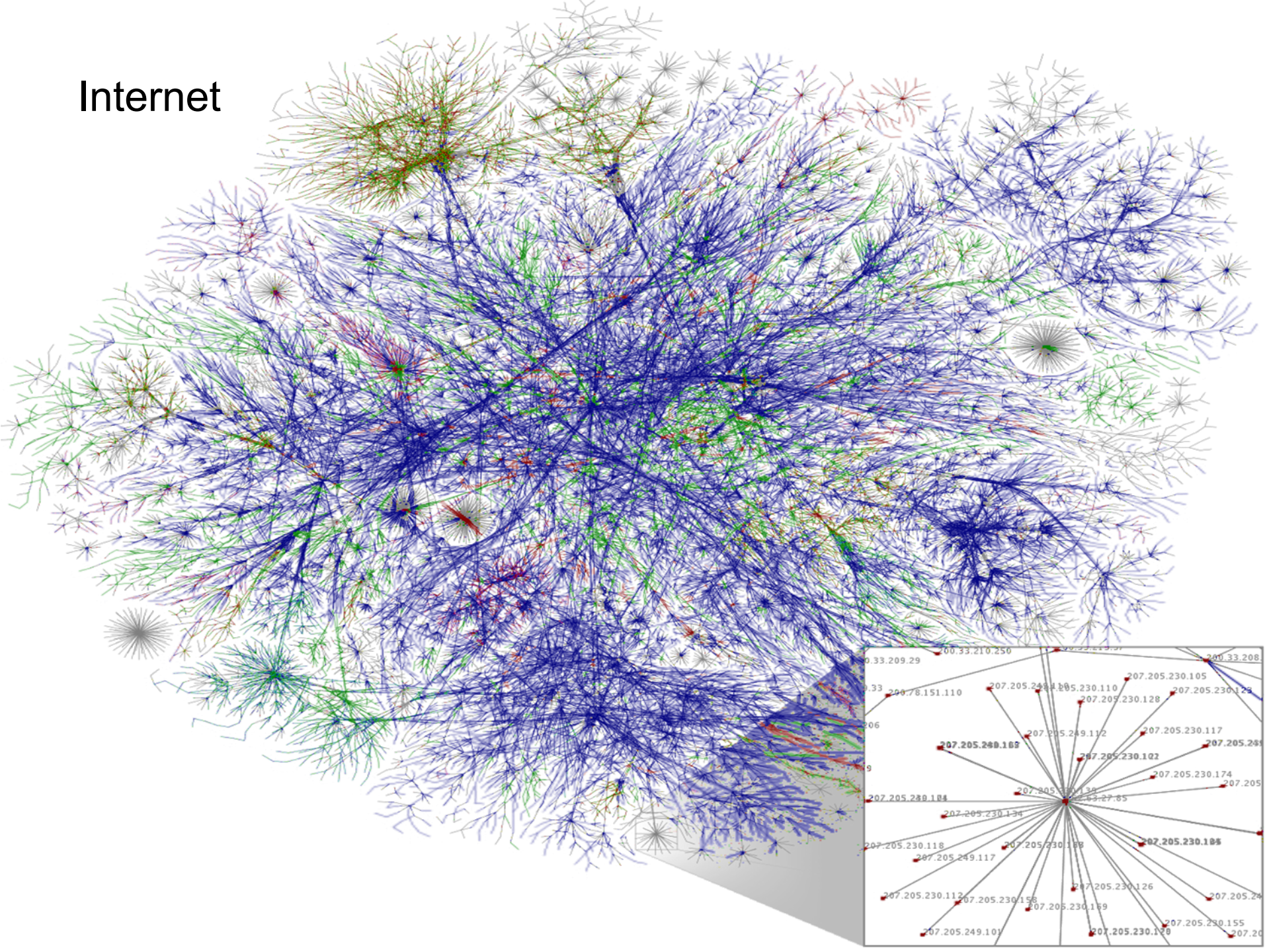


# Technology in Mobile Device Industry

- Internet
- Computing Power
- User Interface
- Visual Display
- Camera
- Storage
- Form Factor
- Power Saving
- Wireless Broadband
- App
- Social Networking
- On-Demand Service



# Internet





# Computing Power: Acceleration of Change

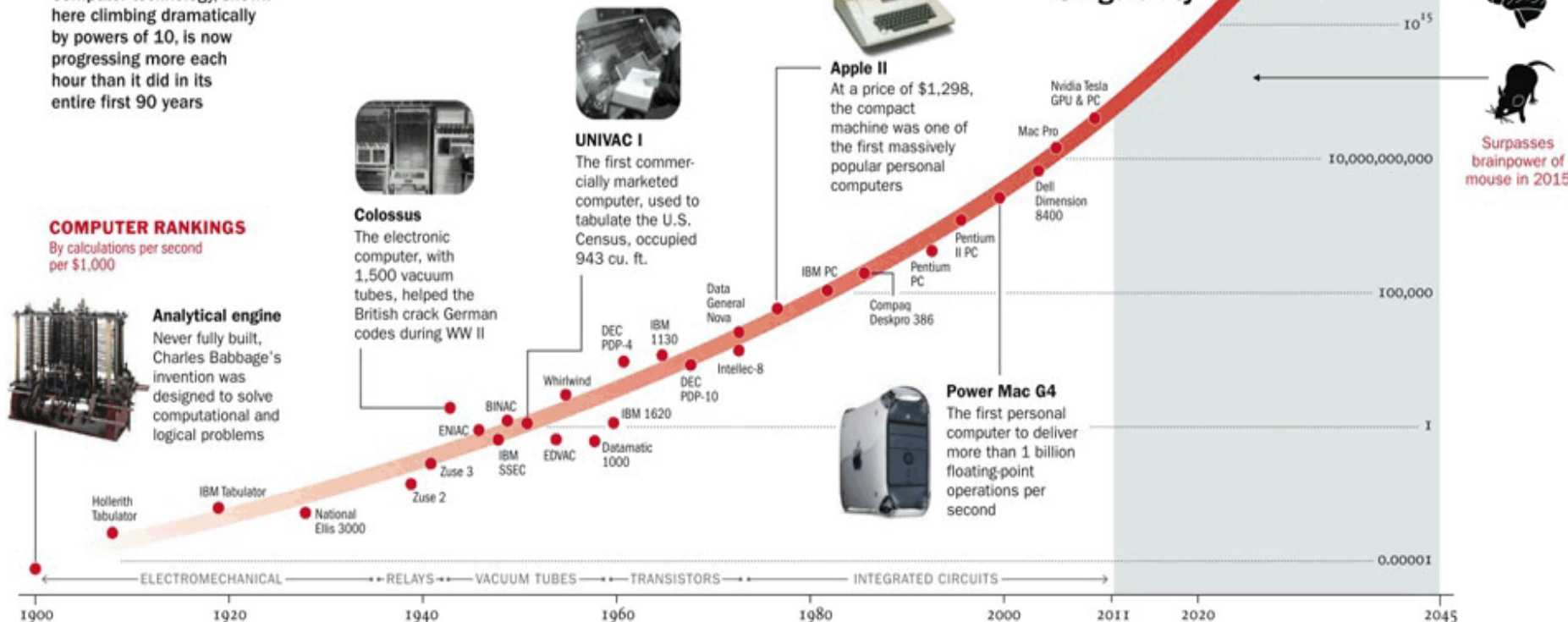
## 1 The accelerating pace of change ...



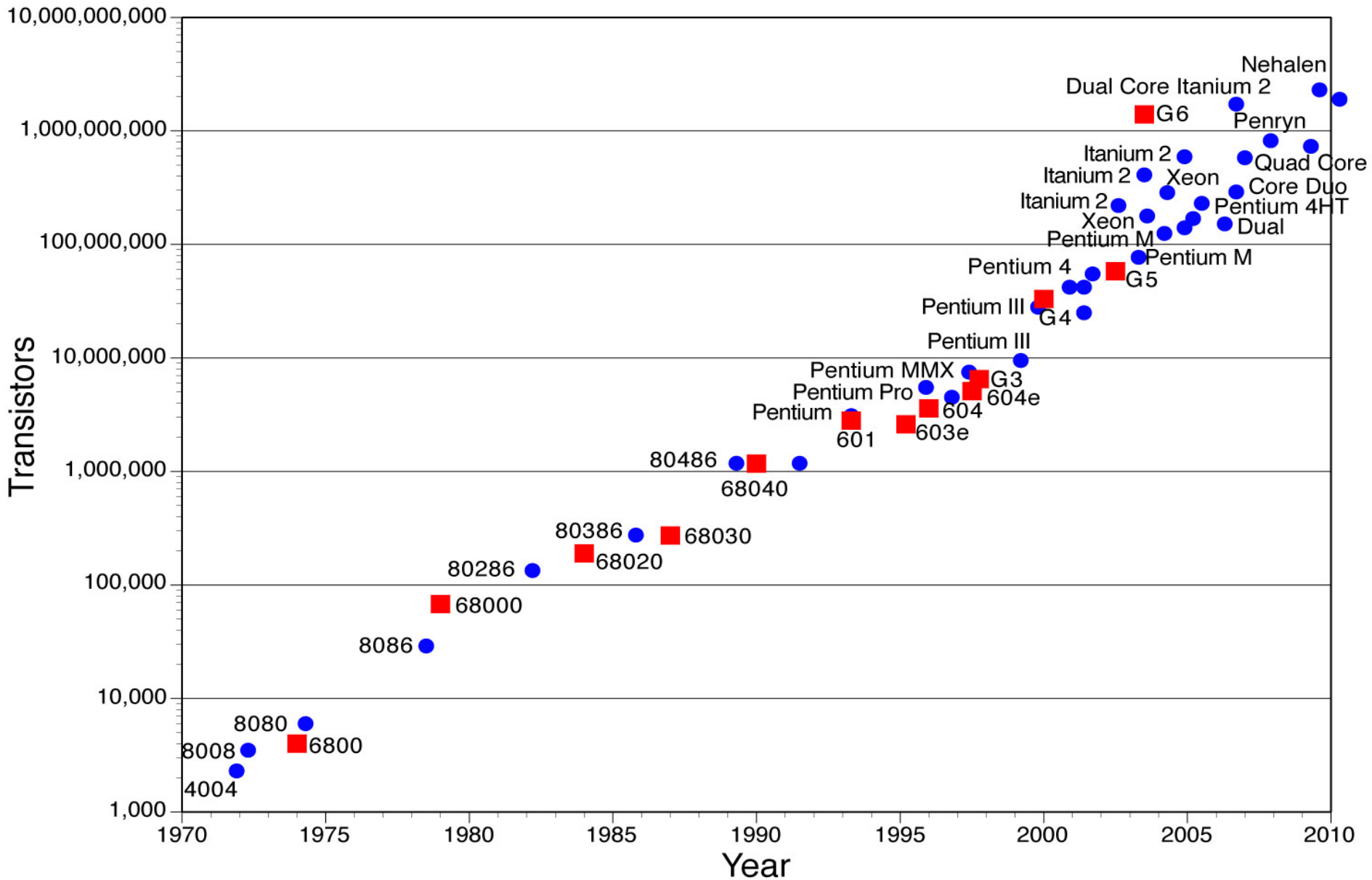
## 2 ... and exponential growth in computing power ...

Computer technology, shown here climbing dramatically by powers of 10, is now progressing more each hour than it did in its entire first 90 years

## 3 ... will lead to the Singularity



# Moor's Law and CPU Transistor Counts



# Hardware Inside Out

## Inside the iPhone 5

The new model is estimated to cost Apple about \$9 more than the predecessor, due to the larger display and added wireless technology.



**IPHONE 5**  
16 GB  
VERSION

**IPHONE 4S**

### TOTAL COST OF COMPONENTS

**\$197** **\$188**

**\$649** **\$649**

RETAIL PRICE

Note: Cost of materials doesn't include manufacturing, software or royalties. Numbers do not total due to rounding.

Source and photos: IHS iSuppli Research

### COMPONENTS (PRICE)

**1**

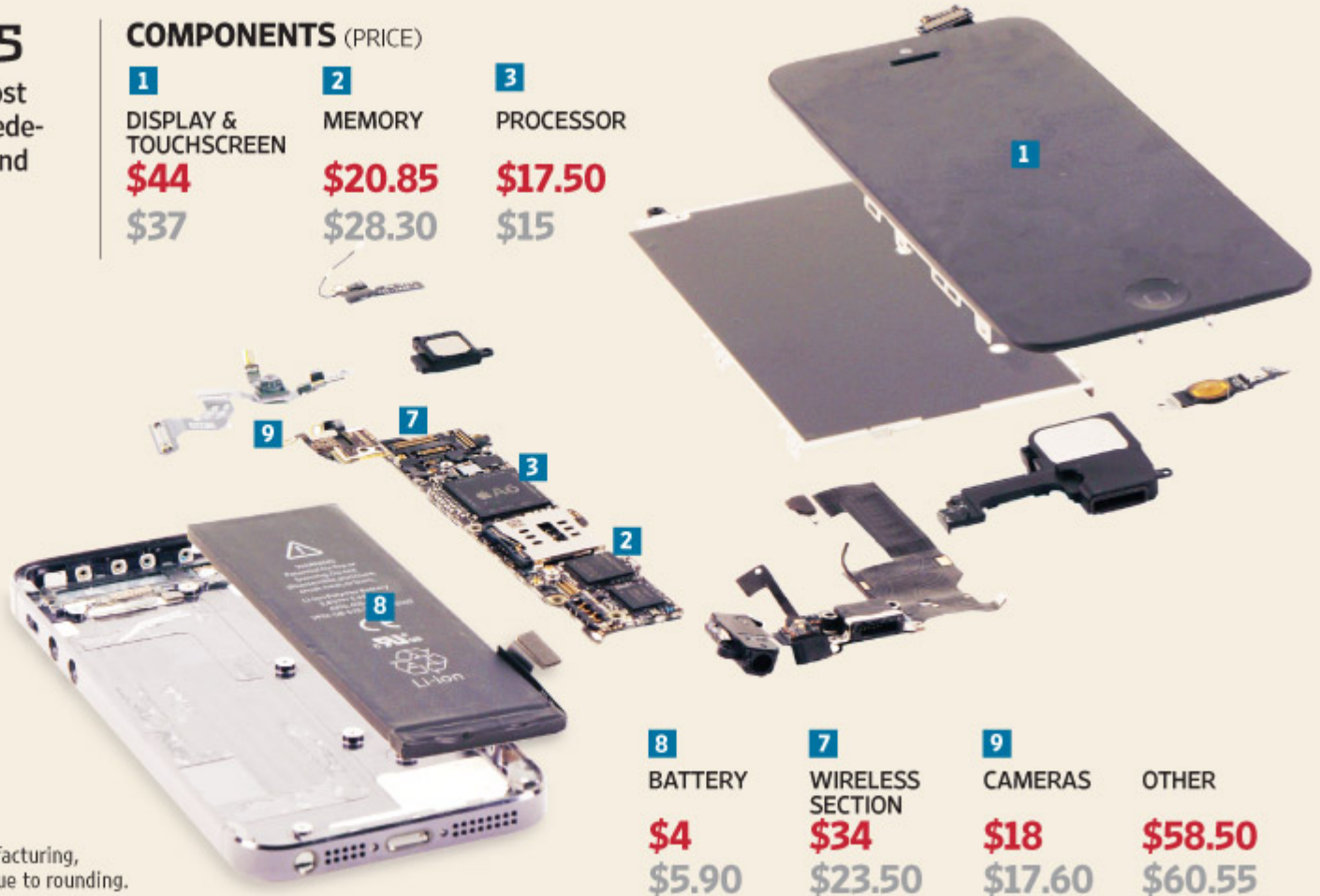
DISPLAY &  
TOUCHSCREEN  
**\$44**  
\$37

**2**

MEMORY  
**\$20.85**  
\$28.30

**3**

PROCESSOR  
**\$17.50**  
\$15



**8**

BATTERY  
**\$4**  
\$5.90

**7**

WIRELESS  
SECTION  
**\$34**  
\$23.50

**9**

CAMERAS  
**\$18**  
\$17.60

OTHER  
**\$58.50**  
\$60.55

# ASP(average selling price) and Profit Margin

Preliminary iPhone 5 Bill of Materials and Manufacturing Cost Estimate Based on Virtual Teardown  
(Costs in U.S. Dollars)

Components / Hardware Elements	iPhone 5 Hardware Comments	iPhone 5 Model		
		16GByte	32GByte	64GByte
Pricing without Contract		\$649	\$749	\$849
Total BOM Cost		\$199	\$209	\$230
Manufacturing Cost		\$8.00	\$8.00	\$8.00
BOM + Manufacturing		\$207	\$217	\$238
<b>Major Cost Drivers</b>				
Memory				
NAND Flash		\$10.40	\$20.80	\$41.60
DRAM	1GByte LPDDR2	\$10.45	\$10.45	\$10.45
Display & Touchscreen		\$44.00	\$44.00	\$44.00
Processor	A6 Processor	\$17.50	\$17.50	\$17.50
Camera(s)	8 Megapixel + 1.2 Megapixel	\$18.00	\$18.00	\$18.00
Wireless Section - BB/RF/PA	Qualcomm MDM9615+RTR8600+Front End*	\$34.00	\$34.00	\$34.00
User Interface & Sensors		\$6.50	\$6.50	\$6.50
BT / WLAN	BTv4.0 + Dual-Band Wireless-N	\$5.00	\$5.00	\$5.00
Power Management		\$8.50	\$8.50	\$8.50
Battery	Assumed 1800mAh	\$4.50	\$4.50	\$4.50
Mechanical / Electro-Mechanical		\$33.00	\$33.00	\$33.00
Box Contents		\$7.00	\$7.00	\$7.00

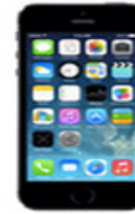
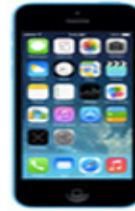
\* - Assumed

Source: IHS iSuppli Research, September 2012



# TECHINSIGHTS

## Apple iPhone BOM Estimate



### Features

	iPhone 4S 16 GB	iPhone 5 16 GB	iPhone 5C 16 GB	iPhone 5S 16 GB
<b>Display</b>	3.5" IPS 960x640	4" IPS 1136x640	4" IPS 1136x640	4" IPS 1136x640
<b>Battery</b>	1420 mAh	1440 mAh	1508 mAh	1560 mAh
<b>Camera</b>	8 Megapixel f/2.4 + VGA Front	8 Megapixel f/2.4 + 1.2MP Front	8 Megapixel f/2.4 + 1.2MP Front	8 Megapixel with 1.5µ pixels, f/2.2 +
<b>WiFi/BT/GPS</b>	2.4GHz 802.11 b/g/n Bluetooth 2.1	2.4 + 5GHz 802.11 a/b/g/n Bluetooth 4.0	2.4 + 5GHz 802.11 a/b/g/n Bluetooth 4.0	2.4 + 5GHz 802.11 a/b/g/n Bluetooth 4.0
<b>NAND</b>	16 GB	16 GB	16 GB	16 GB
<b>SDRAM</b>	512 MB	1 GB	1 GB	1 GB
<b>Processor</b>	Apple A5	Apple A6	Apple A6	Apple A7 + M7
<b>BB+XCR</b>	Qualcomm MDM6610 Qualcomm RTR8605	Qualcomm MDM9615M Qualcomm RTR8600	Qualcomm MDM9615M Qualcomm WTR1605L	Qualcomm MDM9615M Qualcomm WTR1605L

### Cost\*

	iPhone 4S 16 GB	iPhone 5 16 GB	iPhone 5C 16 GB	iPhone 5S 16 GB
<b>Teardown Date</b>	October-2011	December-2012	September-2013	September-2013
<b>Display/Touchscreen</b>	\$35.00	\$31.00	\$29.00	\$29.00
<b>Battery</b>	\$5.00	\$5.00	\$3.50	\$3.50
<b>Camera</b>	\$16.00	\$16.00	\$14.00	\$15.00
<b>WiFi/BT/GPS</b>	\$4.00	\$5.00	\$4.50	\$4.50
<b>NAND</b>	\$13.00	\$18.00	\$9.00	\$9.00
<b>SDRAM</b>	\$6.00	\$5.00	\$5.00	\$5.00
<b>Processor</b>	\$26.00	\$33.00	\$31.50	\$36.50
<b>BB+XCR</b>	\$17.00	\$27.00	\$25.50	\$25.50
<b>Non-Electric</b>	\$16.00	\$9.00	\$8.00	\$9.00
<b>Other</b>	\$33.00	\$44.00	\$39.00	\$41.00
<b>Supporting Materials</b>	\$4.00	\$6.00	\$5.50	\$5.50
<b>Assembly &amp; Test</b>	\$8.00	\$11.00	\$10.50	\$10.50
<b>Total</b>	\$182.00	\$209.00	\$185.00	\$194.00

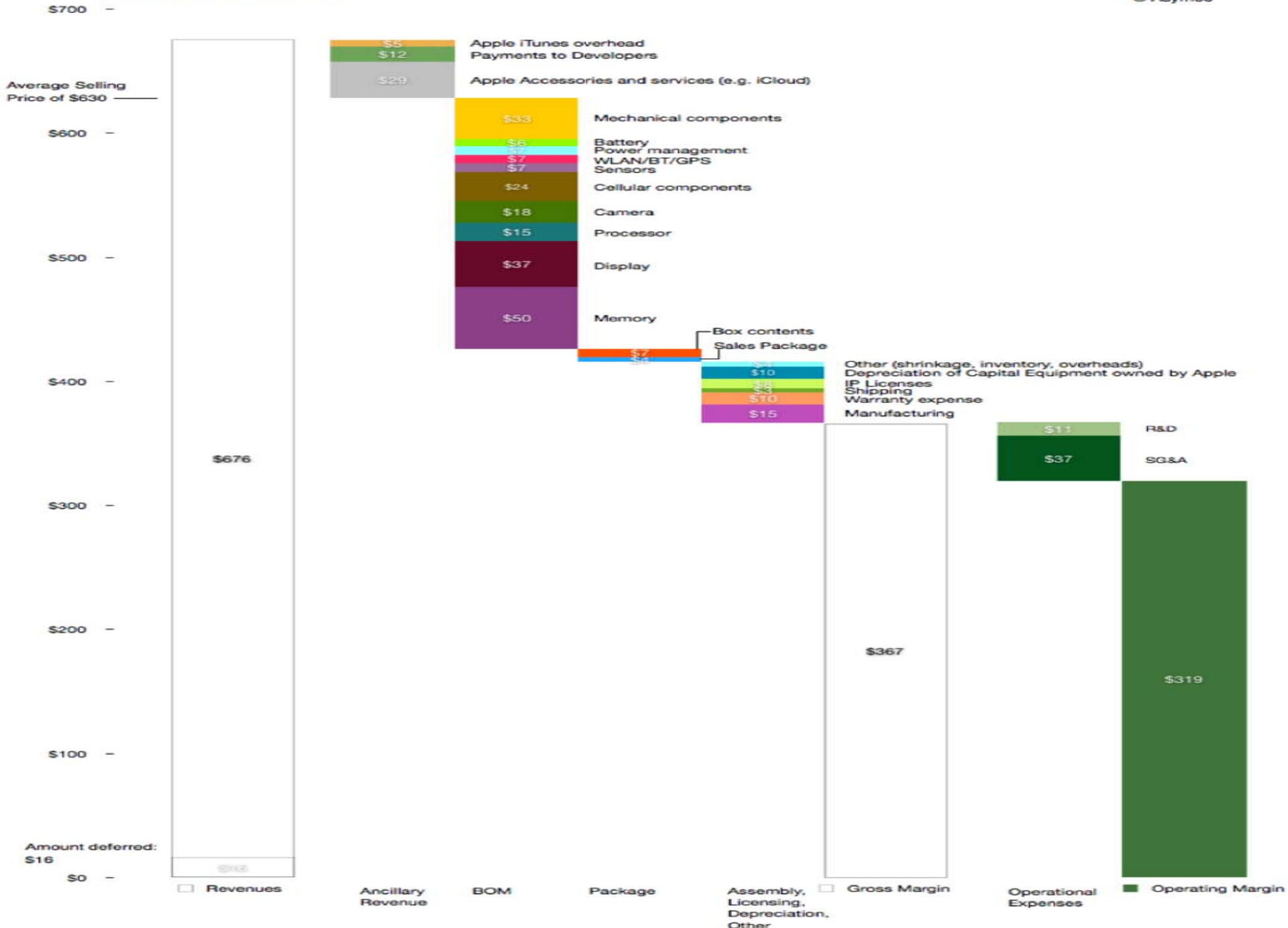
\*Estimate only since the devices have not been fully analysed - final estimate is expected to be different

Apple iPhone 5 Key Vendors and Parts - In Descending Order of Component Value

Manufacturer	Part Number	Description	Comment
		Display / Touchscreen Module - 4" Diagonal, Retina Display, w/ In-Cell Multi-Touch	Japan Display Inc. and LG Display are likely sources
Sandisk	SDMALBB4032G	Flash - NAND, 32GB, MLC	Hynix, Samsung, and Toshiba are other likely sources; Hynix is the supplier in A1429 (Verizon & Sprint version) we torn down
Samsung Semiconductor	APL0598	Apps Processor - PoP	New Apple A8 Processor
Qualcomm	MDM9815	Baseband Processor - Multi-Mode, Multi-Band, GSM/CDMA/EVDO RevB/LTE, w/ Elpida Mobile DDR	Was MDM9800 in the latest iPad
		Primary Camera Module - 8MP, BSI CMOS (TBD), Auto Focus Lens	
		Enclosure, Main, Center - Machined Aluminum Unibody	
Elpida	B8164B3PM-1D-F	SDRAM - Mobile DDR2, 1GB, PoP	Hynix, and Samsung are other likely sources
Murata		BT / WLAN Module - Contains BCM4334, BT v4.0, IEEE802.11 a/b/g/n	
Qualcomm	RTR8600	RF Transceiver - Multi-Band, GSM/EDGE/HSPA+/LTE, 65nm RF CMOS	Same RF transceiver in the latest iPad
Dialog Semiconductor		Power Management IC	PMIC for A8
Qualcomm	PM8018	Power Management IC	PMIC for MDM9815
Sony	US373291H	Battery - Li-Polymer, 3.8V, 1430mAh	ATL is another supplier in A1429 (Verizon & Sprint version) we torn down
		Secondary Camera Module - 1.2MP, BSI CMOS (TBD), Fixed Lens	
Broadcom	BCM5976	Touchscreen Controller	
Texas Instruments	CDPF3246	Touchscreen Controller (TBD)	
ST Microelectronics	L3G4200D	Gyroscope - 3-Axis, Digital	
Cirrus Logic	CS42L65	Audio Codec	This version is approximately 3 times the die size of the previous version in the 4S.
Avago	AFEM7814	PAM - w/ Duplexer	AFEM7813 in A1429 (Verizon & Sprint Version)
Skyworks	SKY77487-18	PAM	SKY77491-158 in A1429 (Verizon & Sprint Version)
Skyworks	SKY77352-15	PAM - Quad-Band GSM/EDGE	Same in A1429 (Verizon & Sprint Version)
NXP	CBTL1808	Interface IC - for Display	
Cirrus Logic	CS35L19	Audio Power Amplifier - w/ Signal Processing	
AKM Semiconductor	AK8983C	Electronic Compass - 3-Axis, w/ Built-In ADC & 14/16-Bit Selectable Digital Output	
Skyworks	SKY77729-4	PAM - LTE Band 17	Avago A5813 LTE Band 13 PAM in A1429 (Verizon & Sprint Version)
ST Microelectronics		Accelerometer	
Murata	SWUA127	FEM	SWUA147 in A1429 (Verizon & Sprint Version)
Skyworks	SKY70631	Antenna Switch Module	Same in A1429 (Verizon & Sprint Version)
RF Micro	RF1102	RF Switch	Same in A1429 (Verizon & Sprint Version)

Source: IHS iSuppli Research, September 2012

# The iPhone Cost Structure



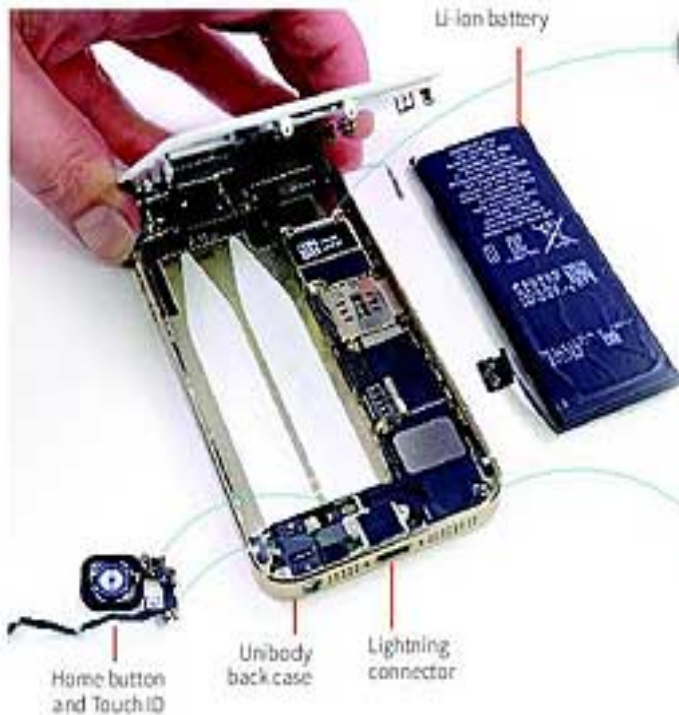
Sources: BOM estimates from iSupply, others are my estimates



# iPhone 5S Teardown

## Deconstructing Apple's iPhone 5S

### Key components



### Back of logic board



### Front of logic board



Source: iFixit

<http://www.ifixit.com/Teardown/iPhone+5s+Teardown/17383/1>

# Shrinkage Technology: (battery, cover, and in-cell touch panel)

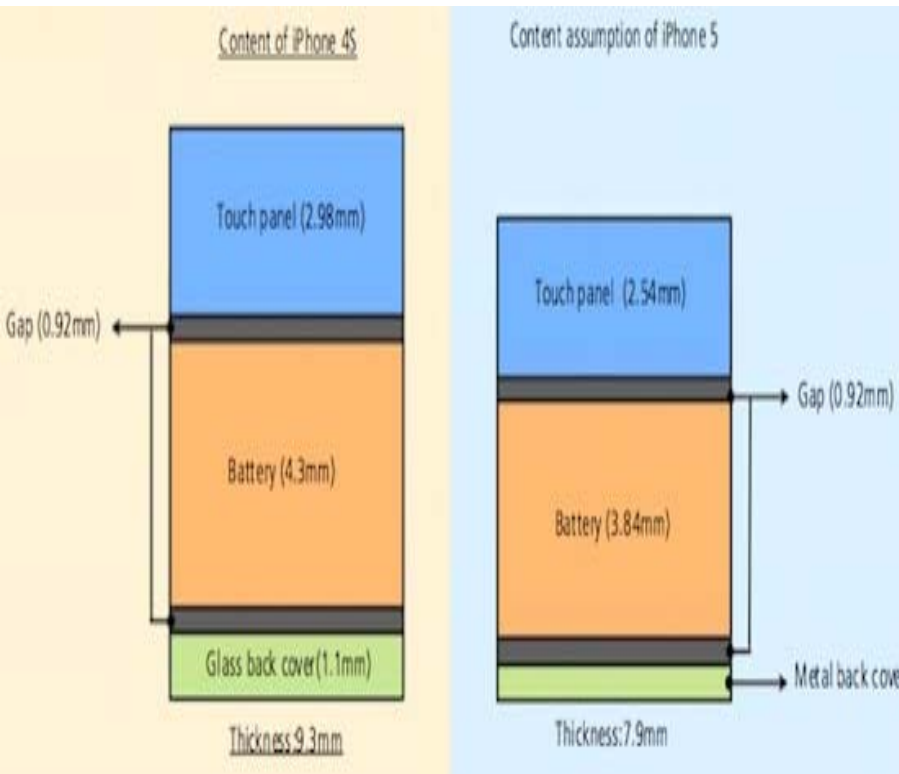
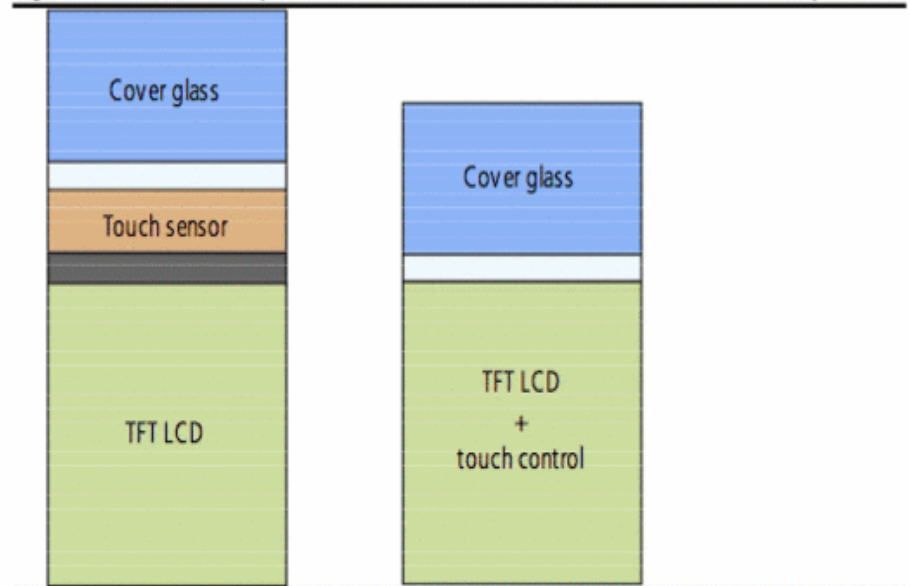


Figure 1: Structural comparison of iPhone 4S G/G and iPhone 5 in-cell touch panels



Beneficiaries of in-cell	Strengths
TMD, Sharp, LGD	These firms integrate in-cell touch in panel solution, replacing conventional touch panel suppliers (e.g. TPK), and gain added value from bonding cover glass and
Sony Chemical	Firm's OCR (Optical Clear Resin) will be applied to iPhone 5's in-cell bonding, replacing OCA (Optically Clear Adhesive).

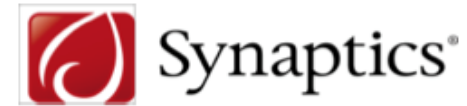
Source: KGI Research estimates



# Visual Advantage of In-cell Technology

## Display Integration

*Enhanced Optical Quality, Thinner, Cheaper*

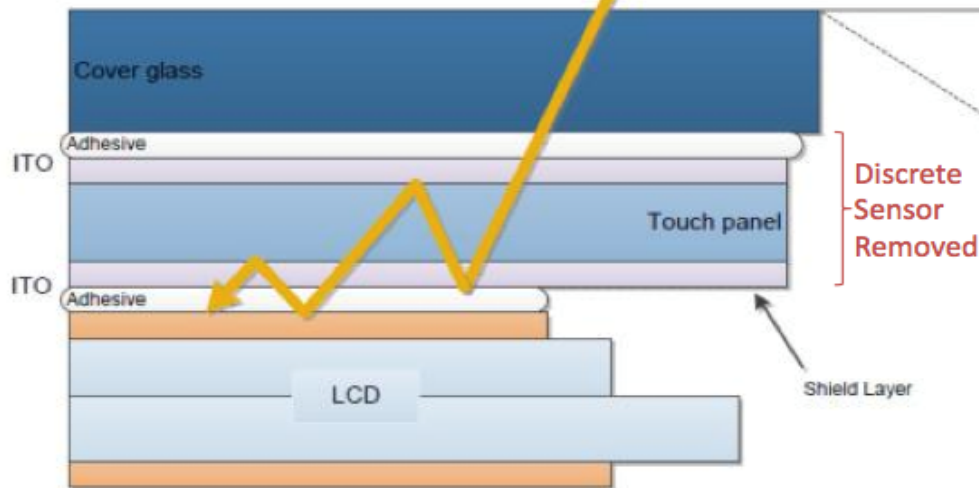


## Non-in-cell

### Comparison of Thickness with Earlier Modules

Existing external touch panel module

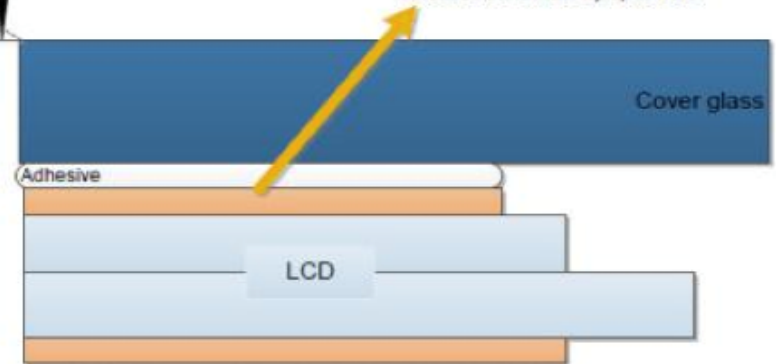
A high amount of interfacial reflection



## In-Cell

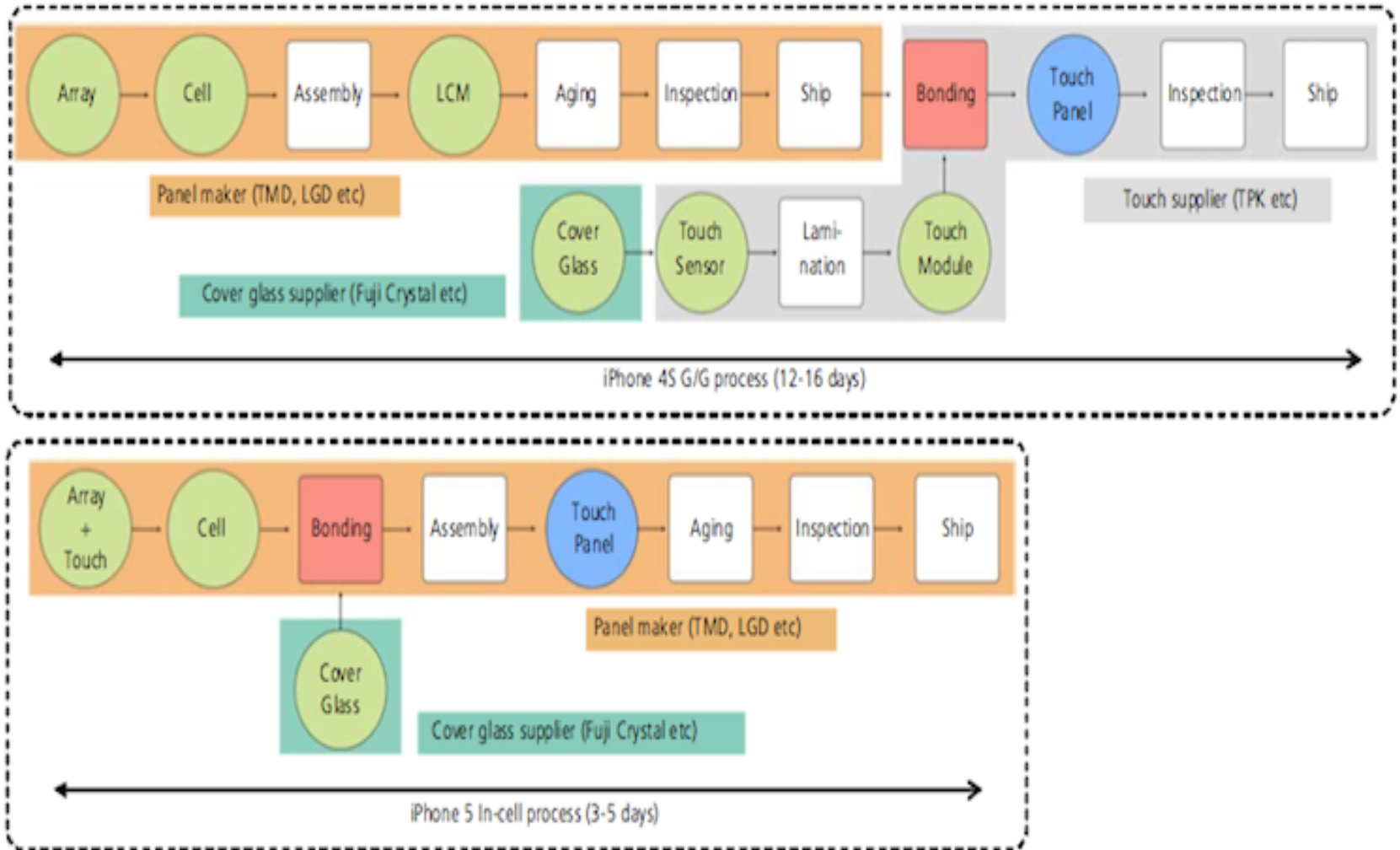
0.4 to 0.9 mm

Elimination of an unnecessary interface increases transmitter by up to 10%



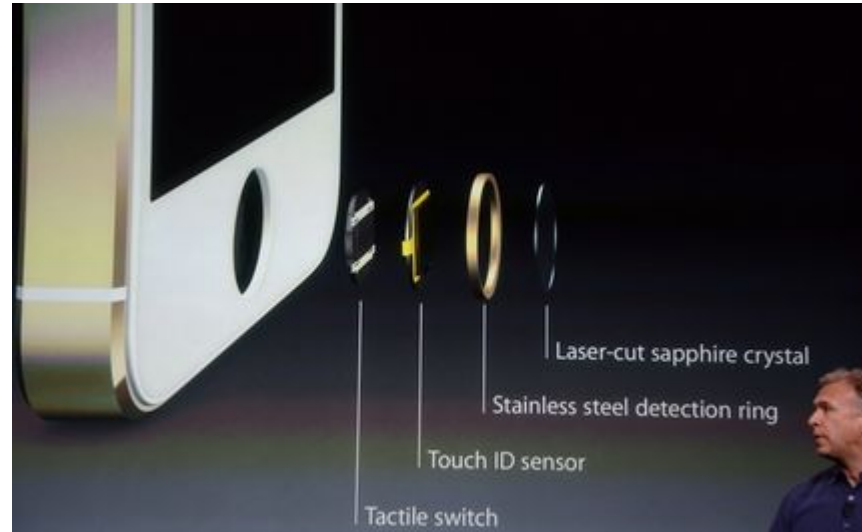
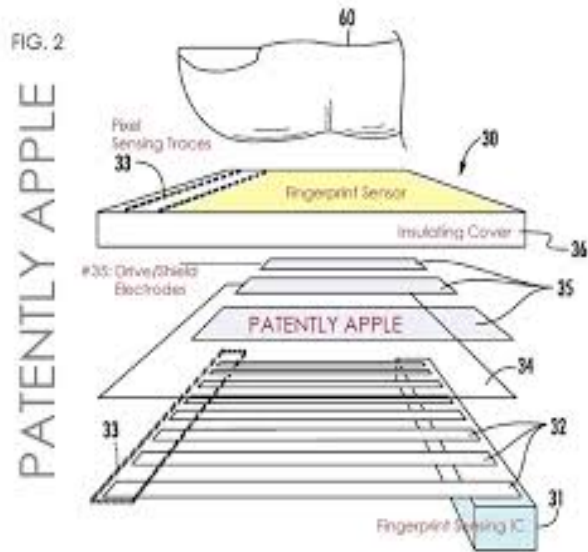
**Brightness increased 10%**  
**Up to 1 mm Thinner**

Figure 6: In-cell touch makes iPhone touch panel supply chain leaner



# Fingerprint Sensor

<http://www.youtube.com/watch?v=n9TxTStyha8>



# Real or Virtual Teardown of Smartphone

- Perform a physical teardown with your own cost or do it virtually with the following links:

[http://www.youtube.com/watch?v=TzuRDujwb\\_A](http://www.youtube.com/watch?v=TzuRDujwb_A)

<http://www.youtube.com/watch?v=nIUQfXwvQLc&feature=related>

<http://www.youtube.com/watch?v=UV8QsM7TTyc>





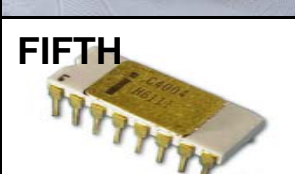
<http://www.ifixit.com/Teardown/iPhone-5-Teardown/10525/1>

<http://www.ifixit.com/Teardown/iPhone+5s+Teardown/17383/1>

Overall Economical Scale of iPhone 5		iPhone 5		
Components/ Hardware Elements	iPhone 5 Hardware Comments	16GB	32GB	64GB
Pricing without Contract		\$649.00	\$749.00	\$847.00
Total BOM Cost		\$198.85	\$209.25	\$230.05
Manufacturing Cost		\$8.00	\$8.00	\$8.00
BOM + Manufacturing		\$206.85	\$217.25	\$238.05
Malor Cost Drivers				
Memory				
NAND Flash		\$10.40	\$20.80	\$41.60
DRAM	IGByte LPDDR2	\$10.45	\$10.45	\$10.45
Display & Touchscreen		\$44.00	\$44.00	\$44.00
Processor	A6 Processor	\$17.50	\$17.50	\$17.50
Camera(s)	8 Megapixel(Back) + 1. 2 Megapixel(Front)	\$18.00	\$18.00	\$18.00
Wireless Section - BB/RF/PA	Qualcomm MDM9615 + RTR8600 + Front End	\$34.00	\$34.00	\$34.00
User Interface & Sensors		\$6.50	\$6.50	\$6.50
BT/WLAN	BTv4.0 + Dual-Band Wireless-N	\$5.00	\$5.00	\$5.00
Power Management		\$8.50	\$8.50	\$8.50
Battery	Assumed 1800mAh	\$4.50	\$4.50	\$4.50
Mechanical/Electro-Mechanical		\$33.00	\$33.00	\$33.00
Box Contents		\$7.00	\$7.00	\$7.00
Average Selling Price (ASP)			\$748.33	
Gross Profit Margin			70.51%	
Hardware Sales Unit Total (2012-2014) est. 263M			1.97E+11	(\$197 billion)
Accessory Sales est. 50% of ASP			9.84E+10	(\$75 billion)
Operator Service Contract 2 years with US\$120/month			7.57E+11	(\$757 billion)
Operator Subsidized Loss (ass. 2-year contract price US\$300)			-1.18E+11	(\$118 billion)
Others (Financial Transaction, Apps Subscription, Location Service, Legals, Patents, R/D, Marketing, Ads etc.) ass. ?				TBD
<b>Grand Total Economy</b>		<b>9.35E+11</b>	<b>(\$935 billion and up)</b>	



# Five Successive Technological Revolutions, 1770s to 2000s

<i>Technological revolution</i>	<i>Popular name for the period</i>	<i>Core country or countries</i>	<i>Big-bang initiating the revolution</i>	Year
<b>FIRST</b> 	The 'Industrial Revolution'	Britain	Arkwright's mill opens in Cromford	1771
<b>SECOND</b> 	Age of Steam and Railways	Britain (spreading to Continent and USA)	Test of the 'Rocket' steam engine for the Liverpool-Manchester railway	1829
<b>THIRD</b> 	Age of Steel, Electricity and Heavy Engineering	USA and Germany forging ahead and overtaking Britain	The Carnegie Bessemer steel plant opens in Pittsburgh, Pennsylvania	1875
<b>FOURTH</b> 	Age of Oil, the Automobile and Mass Production	USA (with Germany at first vying for world leadership), later spreading to Europe	First Model-T comes out of the Ford plant in Detroit, Michigan	1908
<b>FIFTH</b> 	Age of Information, Computing, and Telecommunications	USA (spreading to Europe and Asia)	The Intel microprocessor is announced in Santa Clara, California	1971

# Age of ICT Revolution

- 1965: Uncanny Moor's Law "The number of transistors that can be fit on a computer chip will double every 1-2 years" published
- 1971: 1<sup>st</sup>. CPU announced by Intel
- 1972: 1<sup>st</sup>. PC Xerox Alto
- 1976: Apple I (The Apple I was Apple's first product, and to finance its creation, Jobs sold his only means of transportation, a VW van and Wozniak sold his HP-65 calculator for \$500)
- 1981: 1<sup>st</sup>. IBM PC Launched
- 1981: MS-DOS 1.0. This was Microsoft's first operating system, and it also became the first widely used operating system for the IBM PC and its clones.

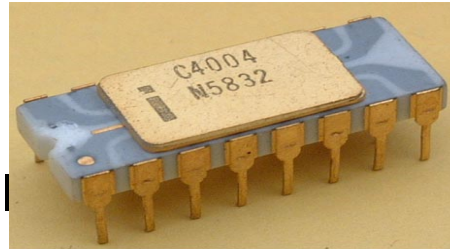


Image courtesy of CPU-Zone.com. Used with permission.



	Components	Device	Network	Software	Applications
1980s & before	Semiconductors Memory Storage	Computers	TCP/IP		
1990s	Semiconductor Foundry Service	Cellular Phones	Private Networks / LAN	Operating systems / GUI	
		Personal Computers	Telecoms / PSTN		
Early 2000s	Fabless	Mobile computing / Laptops	Public Networks / Internet	Browsers	BPO(business process outsourcing)
			Cellular	Enterprise software	
		Mobile phones			Internet Search
		Consumer electronics			Open-source / GPL(general public license)
Late 2000s	SOC(system-on-chip)	SmartPhones	Mobile Internet	SaaS(software as a service)	Web 2.0 / Social media
			3G		
		3D	Wi-Fi	Cloud Computing	Virtual Reality

	Components	Device	Network	Software	Applications
1980s & before	Competing against better and cheaper: Intel and Samsung Electronics	IBM	TCP/IP		
1990s	TSMC, UMC, Chartered, etc.	Competitive Advantage of a Firm within a Country: Finland and Nokia	Private Networks / LAN	Evolution of Microsoft's Business Model	
		Mapping out the Global PC Value Chain	Telecoms / PSTN		Outsourcing for the World: Taiwan, China and India
Early 2000s	Fabless	WINTEL	Competitive Advantage of High-tech Nations: Taiwan, S. Korea, Singapore and Israel	Browsers	BPO (business process outsourcing)
		Laptops	Cellular	Enterprise software	Rise of Global Internet Giants: Google and Tencent, Alibaba
		Mobile phones		Open-source / GPL (general public license)	
	GlobalFoundries, Samsung	Consumer Electronics: Then and Now Sony, Samsung and Apple			
Late 2000s	SOC (system-on-chip)	Smartphones	Mobile Internet	SaaS (software as a service)	Web20 Development of Free, No Business Model Service: Skype, Youtube, Facebook
			3G	Development of the IaaS, PaaS, SaaS Industries	Wikipedia, Twitter, Flickr, LinkedIn etc.
		3D	Wi-Fi		



	Components	Device	Network	AI Robot	Software	Applications
Emerging @ 2010 & before	Memrister, SCM (storage class memory; RRAM, PCM etc.),	Tablet Computing Device, Soft Display, Light Field Camera(hand held)	IPV6 and 4G		<a href="#">Cloud Computing , Cloud Service</a>	IBM 2 <sup>nd</sup> . Life
2010s	3DIC, Biochip, LoC	iPad, Kindle, Smart Phone, 3D-TV glasses-less, 3D Printer, Google Glass	Ubiquitous 4G and IPV6 Devices, IoT	Siri-iPhone and alikes	Augmented Reality	iCloud, Amazon, Blue Cloud,
2020s	TeraHertz Components, Organic Components, Graphene	Quantum Computing, Analog Computing, Optical Computing	Sensor Networking,	Avatar(web)	Contextual Search, Analytic Search Engine, Virtual Reality	Semantic Web, Real-time Predictive Analytics,
2030s	Nanomachine	BioComputing,		Avatar(physical)		

# Future Industry Trend

- Coffee
- Mobile Device

# Coffee Industry Trend

- Biotechnology
- Decaffeine waste treatment
- Grinding and Brewing

Evidence of caffeine in mussels they tested near the Oregon coast



<http://www.loe.org/shows/segments.html?programID=12-P13-00032&segmentID=2>



# Mobile Device Trend

- Your view!

	Components	Device	Network	AI Robot	Software	Applications
Emerging @ 2010 & before	Memrister, SCM (storage class memory; RRAM, PCM etc.),	Tablet Computing Device, Soft Display, Light Field Camera(hand held)	IPV6 and 4G		<a href="#">Cloud Computing , Cloud Service</a>	IBM 2 <sup>nd</sup> . Life
2010s	3DIC, Biochip, LoC	iPad, Kindle, Smart Phone, 3D-TV glasses-less, 3D Printer, Google Glass, Flexible and Wearable Devices	Ubiquitous 4G and IPV6 Devices, IoT	Siri-iPhone and alike	Augmented Reality	iCloud, Amazon, Blue Cloud,
2020s	TeraHertz Components, Organic Components, Graphene	Quantum Computing, Analog Computing, Optical Computing	Sensor Networking,	Avatar(web)	Contextual Search, Analytic Search Engine, Virtual Reality	Semantic Web, Real-time Predictive Analytics,
2030s	Nanomachine	BioComputing,		Avatar(physical)		

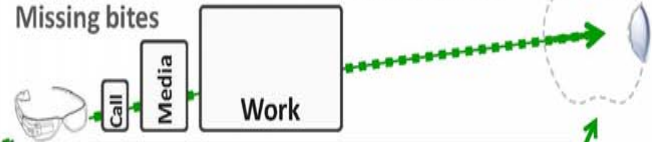
What's Next!

# Missing bite

## Reality/Knowledge/Media Device Evolution

Near future devices 2012 – 2017: "Mobile Devices get drama, beauty and meaning." Juhani Risku

Risku  
Wisdom/Drama/Beauty Machine  
**Interest Machine = iMachine**  
Juhani Risku 2012  
The Missing Bite Engine



Next Abstraction

VR

AI + AR

Media

Applications

Early Internet

Data delivery

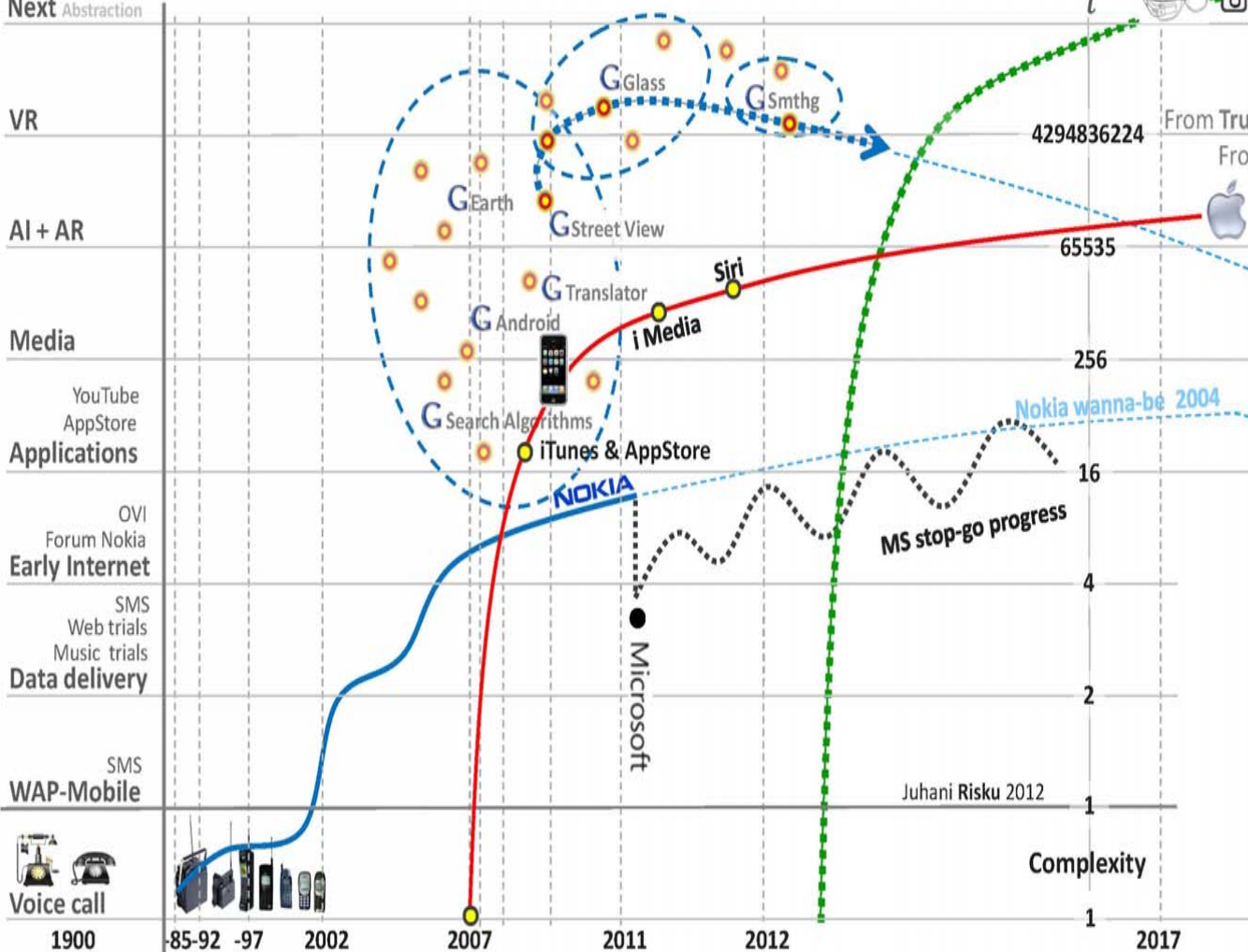
WAP-Mobile

Voice call

1900

85-92 -97 2002 2007 2011 2012 2017

Fixed Mobile



From Meaning to Love  
From Drama and Beauty to Meaning  
From Truth and Wisdom to Drama and Beauty  
From Knowledge to Truth and Wisdom  
From Information to Knowledge  
From Data to Information

Trend

Combination  
Yahoo  
Amazon  
Samsung, HTC...  
Sony Oracle IBM...

VR  
AI + AR  
Media  
Applications  
Internet  
Data delivery  
Mobile  
Voice call

Juhani Risku 2012