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Overview of main findings

High Level Policy Dialogue on Technology and Innovation Policies in the GVC Age

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Carsten Fink
WIPO Chief Economist

Overview

- The rise of global value chains
- What return accrues to intangible capital?
- Case studies
  - Coffee
  - Solar panels
  - Smartphones
- How will global value chains further evolve?

The rise of global value chains

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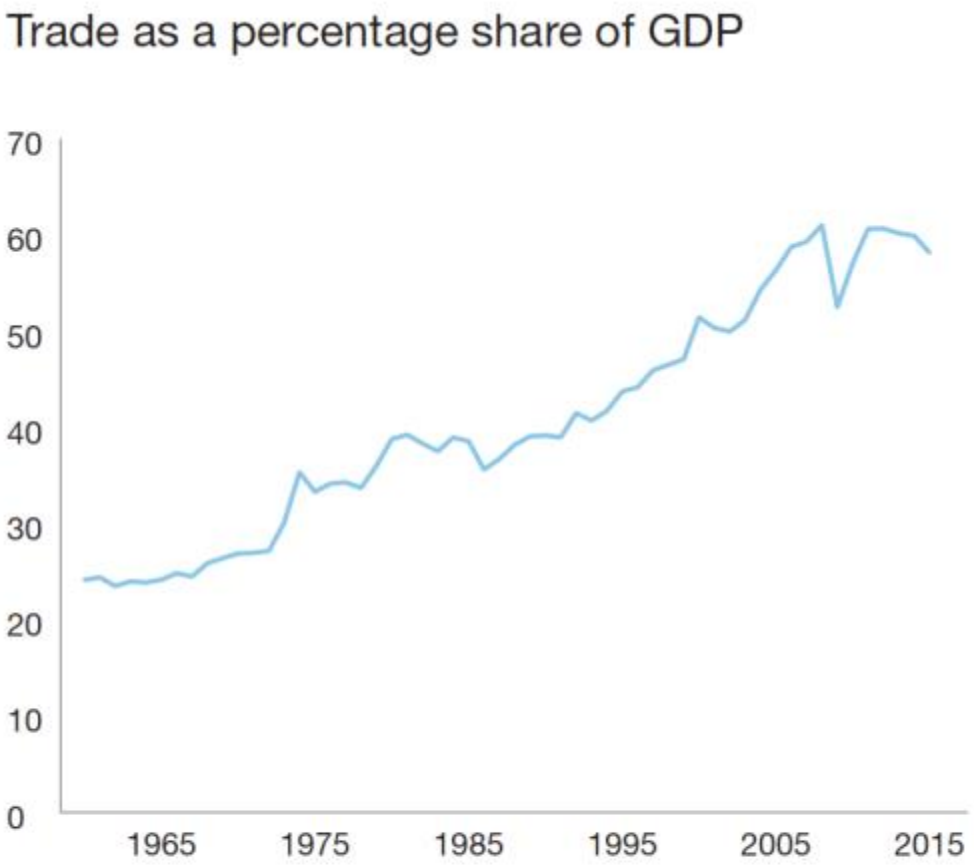
Two waves of globalization

- First wave (18th to early 20th century)
  - Trade in commodities and finished manufactured products
- Second wave (since second half of 20th century)
  - Unbundling of production process and spreading of production locations
  - Key driving forces: falling transport costs, more liberal trade policies and advances in information and communication technologies (ICTs)
  - Trade in intermediary goods within particular industries

World trade growing faster than output



Note: Trade is defined as exports plus imports.

Source: World Bank World Development Indicators.

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What return accrues to intangible capital?

Point of departure: value added

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Point of departure: value added

Inputs
- Purchased domestically
- Imported from abroad

Outputs
- Sold domestically
- Exported abroad

Employs
- Labor
- Tangible capital
- Intangible capital

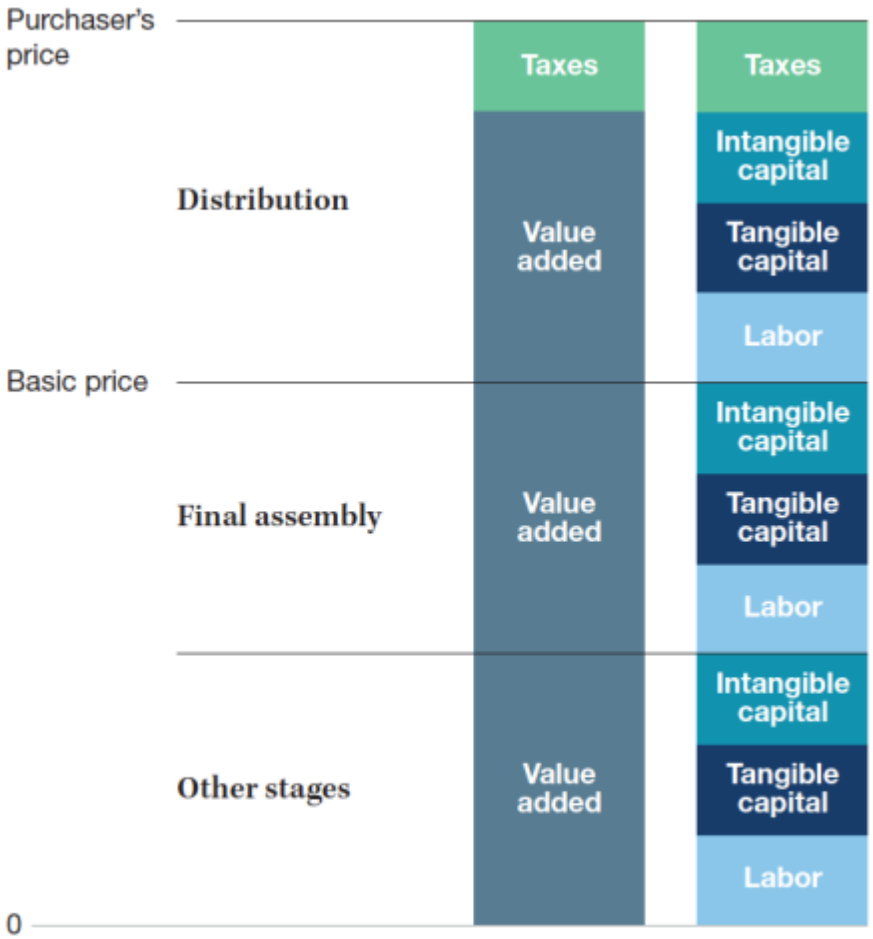
Intangible capital:
- technology
- know how
- design
- branding
- etc.

Value added = value of outputs – value of inputs

Macroeconomic measurement

- Database on value added in global production by Groningen University research team:
  - Based on national accounts, input-output tables and international trade statistics
  - Global coverage
  - 19 manufacturing global value chains, around one-quarter of global output
  - Database entry: value added of a particular economy for a particular product at different production stages

Slicing up global value chains



Source: Chen et al. (2017).

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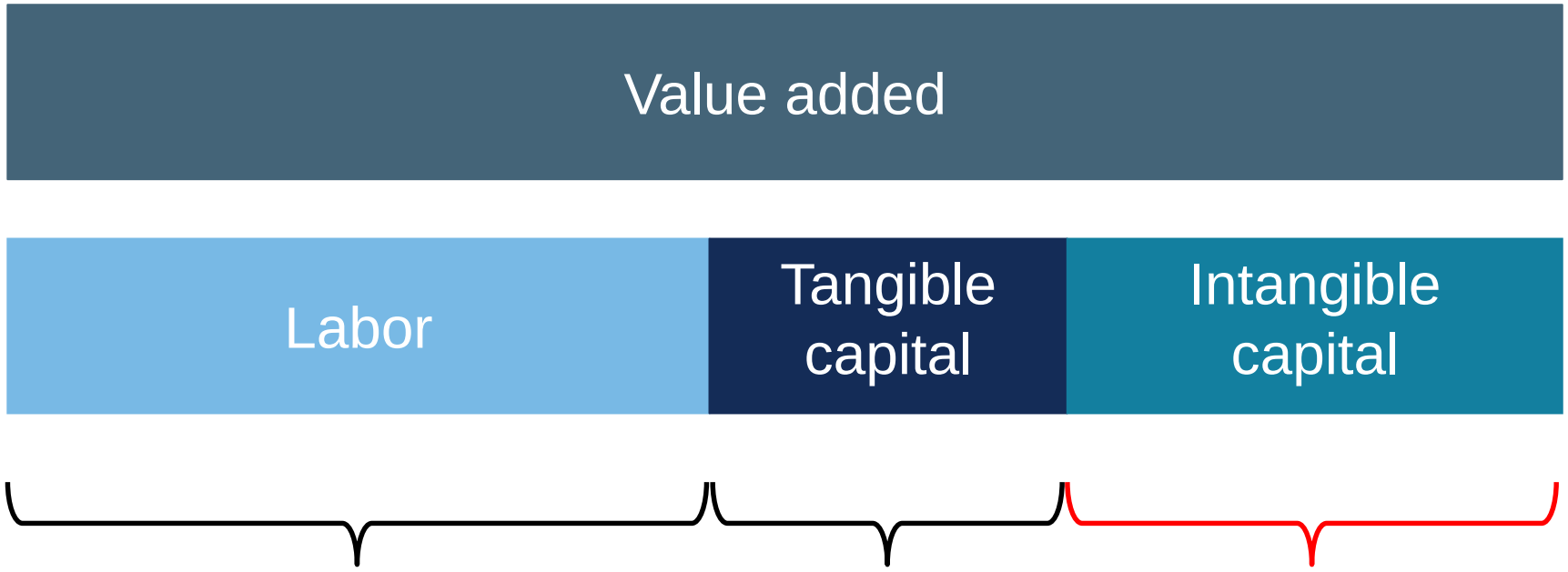
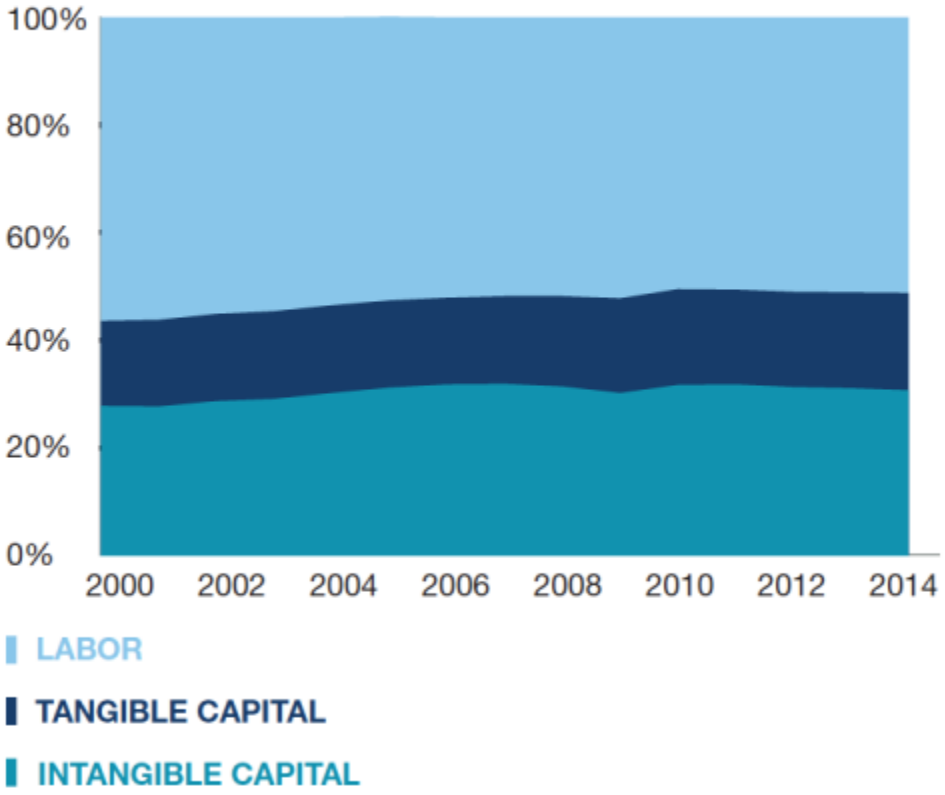
How to measure returns to intangibles?



Intangible capital accounts for one-third

Value added as a percentage of the total value of all products manufactured and sold worldwide



Source: Chen et al. (2017).

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Returns by product group

Income shares by manufacturing product group, 2014

Product group name	Intangible income share (%)	Tangible income share (%)	Labor share (%)	Global output (USD bn)
Food, beverages, and tobacco products	31.0	16.4	52.6	4,926
Motor vehicles and trailers	29.7	19.0	51.3	2,559
Textiles, apparel and leather products	29.9	17.7	52.4	1,974
Other machinery and equipment	27.2	18.8	53.9	1,834
Computer, electronic and optical products	31.3	18.6	50.0	1,452

Product group name	Intangible income share (%)	Global output (USD bn)
Food, beverages, and tobacco products	31.0	4,926
Motor vehicles and trailers	29.7	2,559
Textiles, apparel and leather products	29.9	1,974

Paper products	28.0	20.9	51.1	140
Other non-metallic mineral products	29.7	21.5	48.9	136
Wood products	27.5	20.0	52.5	90
Printing products	27.1	21.2	51.7	64

Source: Chen et al. (2017).

Caveats

- Measurement challenges
- Broad concept of intangible capital
- Difficult to tell which economies harvest returns to intangibles
- Profit-shifting as part of tax minimization strategies:
  - Relies heavily on intangible capital and IP
  - Redistributes value added along the value chain

Coffee: how consumer choices are reshaping the global value chain

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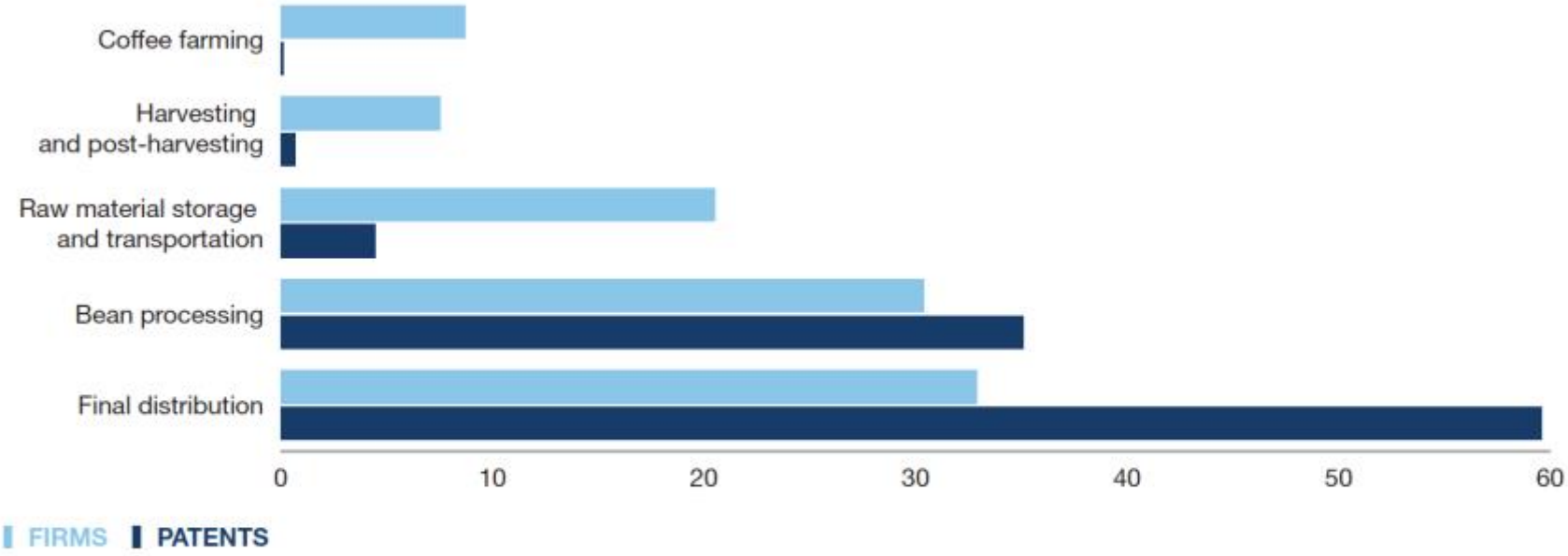
What are the coffee intangibles?

- Brand reputation and image, which allow companies to differentiate their offering from those of their competitors
- Technology associated with coffee farming and with turning coffee into a high-quality and appealing consumer product.

Innovation occurs close to the consumer

Percentage share of firms in the coffee industry and share of coffee-related patent applications by value chain segment



Source: WIPO based on PATSTAT and Ukers (2017); see technical notes. The classification of value chain segments is based on Samper et al. (2017).

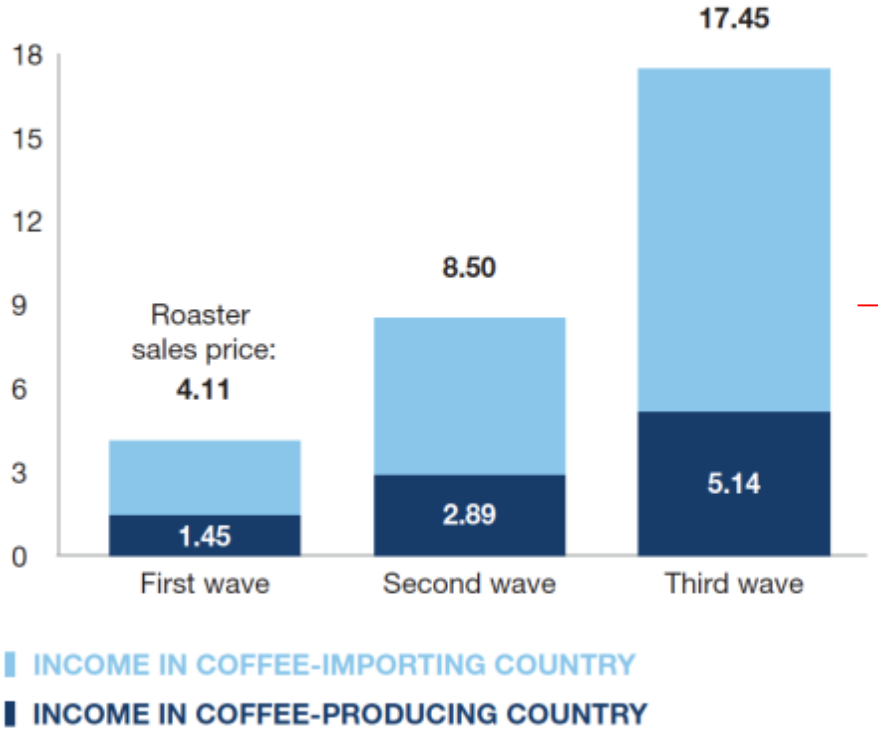
Note: The bars in light blue represent the share of all firms in the coffee industry operating in each particular segment of the value chain. The dark blue bars indicate the share of coffee-related patents attributable to each chain segment. The share of coffee participants for the coffee-farming segment is likely an underestimate as the list of coffee participants retrieved from the Ukers directory only includes registered firms.

Shifting consumer tastes

- First wave: coffee brewed at home
  - Standardized products; competitive market with prices reflecting differences in the quality of blends
- Second wave: coffee in a social setting
  - Coffeehouses offer distinct ambiance to attract consumers, higher quality coffee beans, voluntary sustainability standards
- Third wave: specialty coffee
  - Superior quality; consumers interested in origin of coffee, how it was farmed and how best to brew the beans

Third wave coffee commands highest price

Share of total income from coffee going to participants in producing and importing countries by market segment, 2014



Source: ICO (2014), SCAA (2014) and Wendelboe (2015).

Note: See notes on table 2.3.

Opportunities for coffee farmers to gain better remuneration, partly through own branding activities

Solar panels: technological catch-up and competition in the global value chain

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Innovation shapes competitive dynamics

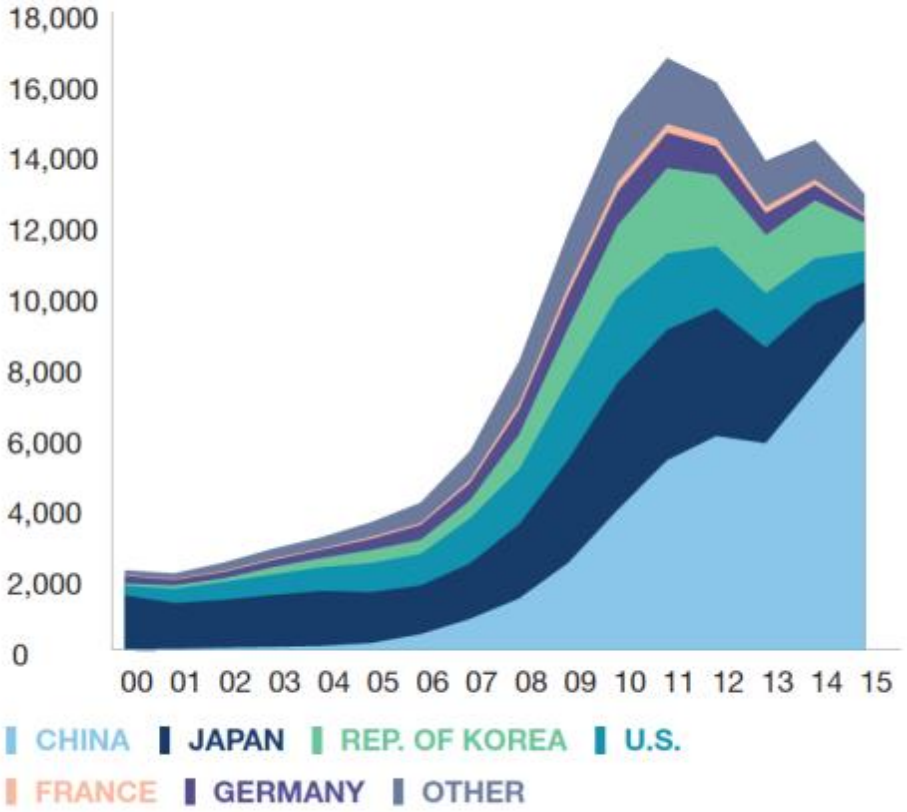
- Intangible capital of value chain participants consists of advanced technology, which often requires specific know-how which is held secret
- Technological progress has led to a dramatic reduction in the price of photovoltaic (PV) modules – by 80 percent between 2008 and 2015 alone
- Chinese companies have come to dominate PV global value chain, resulting in bankruptcies and acquisitions in the traditional manufacturing locations (U.S., Europe, Japan).

How did Chinese producers acquire intangible capital?

- Purchase of state-of-the-art production equipment – initially, from international suppliers
- Inflow of skilled engineers and executives from abroad, brining technological knowledge, capital and professional networks to China

Global decline in PV patenting

First filings of PV-related patents by origin, 2000-2015



Source: WIPO based on PATSTAT; see technical notes.

But: surviving firms in Europe, Japan and U.S. have stepped up their R&D and patenting activities

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Smartphones: what's inside the box?

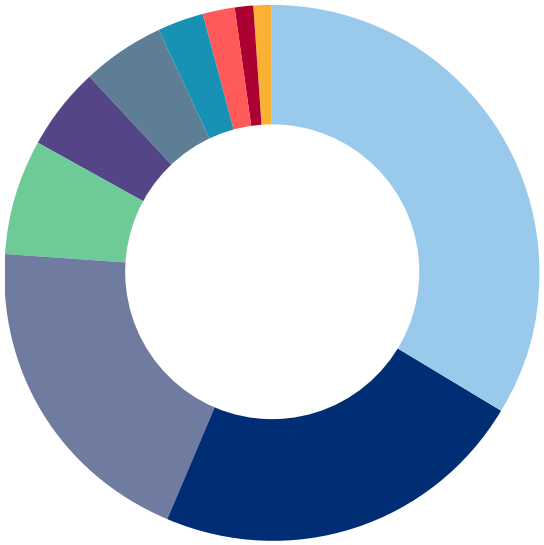
Estimating returns to intangible capital

- Key intangible assets: cutting edge technology, hardware and software design, brand reputation and image
- Case study of three smartphone models offered by Apple, Huawei and Samsung
- Rely on so-called “tear down” reports
- Estimate “value capture” which approximates the return to intangible capital accruing to the lead firms

Value capture: Samsung

Value captured as a percentage of smartphone sale price

- 34% Samsung Electronics
- 23% Cost of materials
- 20% Distribution and retail
- 7% Unidentified material
- 5% IP licenses
- 5% U.S.
- 3% Other Rep. of Korea
- 2% Unidentified labor
- 1% Labor (China)
- 1% Japan



Samsung Galaxy S7

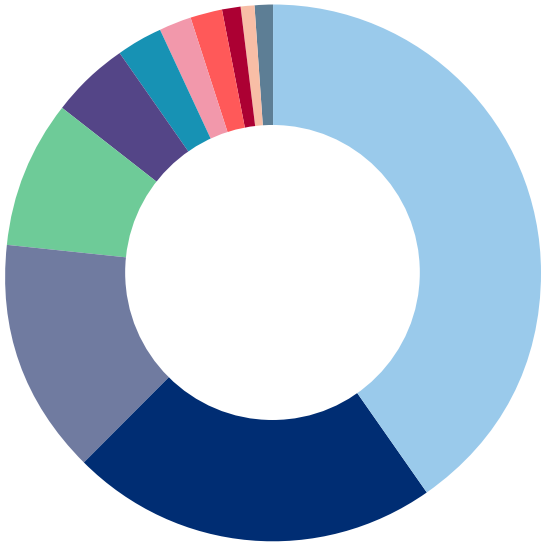
Sources: Dedrick and Kraemer (2017).

Note: The numbers in some charts do not add up to exactly 100% because some numbers have been rounded up.

Value capture: Huawei

Value captured as a percentage of smartphone sale price

- 42% Huawei
- 20% Cost of materials
- 15% Distribution and retail
- 9% Unidentified material
- 5% IP licenses
- 3% Other China
- 2% Rep. of Korea
- 2% Unidentified labor
- 1% Labor (China)
- 1% Taiwan (Province of China)
- 1% U.S.



Huawei P9

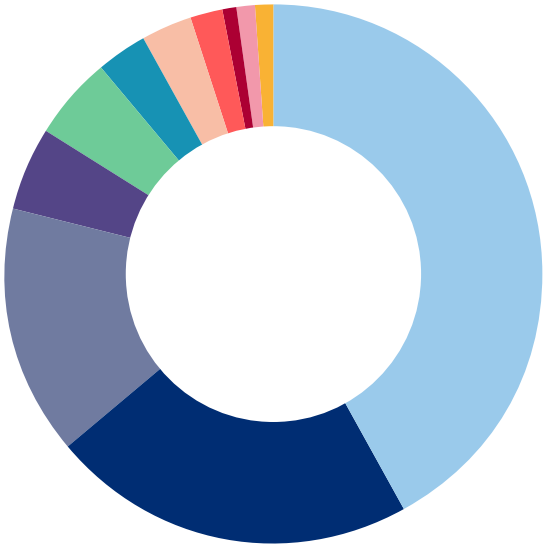
Sources: Dedrick and Kraemer (2017).

Note: The numbers in some charts do not add up to exactly 100% because some numbers have been rounded up.

Value capture: Apple

Value captured as a percentage of smartphone sale price

- 42% Apple
- 22% Cost of materials
- 15% Distribution and retail
- 5% IP licenses
- 5% Unidentified material
- 3% Other U.S.
- 3% Taiwan (Province of China)
- 2% Unidentified labor
- 1% Labor (China)
- 1% Rep. of Korea
- 1% Japan



Apple iPhone 7

Sources: Dedrick and Kraemer (2017).

Note: The numbers in some charts do not add up to exactly 100% because some numbers have been rounded up.

Other value chain participants

- Certain component makers in the U.S. and Asia generate substantial returns to intangible capital – for example, the producer of the iPhone's Gorilla glass (Corning)
- So do providers of patented technologies such as Nokia and Qualcomm
- Contract manufacturers performing assembly realize low margins, but benefit from high-volume activity

The future of global value chains

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Some initial thoughts

- Stagnant trade-to-GDP ratio: are there diminished opportunities for value chains to spread further? If so, is that a problem?
- How will new technologies and business innovations transform global production?
- How should policymakers respond to the shifting demand for workers at different skills levels prompted by transforming global value chains?

Thank you!

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