
Apple –The Global Supply Chain

Dr. Jack M. Wilson

Distinguished Professor of Higher Education, Emerging Technologies, and Innovation



Value Chain

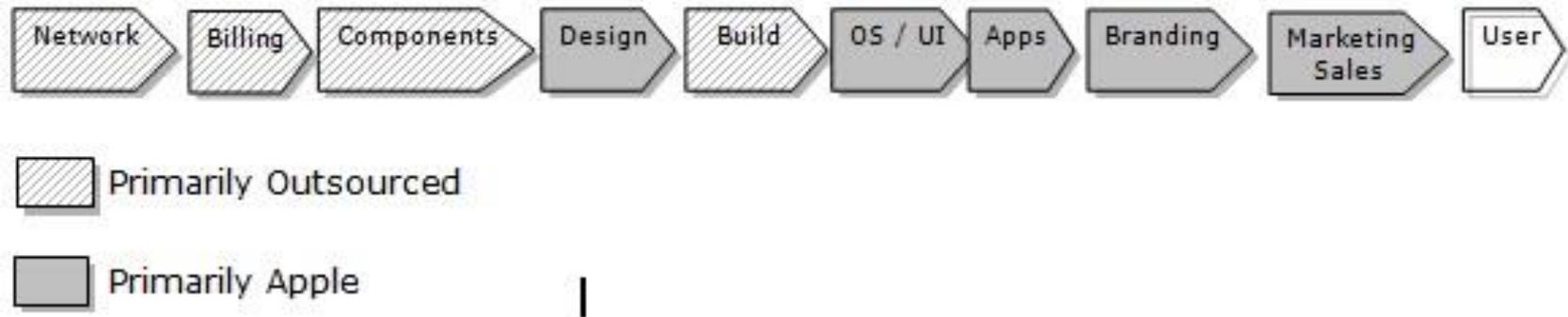
- A string of activities that add (quantified) value as the product moves to market.
 - Primary Activities
 - Inbound logistics (from supplier to firm)->
 - Operations (creating/manufacturing the product)->
 - Outbound Logistics moving the product to the market->
 - Marketing and Sales->
 - Service
 - Then there are support activities
 - Firm Infrastructure
 - HR
 - Tech. Development
 - Resource procurement/purchasing

Apple iPhone Value Chain

- Apple took a look at their entire value chain and decided which of these to do themselves and which they would contract to others.
 - *Simon Reading, Bernt Wahl, Hannes Hesse, Chris Volz, Johnson Nguyen*
 - people.ischool.berkeley.edu/~hal/Courses/.../Tech/.../H-iphone.doc

C. Value Chain

The value chain below illustrates the context in which Apple delivers value to the customer with the iPhone:

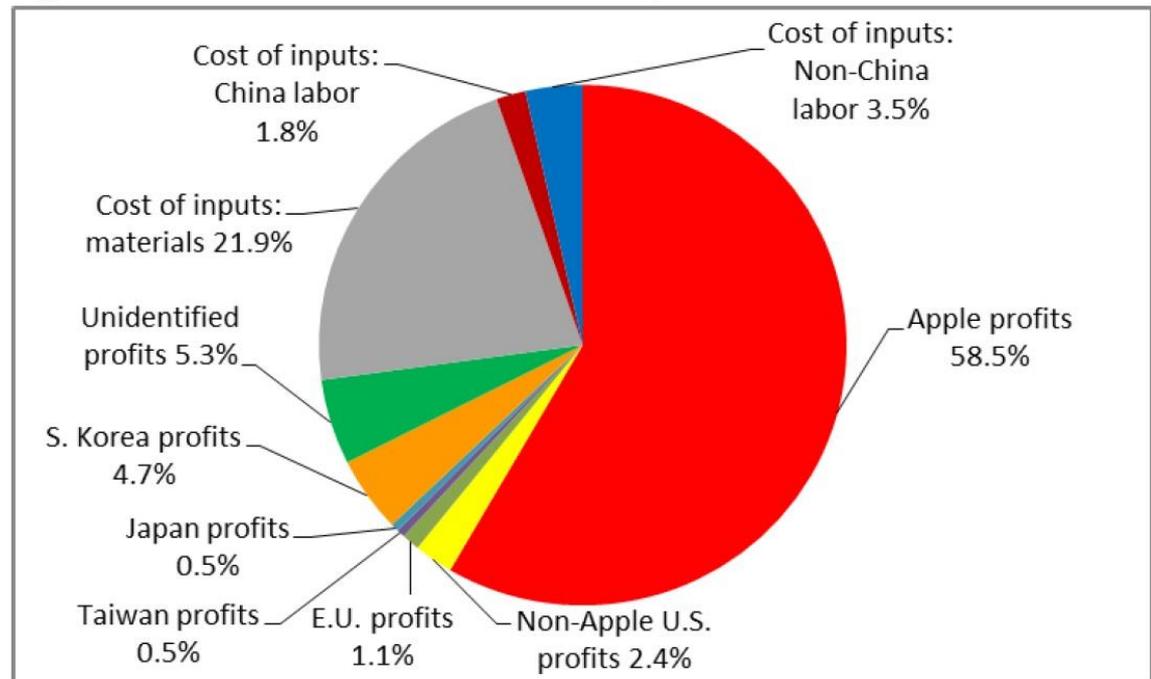


Capturing Value in Global Networks: Apple's iPad and iPhone

How does that value chain translate into the share of the value?

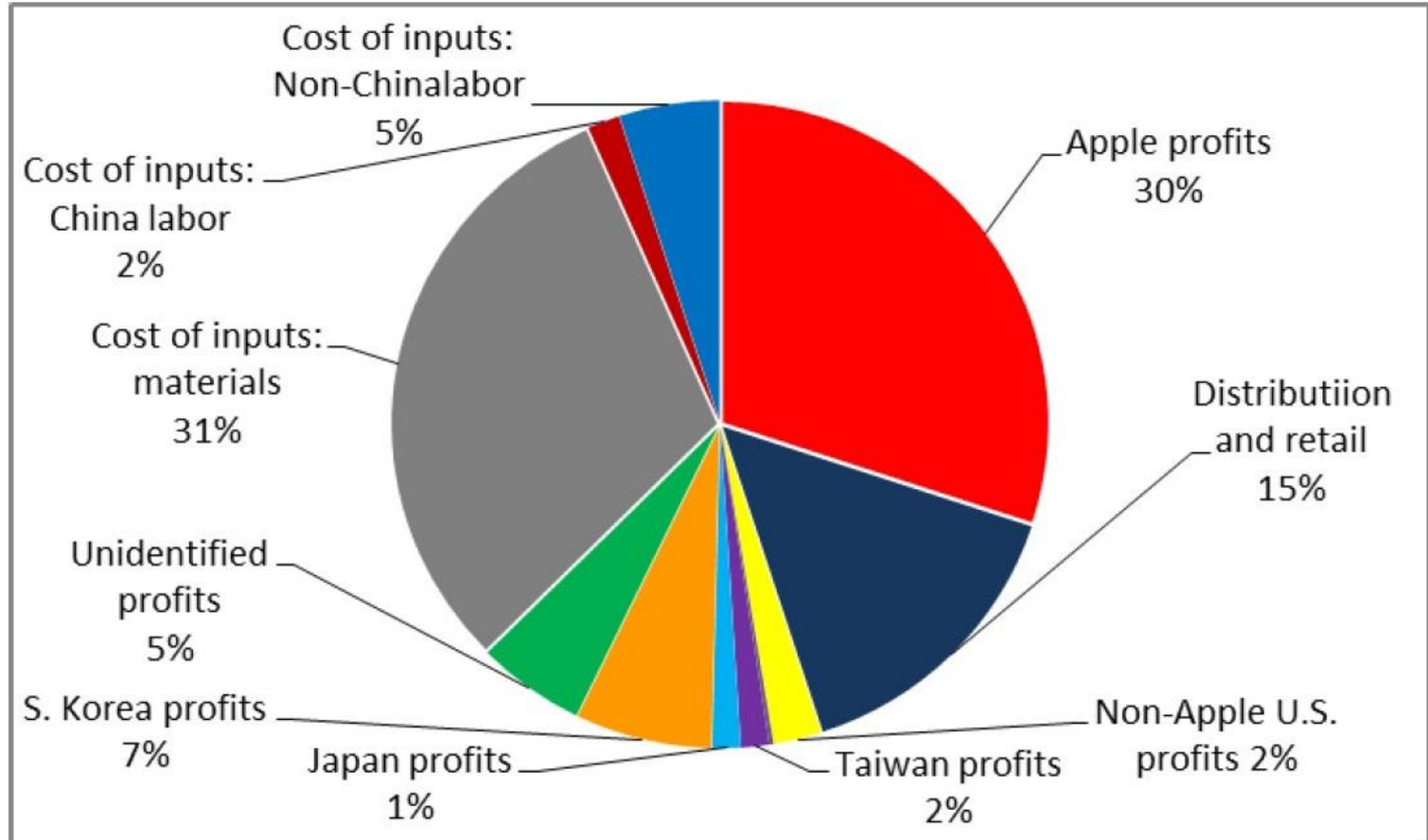
- Kenneth L. Kraemer, Greg Linden, and Jason Dedrick¹
- University of California, Irvine, University of California, Berkeley and Syracuse University
- » http://pcic.merage.uci.edu/papers/2011/Value_iPad_iPhone.pdf

Figure 1. Distribution of value for iPhone, 2010



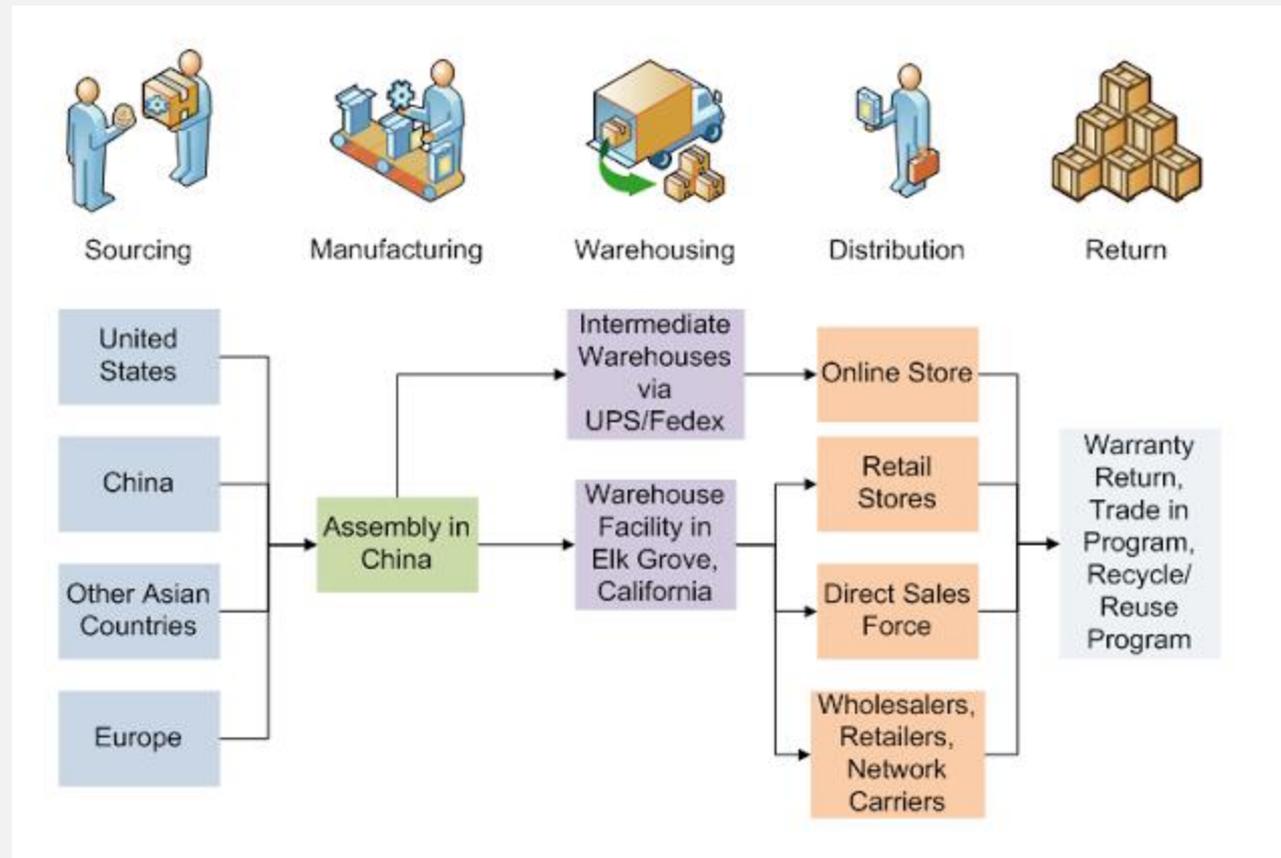
Same authors of NSF study -iPad

Figure 2. Distribution of value for iPad



• Supply chain

- <http://www.supplychainopz.com/2013/01/is-apple-supply-chain-really-no-1-case.html>



Apple Global Suppliers

APPLE AROUND THE WORLD

Location and number of Apple suppliers per country



349		China	11		Vietnam	2		Brazil
139		Japan	7		Mexico	2		Costa Rica
60		USA	6		Indonesia	2		Austria
42		Taiwan	6		Israel	2		Netherlands
32		South Korea	5		France	1		Canada
21		Malaysia	5		Czech Republic	1		Portugal
24		Philippines	3		Belgium	1		Spain
21		Thailand	3		Italy	1		Morocco
17		Singapore	3		Ireland	1		Puerto Rico
13		Germany	3		UK	1		Malta
						1		Hungary

The Apple Supply Chain



<http://betanews.com/2014/09/23/the-global-supply-chain-behind-the-iphone-6/>

Cost Comparison for iPhone 6

\$4

Extra cost if iPhones are assembled in the U.S. Apple's manufacturing strategy is motivated by scalability and supply chain risk rather than cost

**\$600
Million**

Additional labor cost for reshoring iPhone production in the US

35%

Tax on profits Apple would have to pay for US-made iPhones versus 2% on overseas profits

"If Apple brought iPhone manufacturing to the US it would cost them **\$4.2 Billion**"

- Tim Worstall, FORBES

<http://betanews.com/2014/09/23/the-global-supply-chain-behind-the-iphone-6/>

US Suppliers

iPhone 6 Boosts US Production

GT Advanced Technology (Mesa, AZ)



Product: sapphire crystal components

Has ordered additional 420 sapphire crystal furnace units to bump up production by 84 to 94 million screencovers.

Samsung (Austin, TX)



Product: A series chips

Despite strong competition from TSMC of Taiwan, Samsung is said to be manufacturing A8 in its US plant for iPhone 6S on top of its A9 plan.

GlobalFoundries (Malta, NY)



Product: A series chips

The company is Samsung's partner to produce A chips possibly for iPhone 6S in 2015, expanding its Fab 8 facility in its New York plant.

<http://betanews.com/2014/09/23/the-global-supply-chain-behind-the-iphone-6/>

Companies that Ramped up US Operations for recent iPhones

Avago Technologies (Fort Collins, CO)
Product: RF chips
Expanded its US capacity with \$130 million worth of equipment

Texas Instruments (Richardson, TX)
Ramped up production at its chip facilities, including in Richardson.

Fairchild Semiconductor (San Jose, CA)
Product: chips
Wafer plants in the US operating at full capacity

Maxim Integrated (San Jose, CA)
Product: chips
Started last year a multi-year investment in its American facilities.

CORNING
Coming out?
Coming (Harrodsburg KY), makers of Gorilla Glass for Apple devices including previous iPhones, bashed sapphire as 10x more expensive and 1.8 times heavier.

Initially rumored to feature a sapphire crystal cover, iPhone 6 still uses glass but Apple isn't confirming who's the supplier.



iOS 8

Biggest iOS release ever

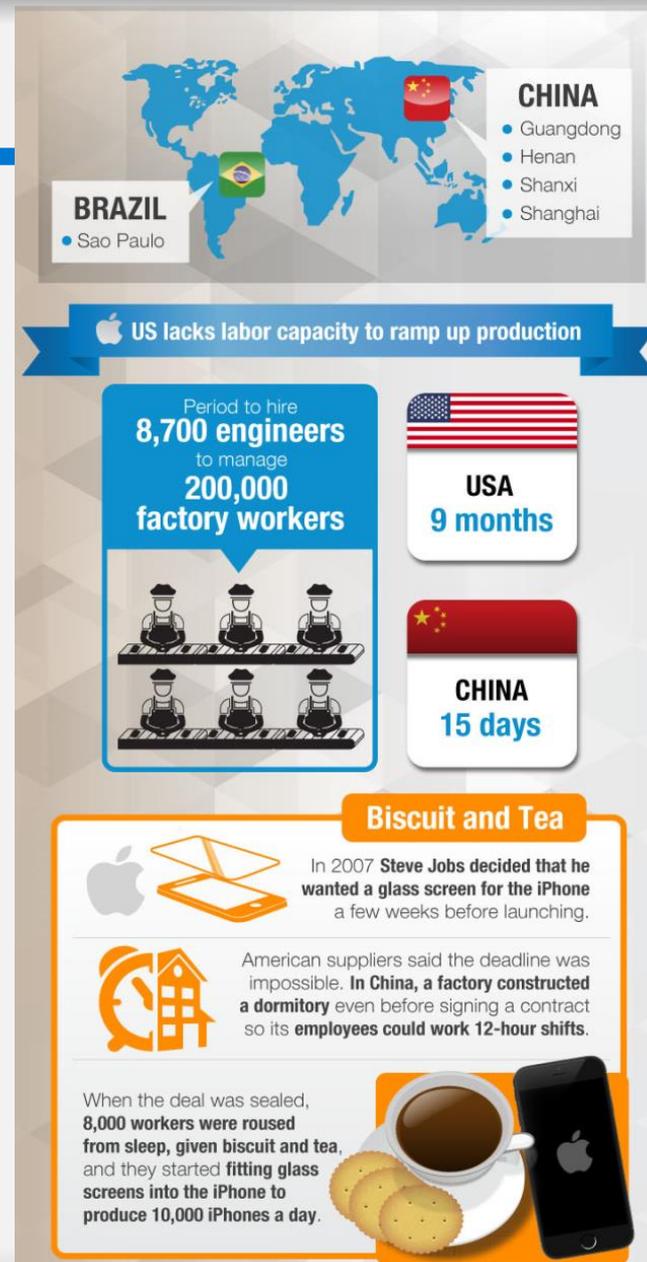
Touted the world's most advanced mobile operating system, iOS 8 is developed by the Cupertino team. It's the first iOS without long-time Apple designer Greg Christie who had a falling out with fellow designer Jony Ive last year over iOS 7.

Could the US do it?

Time to hire 8,700 engineers
and to manage 200,000
factory workers?

US - 9 months

China – 15 Days



<http://betanews.com/2014/09/23/the-global-supply-chain-behind-the-iphone-6/>

Apple Supply Chain

- <http://www.usanfranonline.com/resources/supply-chain-management/apples-process-improvements-make-it-a-global-supply-chain-leader/#.VWtqSqTJBhE>
- “Of the 18 assembly locations, 14 are located in China, one in Brazil, one in California and one in Texas. Apple also owns a Mac assembly plant in Cork, Ireland.”
- There are risks:
 - Global economy could affect the Company.
 - Some re-sellers may also distribute products from competing manufacturers.
 - Inventories can become obsolete or exceed anticipated demand.
 - Some components are currently obtained from single or limited sources.
 - Some custom components are not common to the rest of the industries.
 - Ability to obtain components in sufficient quantities is important.
 - Supply chain disruption such as natural and man-made disasters can be serious.
 - Company depends on logistical services provided by outsourcing partners.
 - Company also relies on its partners to adhere to supplier code of conduct.

Apple supply chain

- Apple's wild success with unibody construction for all models of the MacBook appears to be having a negative effect on the competition in more than just reduced sales -- the other vendors can't get their hands on the CNC (computer numerical control) lathes that are required to make ultra thin magnesium-aluminum shells to encase the electronics of Intel's UltraBook design guideline.
-
- According to Taiwan-based electronics industry site Digitimes, Catcher Technology and Foxconn Technology both have more than 10,000 of the expensive CNC lathes used to make notebook chassis. These two companies are major suppliers to Apple, which means that companies wishing to make metal UltraBooks have to compete for capacity on those lathes. That's a hindrance to high-capacity production, so many manufacturers are choosing a different material.
 - <http://www.tuaw.com/2011/08/04/apples-hold-on-metal-chassis-supply-chain-hinders-competition/>

Global Opportunities

- But for Global Entrepreneurs there are great opportunities here too.
- Many entrepreneurs find a profitable niche in the supply chains of large companies.
 - There is risk for them as well. It is like “sleeping with an elephant –every time it rolls over there is a challenge to remain undamaged.”
- “Though Apple under Tim Cook seems a calmer place, getting things wrong can have similarly disastrous fallout - as the executives at GT Advanced Technologies (GTAT), until last year a little-known maker of solar power systems in New Hampshire, found over the past three months.”
 - A \$578m deal signed between Apple and GTAT in November 2013 looked as though it would not only bring sapphire screens to iPhones, but also create thousands of jobs in the US, salving a sore point with legislators critical of Apple’s use of foreign assembly for almost all its products, especially the iPhone and iPad. But it ended in October 2014 with GTAT filing for bankruptcy, hundreds of people put out of work, and GTAT’s chief executive and chief operating officer facing questions about insider dealing after they sold millions of dollars worth of GTAT stock before Apple’s iPhone announcement in September.
 - <http://www.theguardian.com/technology/2014/nov/14/sapphire-gt-advanced--brutal-apple-supply-chain>
- Article in Forbes gives the optimistic outlook:
 - <http://www.forbes.com/sites/timworstall/2014/05/07/explaining-the-economics-of-apples-sapphire-supply-chain/>