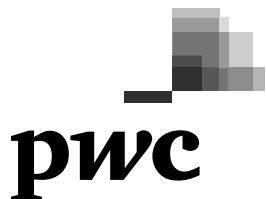


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***2015 Global  
Innovation 1000***

**&**

**Innovation's New World  
Order**



# ***Introduction***

***R&D spending and trends***

***Globalization of R&D***

## ***Study authors***



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***For the 11th year Strategy&, PwC's strategy consulting business, studied innovation trends at the world's 1,000 largest publicly listed corporate R&D spenders***



**2005:  
Money Isn't  
Everything**



**2006:  
Smart Spenders**



**2007:  
The Customer  
Connection**



**2008:  
Beyond Borders**



**2009:  
Profits Down,  
Spending Steady**



**2010:  
How Top  
Innovators Keep  
Winning**



**2011:  
Why Culture  
Is Key**



**2012:  
Making Ideas  
Work**



**2013:  
Navigating the  
Digital Future**



**2014:  
Proven Paths to  
Innovation  
Success**



**2015:  
Innovation's New  
World Order**

# ***The study has become a recognized contributor in better understanding what drives success in R&D and innovation***

- The Global Innovation 1000 study has received significant media and academic recognition over past decade:

– Called “*the most comprehensive assessment of the relationship between R&D investment and corporate performance*” by **The Economist** in 2009

- Awards:
- Silver (2011) and Gold Medals (2014) for original research by the **American Society of Business Press Editors**
  - “Best of Visions” award from **PDMA** in 2009
  - Special Achievement Award for advancing innovation dialog from the **Innovate Forum** in 2006

– Cited in more than 180 publications spanning 27 countries & 6 continents

## **Global Innovation 1000: Selected Press Coverage**



# ***In addition to performing our annual R&D spending analysis, we examined the globalization of R&D***

## **R&D Spending and Trends**

- **Analysis of R&D Spending and Trends**
  - Annual R&D spending across the 1,000 largest R&D spenders globally (publicly-traded firms)
  - R&D spending by region and industry (absolute spending, growth, and proportion of total)
  - R&D intensity (spending as a percent of revenue)
  - Top 20 R&D spenders globally
  - 10 Most Innovative Companies
- **Methodology**
  - Spending determined on the basis of companies' annual reports from their most recent fiscal year, as of June 30, 2015
  - Most Innovative Companies determined based on a web survey of 369 senior R&D executives and Innovation leaders

## **The Globalization of R&D**

- **Understanding Global R&D Flows**
  - How much and where in the world are companies choosing to spend their R&D
  - How regional spending has changed since we last looked at this topic in 2008, "Beyond Borders"
- **Methodology**
  - We researched the global R&D footprint of:
    - Top 100 companies from the Global Innovation 1000
    - Top 50 companies in the largest three industries: auto, healthcare, and computing & electronics
    - Top 20 companies in industrials, and software & Internet
  - This resulted in 207 companies – reflecting overlap – which are headquartered in 23 countries, conducting R&D activities at 2,041 R&D sites in more than 60 countries, and represent 71% of the total Global Innovation 1000 R&D spend.

***Introduction***

***R&D spending and trends***

***Globalization of R&D***

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## ***Executive Summary***

- In 2015, R&D spending by the Global Innovation 1000 increased 5.1% to \$680 billion, the largest year-over-year increase since 2012. R&D spending is now in line with the long-term trend of R&D spending growth of 5.4% over the last 10 years.
- R&D intensity – spending as a percent of revenue - also spiked to 3.7% from 3.5% in 2014, which is the result of falling revenues experienced by the Global Innovation 1000. Similar to what happened in 2010 after the Great Recession, companies tend to stick with their innovation program despite cyclical revenue fluctuations.
- Software & Internet had the highest year-over-year growth rate (27%) of all the industries, which propelled it past the industrials sector to become the fourth-largest industry by R&D spend.
- Apple made its first-ever appearance in the Top 20 R&D Spenders list and has an intensity of 3.3%, compared to an average of 12.5% for the other 19 companies on the list.
- Apple and Google remain the two most innovative companies, according to our survey respondents, while Tesla jumps to third place, pushing Amazon down to fifth. Toyota rejoins the ranking at number 10 after a two-year hiatus.



# Higher R&D spend doesn't ensure performance...

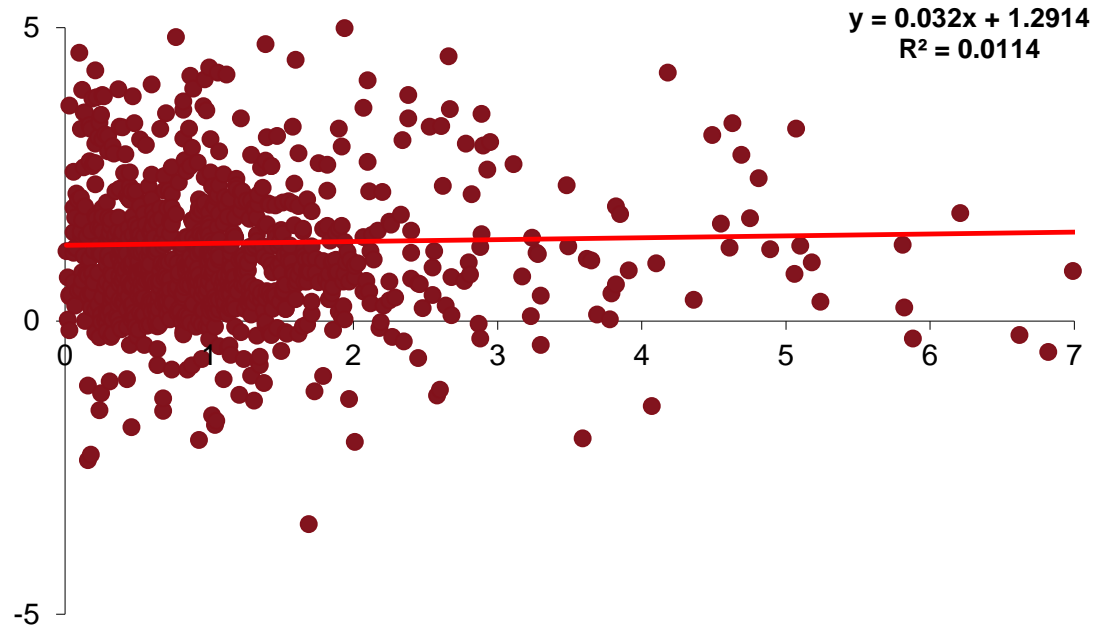
## The Performance Disconnect

Example analysis showing relation between R&D & financial performance

**~10,000 analyses found  
NO statistical relationship  
between R&D spend and:**

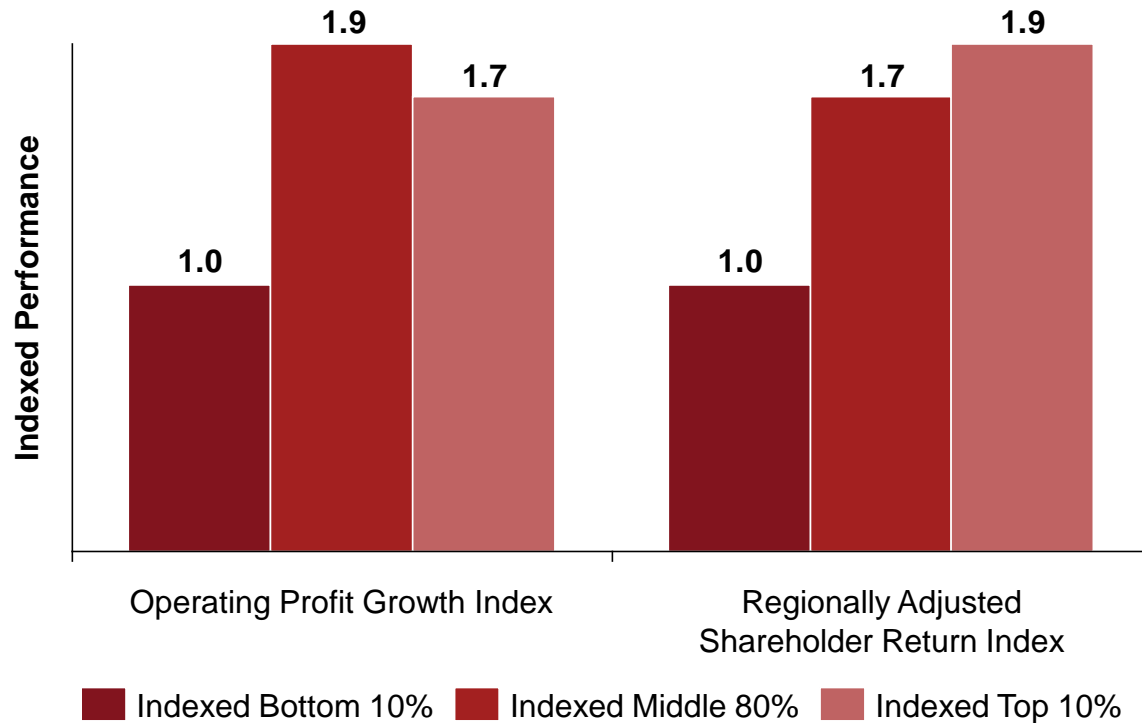
- Sales growth
- Gross profit growth
- Operating profit growth
- Operating margin
- Net profit growth
- Net margin
- Market cap growth
- Total shareholder return

**Indexed  
Sales Growth**



# *...however, there is a minimum threshold – you can be “Too Rich” or “Too Thin”*

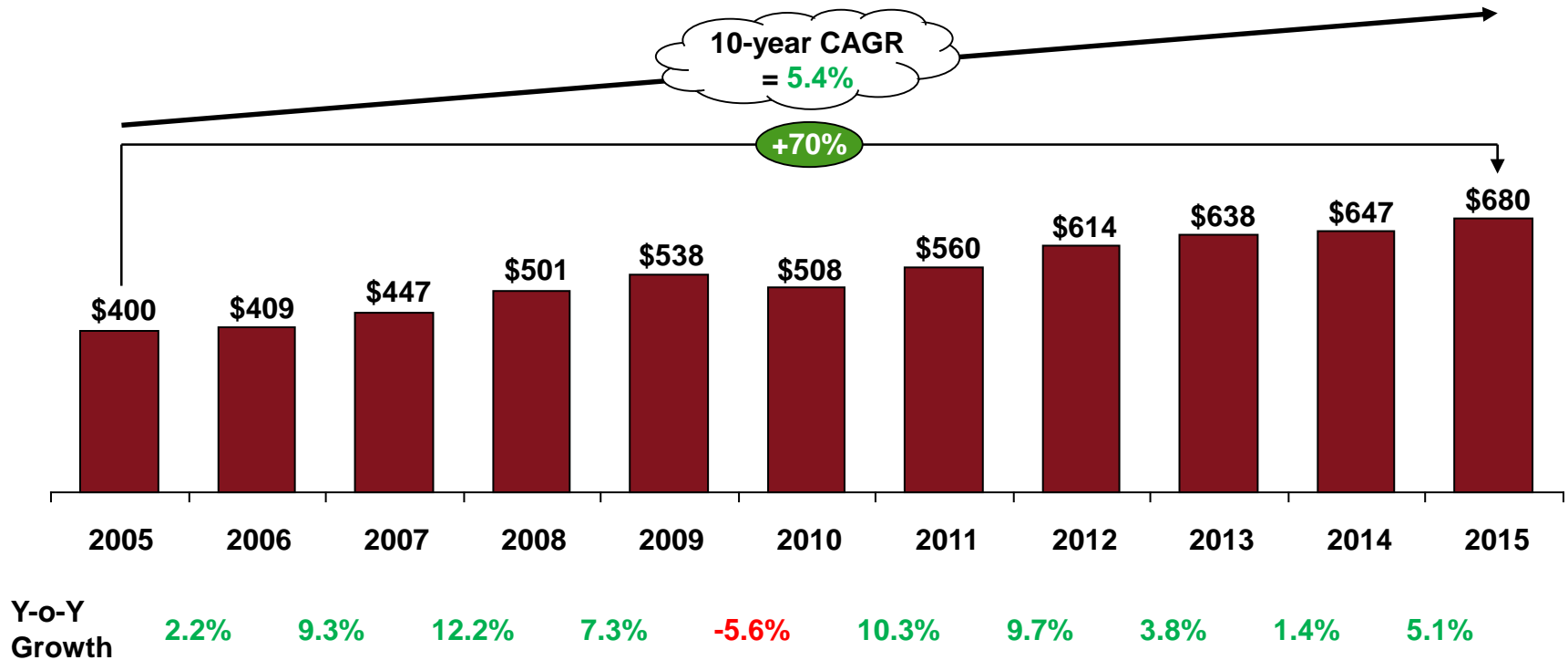
## The Performance Disadvantage of the Bottom 10% of Spenders



- Spending much less than industry median **does** lead to consistently lower performance
- Spending much more than industry median does **not** drive consistently better performance

# *In 2015, R&D spending by the Global Innovation 1000 saw the return to the long-term growth trend*

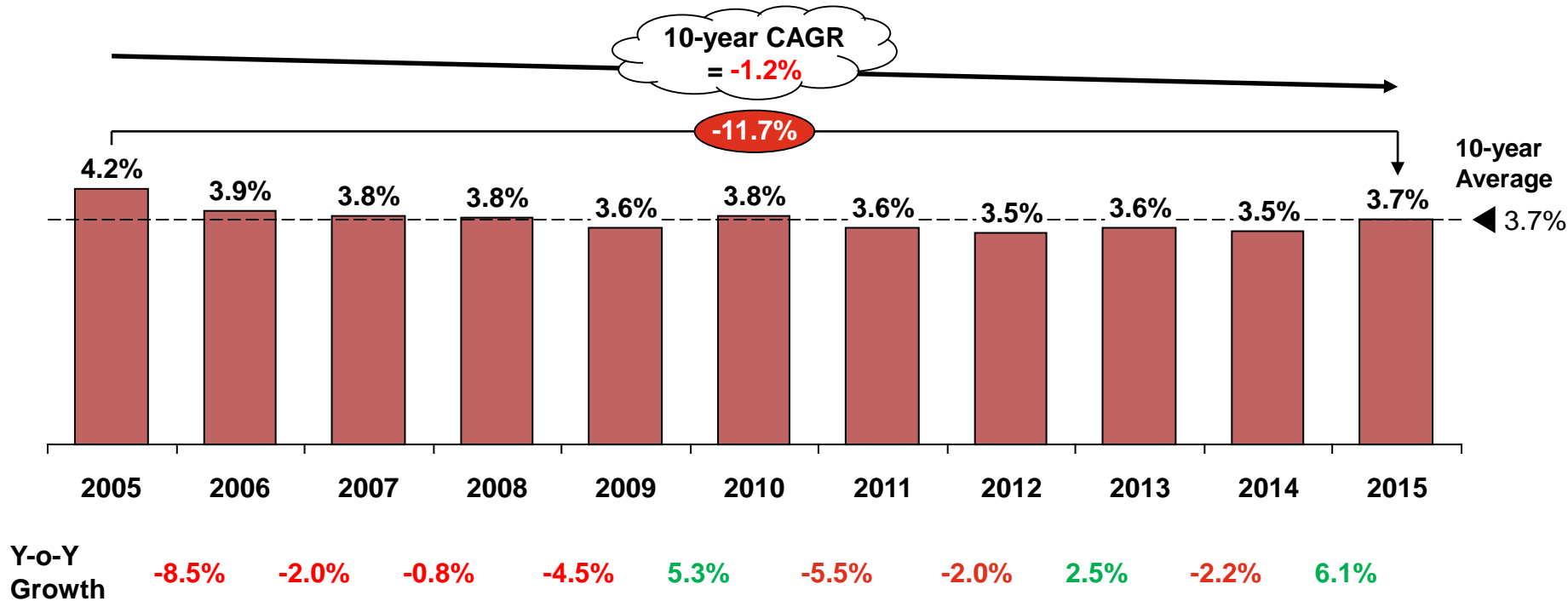
**Global Innovation 1000 R&D Spending**  
\$US Billions



Source: Strategy& 2015 Global Innovation 1000 analysis, Bloomberg data, Capital IQ data

# ***Innovation 1000 firm revenue fell 1%, reversing the long-term trend of decreasing R&D intensity***

Global Innovation 1000 R&D Intensity (Spending as a Percent of Revenue)

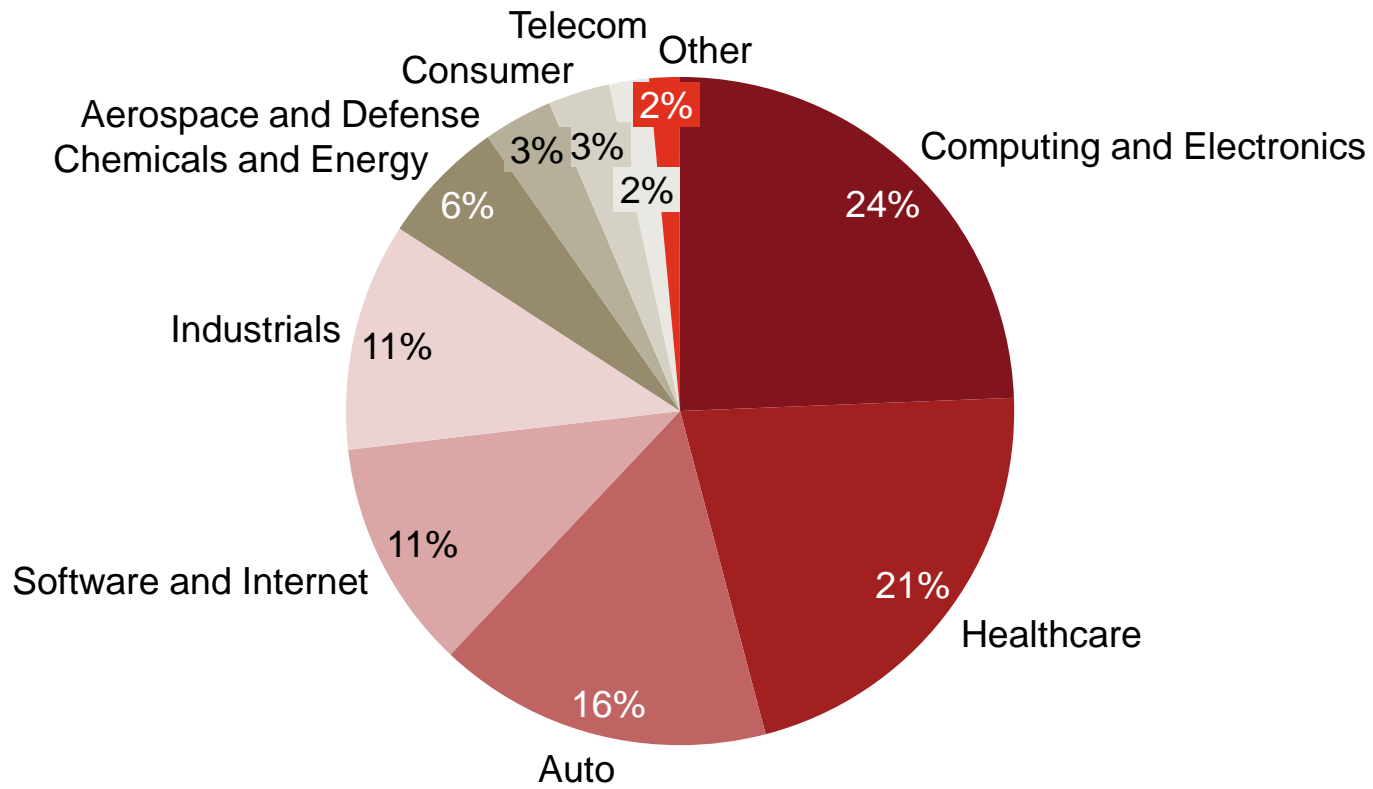


Source: Strategy& 2015 Global Innovation 1000 analysis, Bloomberg data, Capital IQ data

# ***Computing & electronics, healthcare, and auto continue to be the three largest industries in terms of total R&D spend***

## **2015 R&D Spending by Industry**

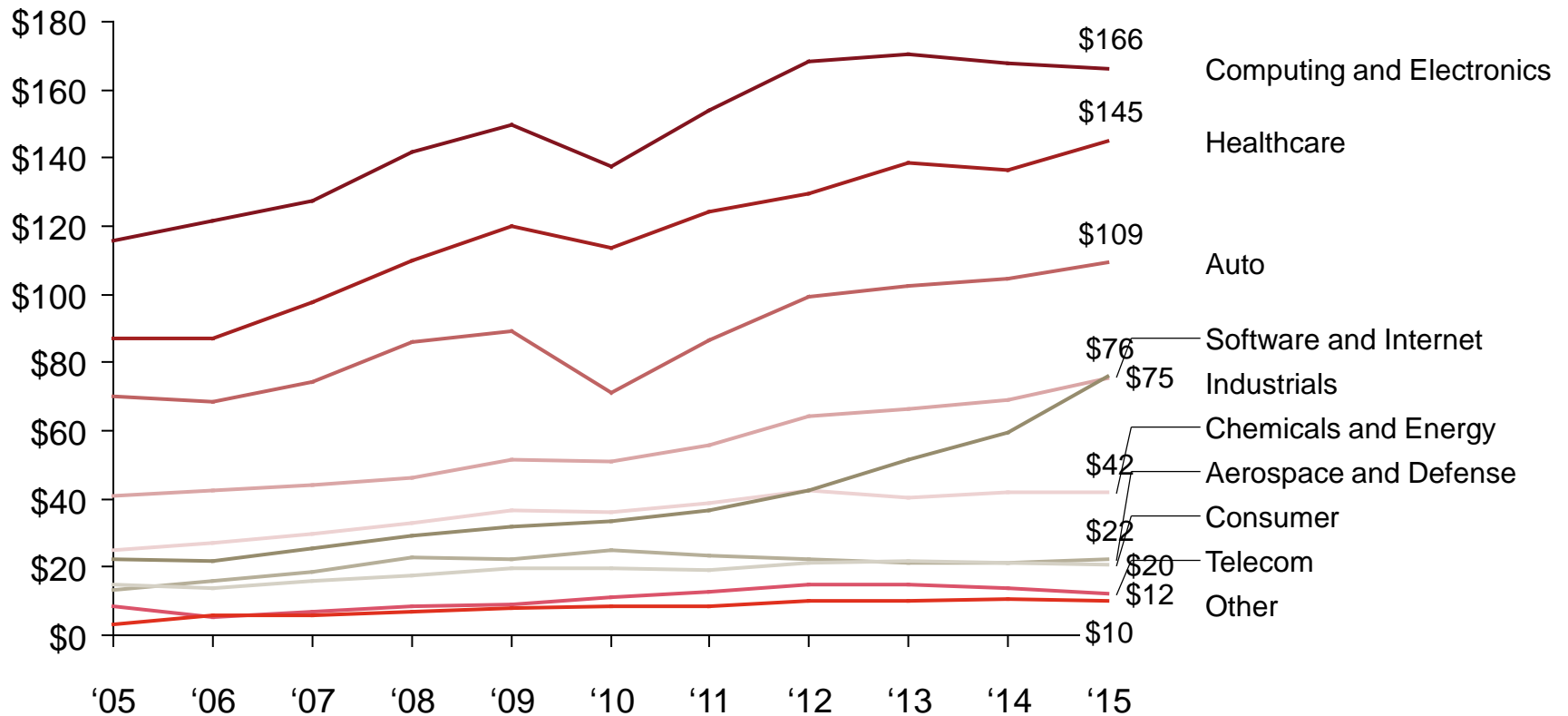
Total = \$680 Billion



Source: Strategy& 2015 Global Innovation 1000 analysis, Bloomberg data, Capital IQ data

# ***Software & Internet passed industrials and healthcare is closing in on C&E as the largest industry by R&D spend***

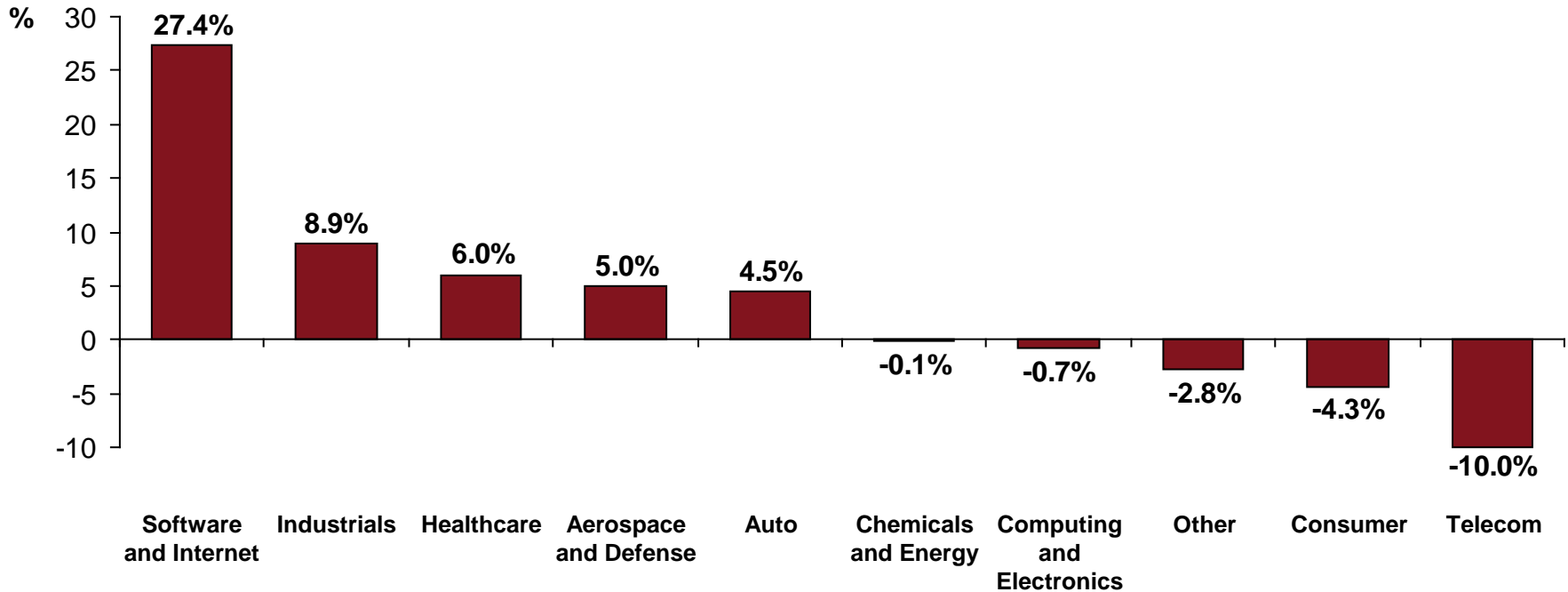
**R&D Spending by Industry**  
\$US Billions



Source: Strategy& 2015 Global Innovation 1000 analysis, Bloomberg data, Capital IQ data

# ***Software & internet grew at over 27%, far greater than the growth of all other industries from 2014 to 2015***

**% Change in R&D Spending by Industry**  
2014-2015



Source: Strategy& 2015 Global Innovation 1000 analysis, Bloomberg data, Capital IQ data

# Apple made its first-ever appearance in the Top 20 R&D Spenders in 2015 despite having a low intensity

## Top 20 R&D Spenders

Rank	Company	Region	Industry	2015 R&D Spending (\$B)	Intensity (%)
1	Volkswagen	Europe	Auto	15.3	5.7%
2	Samsung	Asia	Computing and Electronics	14.1	7.2%
3	Intel	North America	Computing and Electronics	11.5	20.6%
4	Microsoft	North America	Software/Internet	11.4	13.1%
5	Roche	Europe	Healthcare	10.8	20.8%
6	Google	North America	Software/Internet	9.8	14.9%
7	Amazon	North America	Software/Internet	9.3	10.4%
8	Toyota	Asia	Auto	9.2	3.7%
9	Novartis	Europe	Healthcare	9.1	17.3%
10	Johnson & Johnson	North America	Healthcare	8.5	11.4%
11	Pfizer	North America	Healthcare	8.4	16.9%
12	Daimler	Europe	Auto	7.6	4.4%
13	General Motors	North America	Auto	7.4	4.7%
14	Merck	North America	Healthcare	7.2	17.0%
15	Ford	North America	Auto	6.9	4.8%
16	Sanofi	Europe	Healthcare	6.4	14.1%
17	Cisco	North America	Computing and Electronics	6.3	13.4%
18	Apple	North America	Computing and Electronics	6.0	3.3%
19	GlaxoSmithKline	Europe	Healthcare	5.7	15.0%
20	AstraZeneca	Europe	Healthcare	5.6	21.4%

Honda fell to #21, IBM fell to #26,

**Total** \$176.5

↑ ↓ Increase or decrease within Top 20 ranking compared with 2014

Companies that have been among the Top 20 R&D Spenders since 2005

Source: Strategy& 2015 Global Innovation 1000 analysis, Bloomberg data, Capital IQ data



# *Apple & Google continue to lead the Most Innovative list, while Tesla has moved up to third*

## 10 Most Innovative Companies

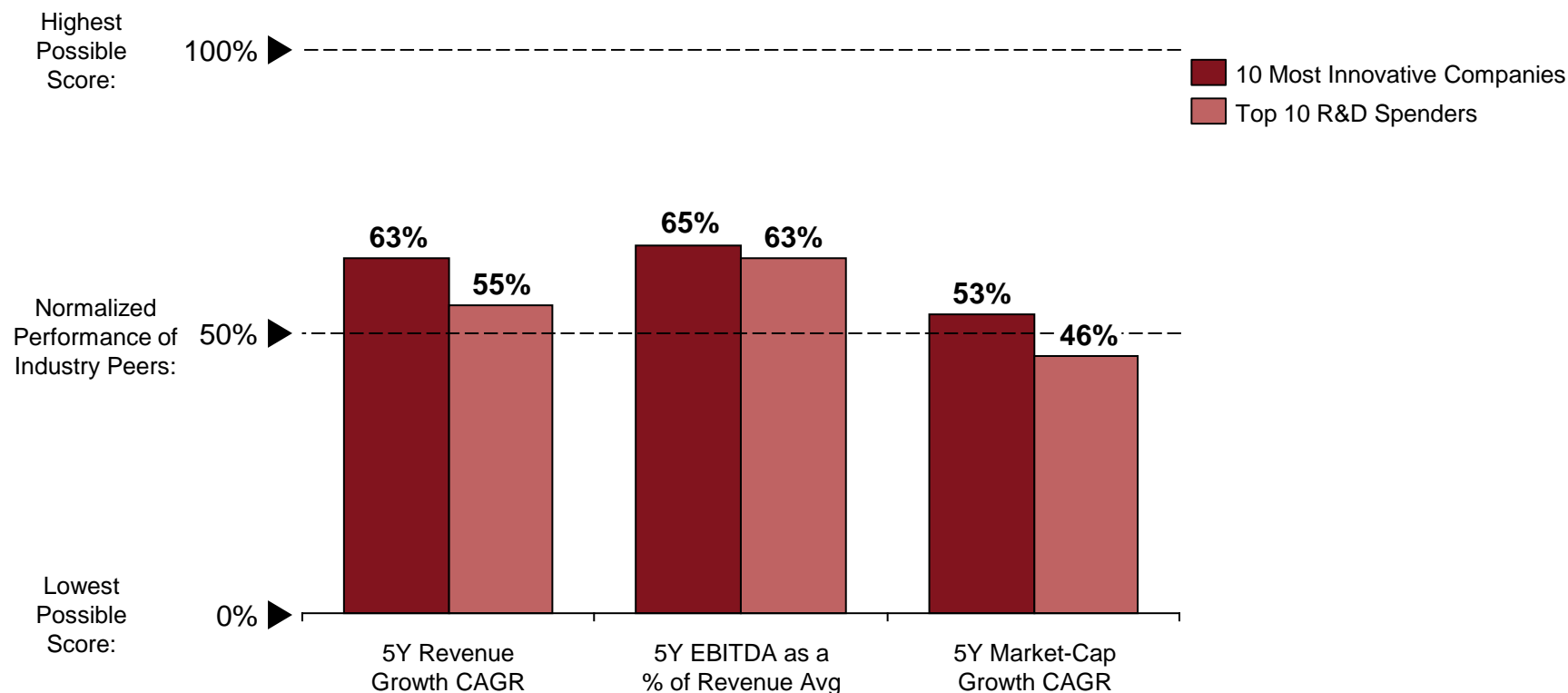
Rank	2010	2011	2012	2013	2014	2015
1	Apple	Apple	Apple	Apple	Apple	Apple
2	Google	Google	Google	Google	Google	Google
3	3M	3M	3M	Samsung	Amazon	Tesla
4	General Electric	General Electric	Samsung	Amazon	Samsung	Samsung
5	Toyota	Microsoft	General Electric	3M	Tesla	Amazon
6	Microsoft	IBM	Microsoft	General Electric	3M	3M
7	Procter & Gamble	Samsung	Toyota	Microsoft	General Electric	General Electric
8	IBM	Procter & Gamble	Procter & Gamble	IBM	Microsoft	Microsoft
9	Samsung	Toyota	IBM	Tesla	IBM	IBM
10	Intel	Facebook	Amazon	Facebook	Procter & Gamble	Toyota

Source: Strategy& 2015 Global Innovation 1000 survey data and analysis

# As in previous years, the 10 Most Innovative Companies outperform the top 10 R&D spenders

## 2015 10 Most Innovative Companies\* vs. 2015 Top 10 R&D Spenders

Financial performance normalized by indexing values within each industry



Source: Strategy& 2015 Global Innovation 1000 analysis, Bloomberg data, Capital IQ data

\*Only 9 of the 10 Most Innovative Companies were included in Market-Cap Growth. Tesla was removed as it does not have Market-Cap data spanning back five years.

***Introduction***

***R&D spending and trends***

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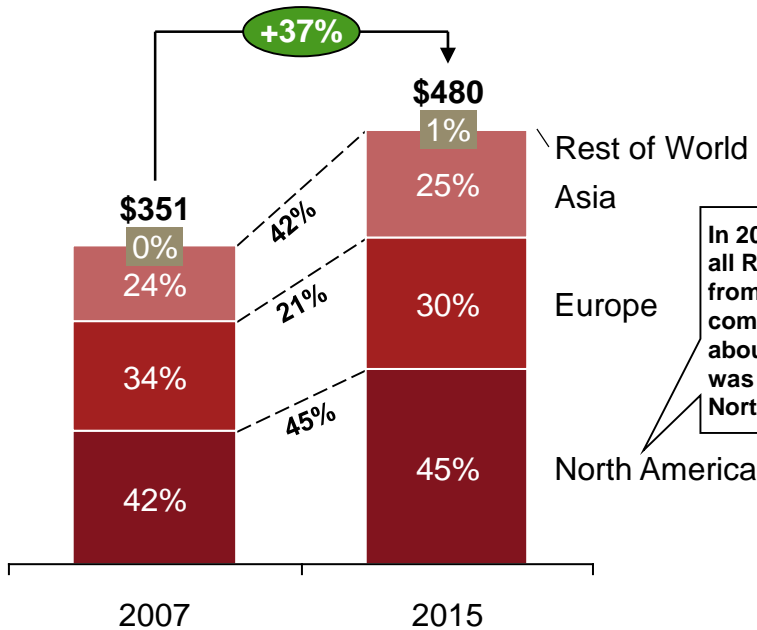
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## ***Executive Summary***

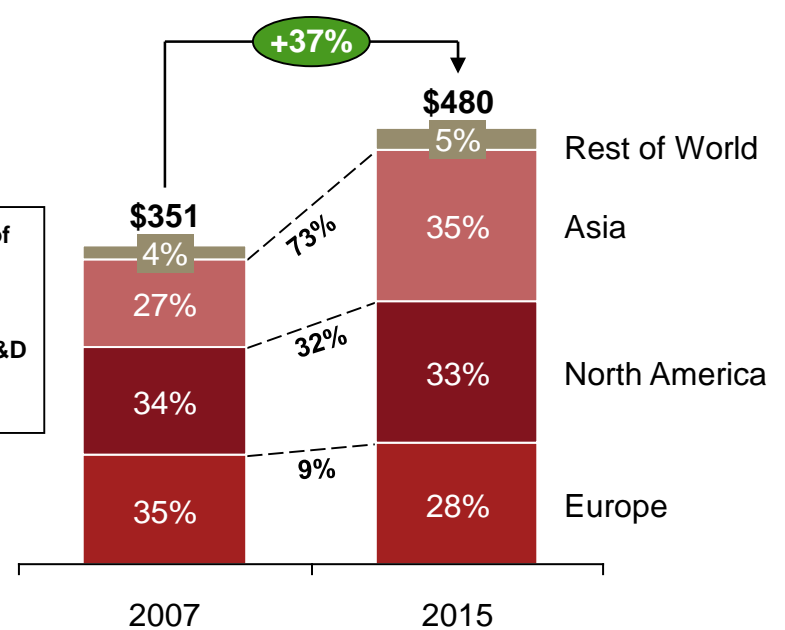
- R&D is now a global activity for the vast majority of major corporations, as 94% conduct R&D in countries beyond their home country.
- Asia has become the number one region for corporate R&D spending, Europe has fallen to number three, and North America remains in second place. In our 2008 study, this order was reversed.
- Asia's rise was driven by strong imports and domestic R&D spending. Most notably, China increased in-country R&D spending by 79% and is closing in on the U.S. as the largest country destination for imported R&D.
- The U.S. is still the largest in-country (domestic and imported) R&D spender. However, its overall lead is shrinking against most Asian countries, but expanded over most Western European countries.
- Europe's fall to third-largest region for R&D spending was the result of low growth in domestic and imported R&D, and high growth in exported R&D; most noticeably in France and Germany.
- Surveyed R&D professionals ranked access to talent and proximity to customers higher than tax advantages in choosing where to conduct R&D.

# ***The largest spenders by region have remained the same, but where they spend their R&D has changed***

**Corporate R&D by Companies Headquartered Region**  
2007 & 2015 \$US Billions



**Corporate In-Region (Domestic & Imported) R&D**  
2007 & 2015 \$US Billions



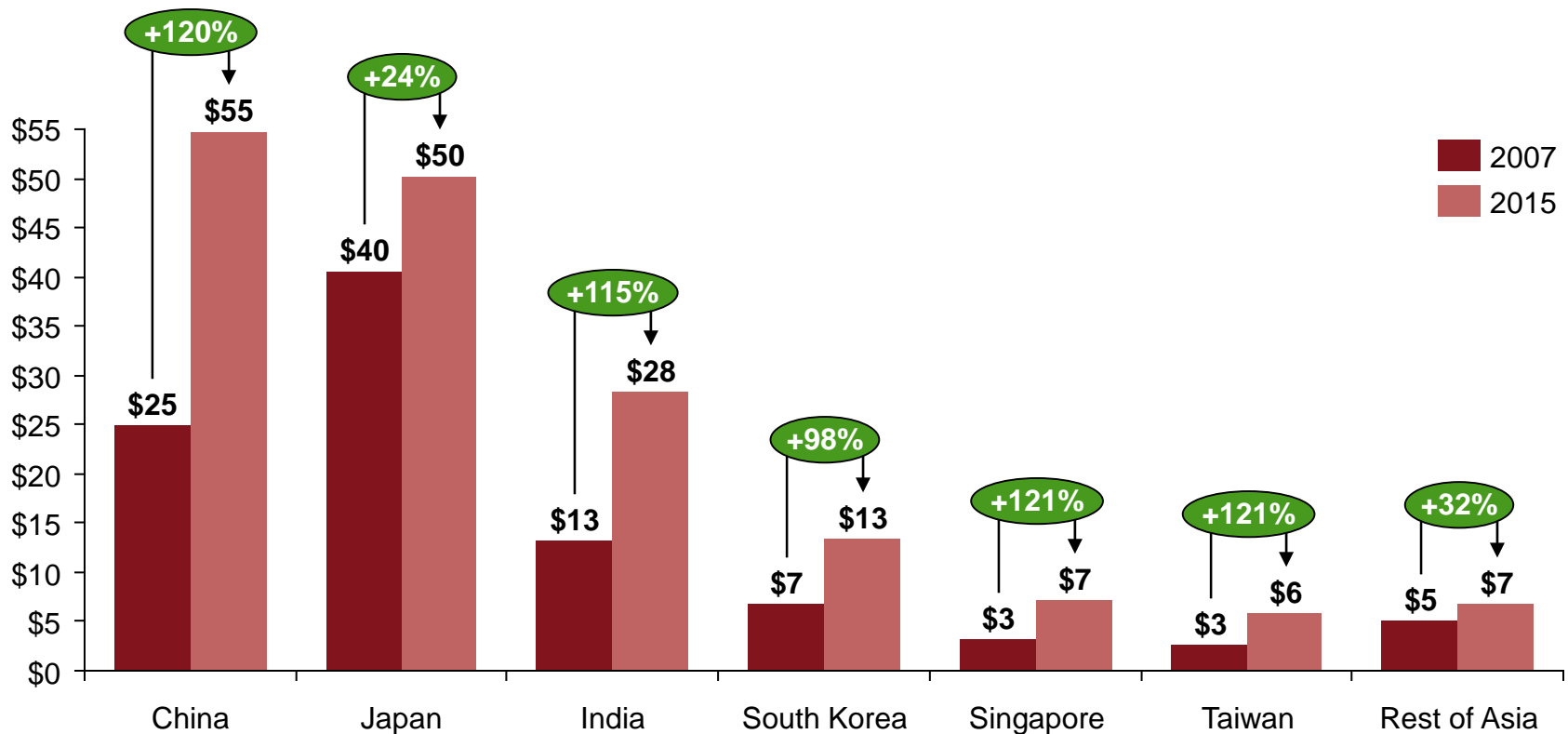
In 2015, almost half of all R&D spend came from North American companies, but only about a third of all R&D was actually done in North America.

**Asia is now the top regional destination for R&D spending, followed by North America and Europe. In 2007, that order was reversed.**

Source: Strategy& 2015 Global Innovation 1000 analysis

# Asia's rise as the top region for R&D spending was driven by both robust imports and domestic spending

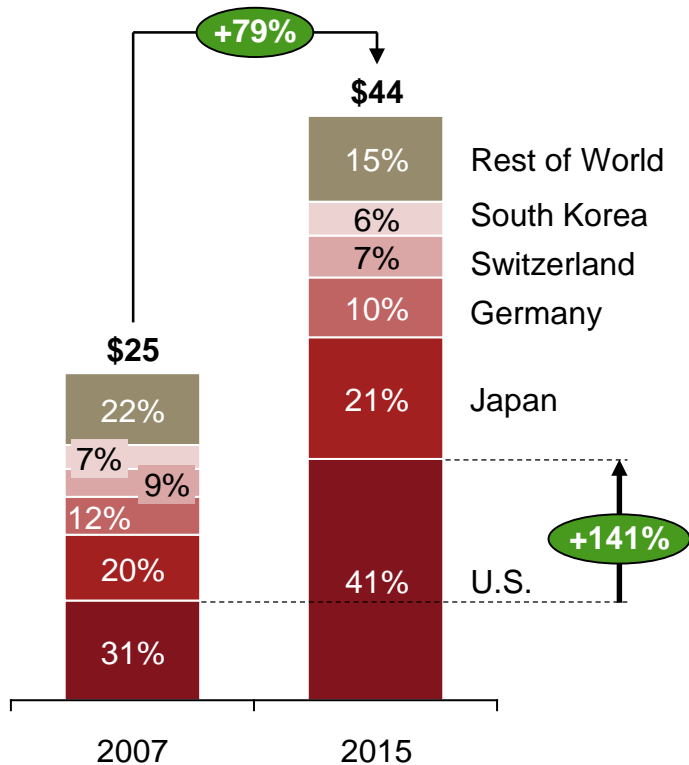
Asia In-Country (Domestic & Imported) R&D  
2007 & 2015 \$US Billions



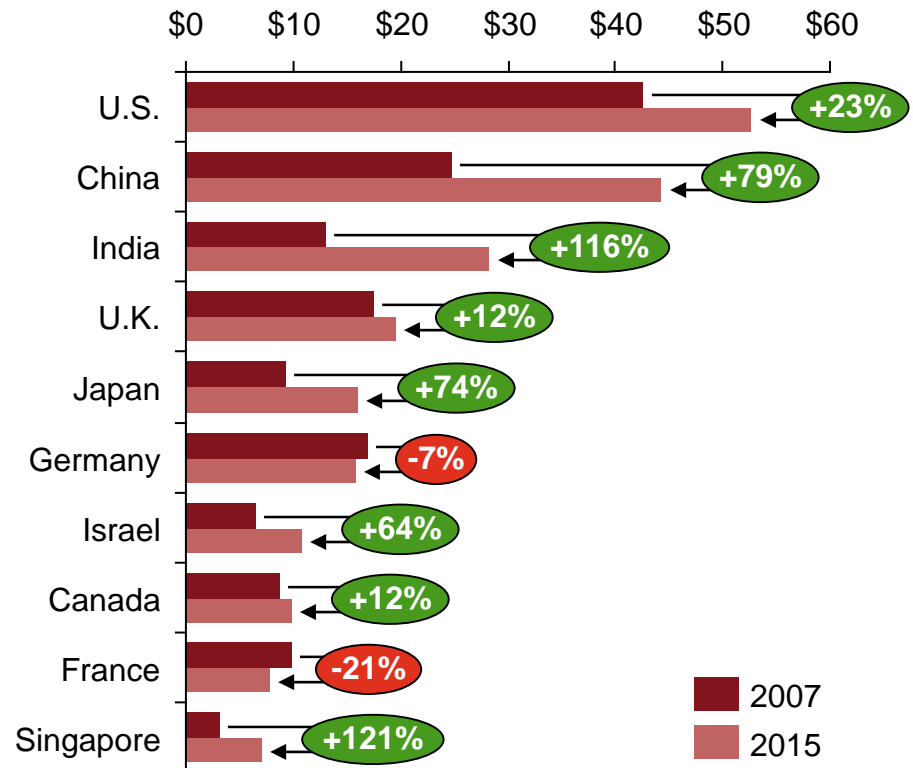
Source: Strategy& 2015 Global Innovation 1000 analysis

# Leading the way for Asia was China, which is closing in on the U.S. as the largest country for imported R&D

**Top Five Countries That China Imported R&D from**  
2007 & 2015 \$US Billions



**Imported R&D by Country**  
2007 & 2015 \$US Billions

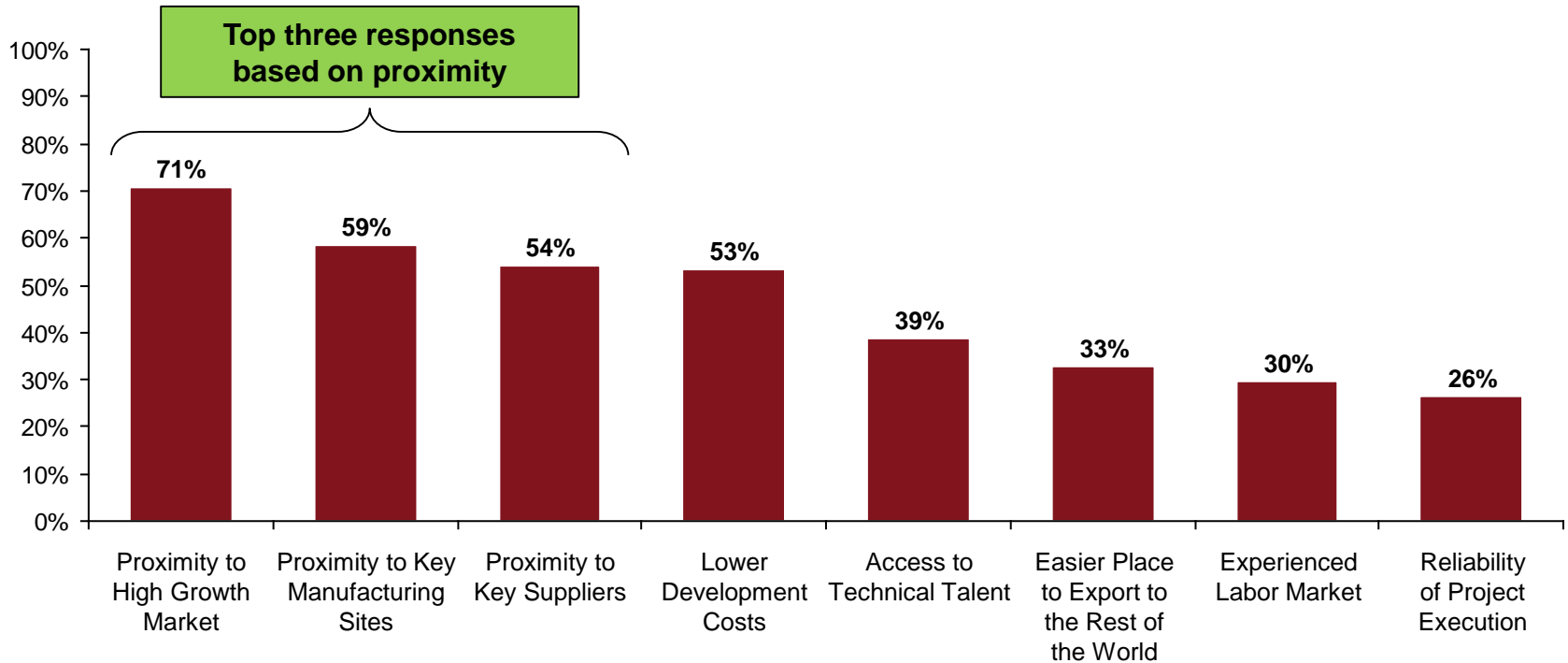


Source: Strategy& 2015 Global Innovation 1000 analysis

# ***R&D professionals ranked strategic reasons higher than cost advantages when moving R&D functions to China***

## **What Are the Benefits of Moving R&D Functions to China?**

n = 369

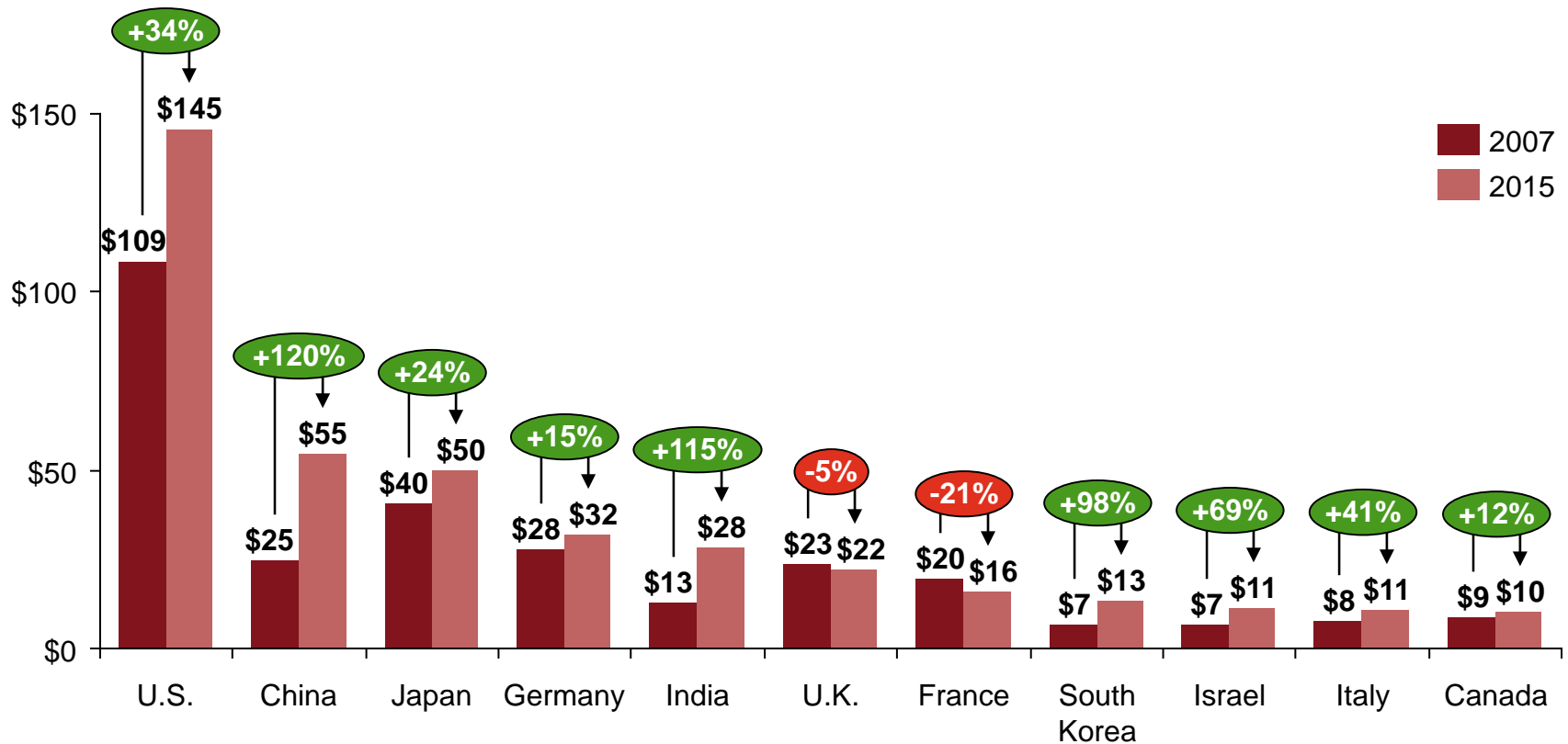


Source: Strategy& 2015 Global Innovation 1000 survey data and analysis



# The U.S. remains the largest in-country R&D spender...

**In-Country (Domestic & Imported) R&D**  
2007 & 2015 \$US Billions

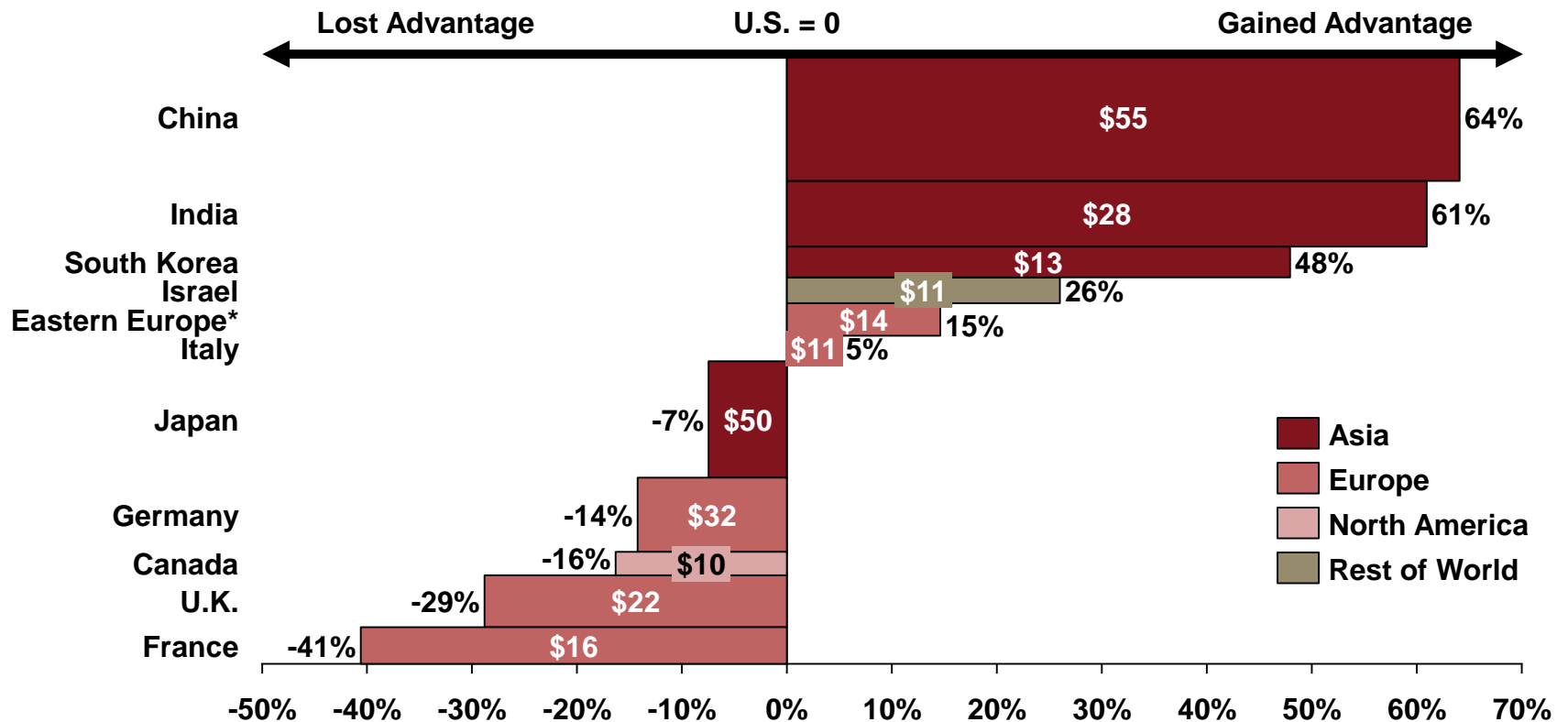


Source: Strategy& 2015 Global Innovation 1000 analysis

# ...however, its lead against key Asian countries is eroding

**% Change 2007-2015, In-Country (Domestic and Imported) R&D Relative to the U.S.**

Height of bar = 2015 In-Country R&D Spend (\$US Billions)

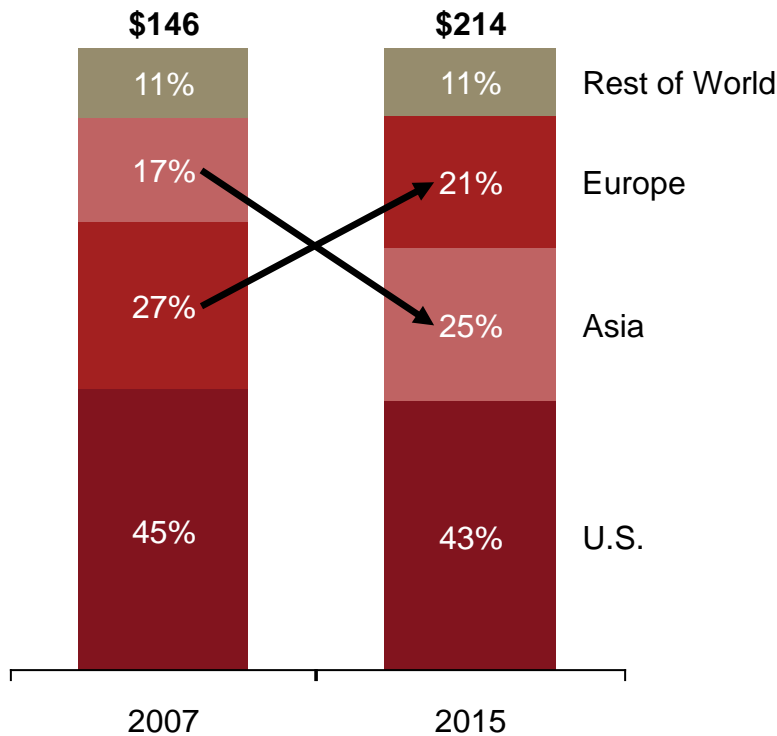


Source: Strategy& 2015 Global Innovation 1000 analysis

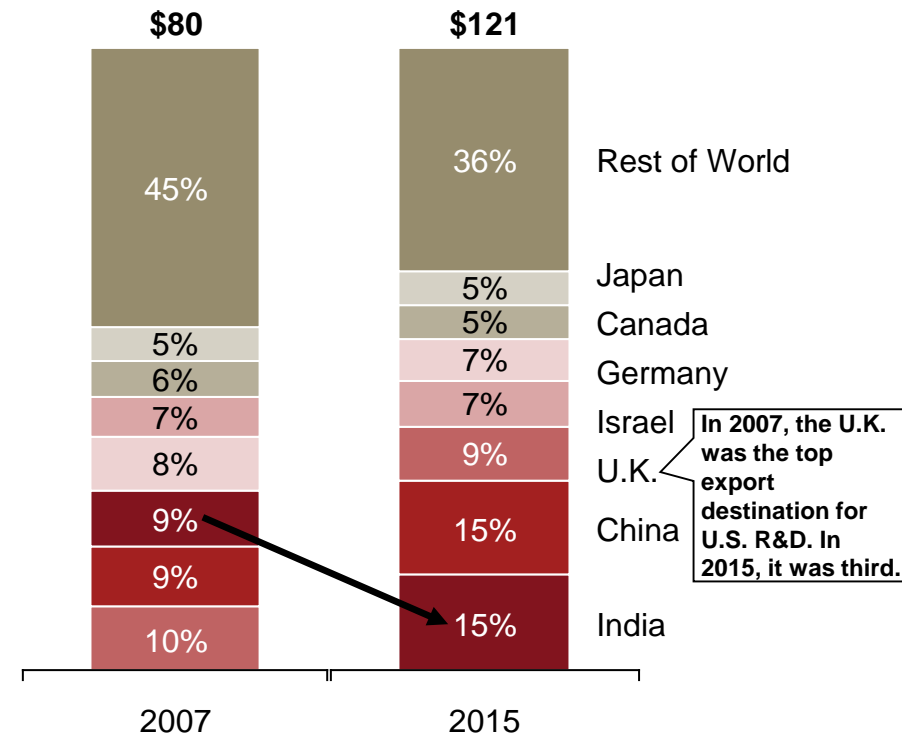
\*Eastern Europe Includes: Russia, Poland, Romania, Czech Republic, Slovakia, Croatia, Hungary, Bulgaria, Estonia, Latvia, Serbia, Turkey, and Slovenia

# U.S. firms significantly increased R&D performed in low-cost Asian countries such as China and India

**U.S. HQ Firms' R&D Allocation**  
2007 & 2015 \$US Billions



**Top 7 Countries That the U.S. Exported R&D to**  
2007 & 2015 \$US Billions

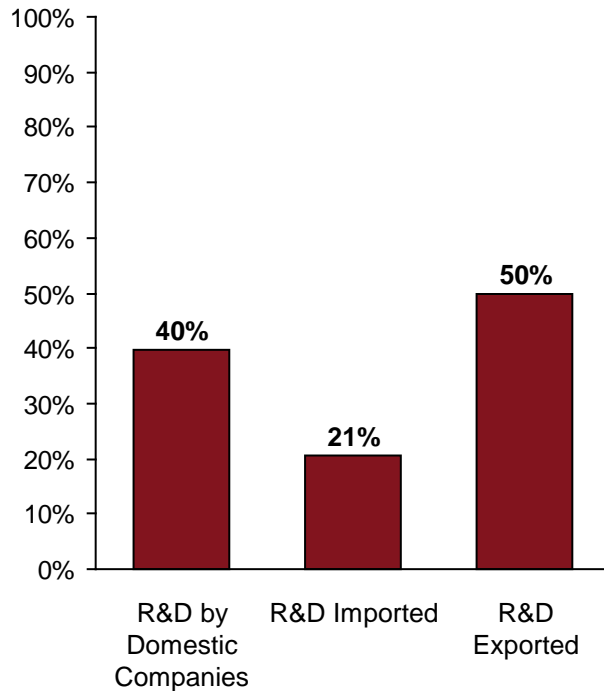


Source: Strategy& 2015 Global Innovation 1000 analysis

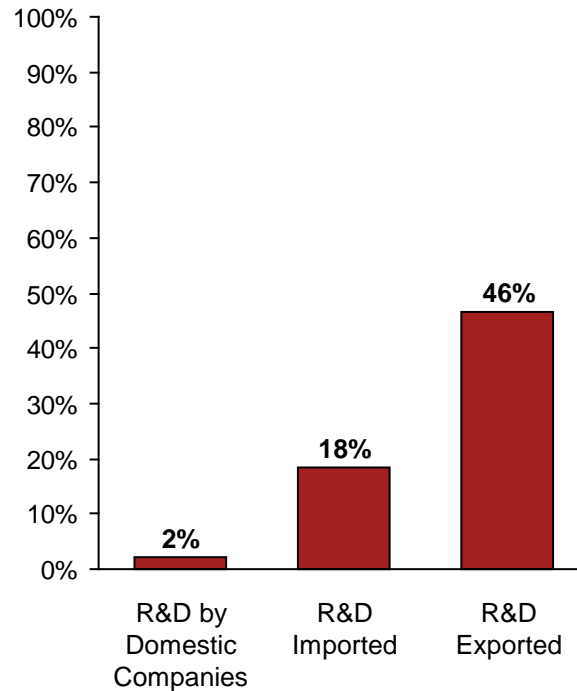
# ***Europe's decline was the result of low growth in domestic and imported R&D, and high growth in exported R&D***

**% Change in R&D Spending By Region**  
2007-2015

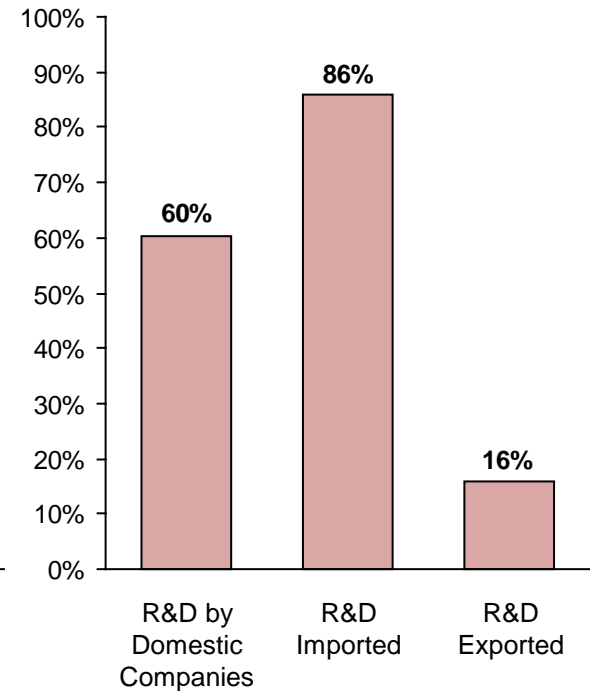
## **North America**



## **Europe**



## **Asia**

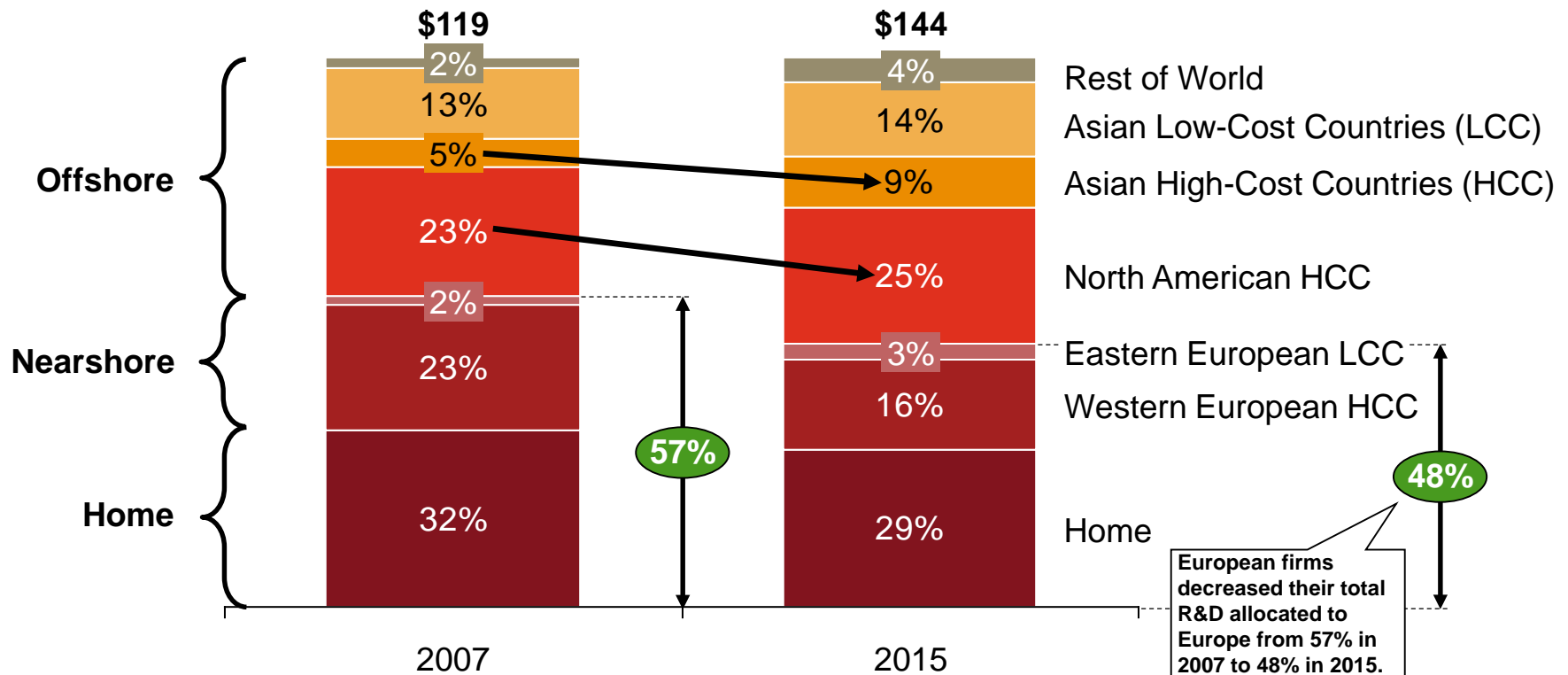


Source: Strategy& 2015 Global Innovation 1000 analysis

# European firms increased their R&D allocation to Asian and North American high-cost countries

## European HQ Firms' R&D Allocation

2007 vs. 2015 \$US Billions



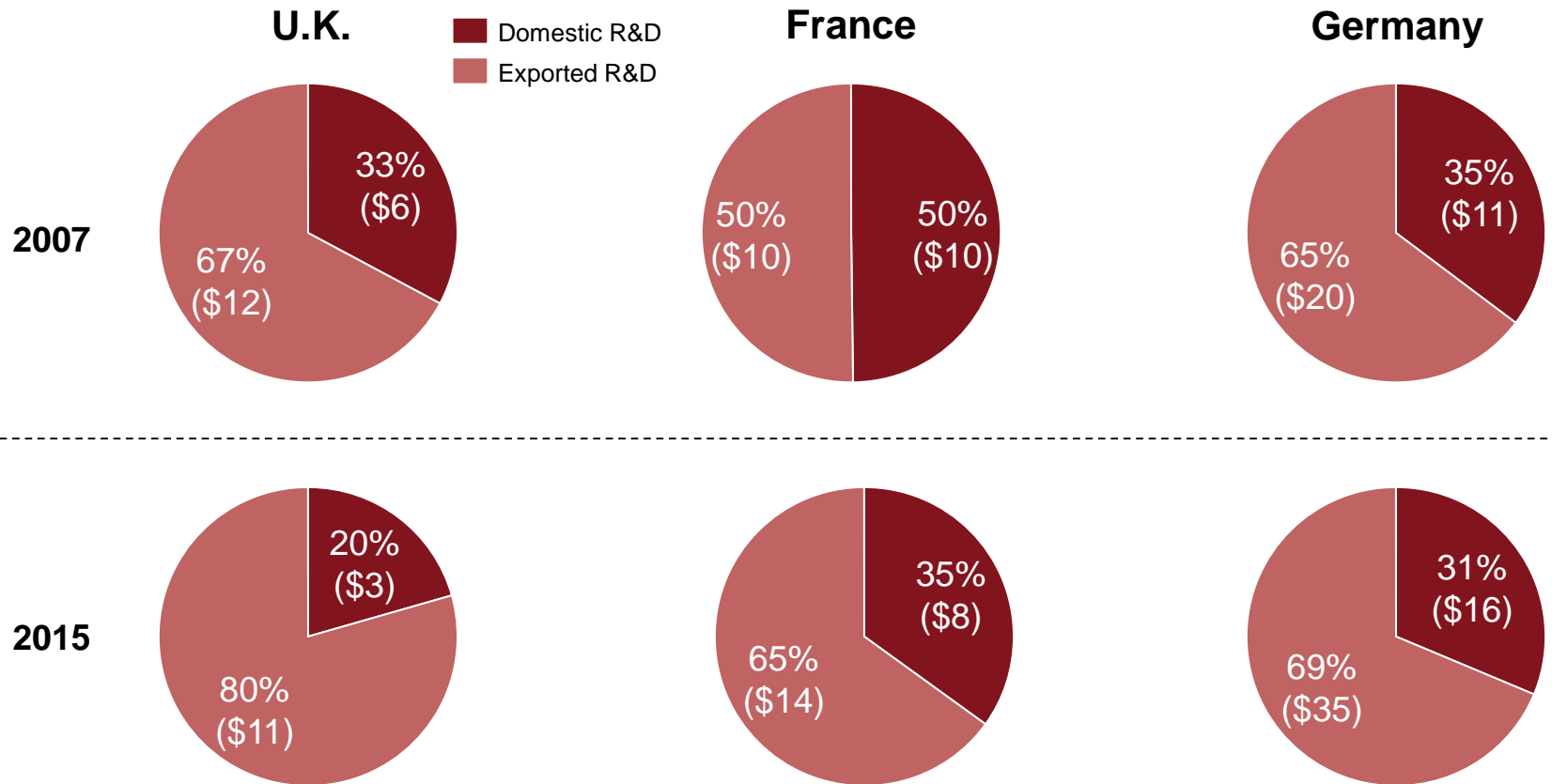
Source: Strategy& 2015 Global Innovation 1000 analysis

Note: High-cost countries (HCC) refers to countries with an average engineering wage > \$35,000. All countries with an average engineering wage of less than or equal to \$35,000 are low-cost countries (LCC).

# The three largest economies in Europe - the U.K., France, and Germany - all increased their share of exported R&D

## R&D Allocation by Country

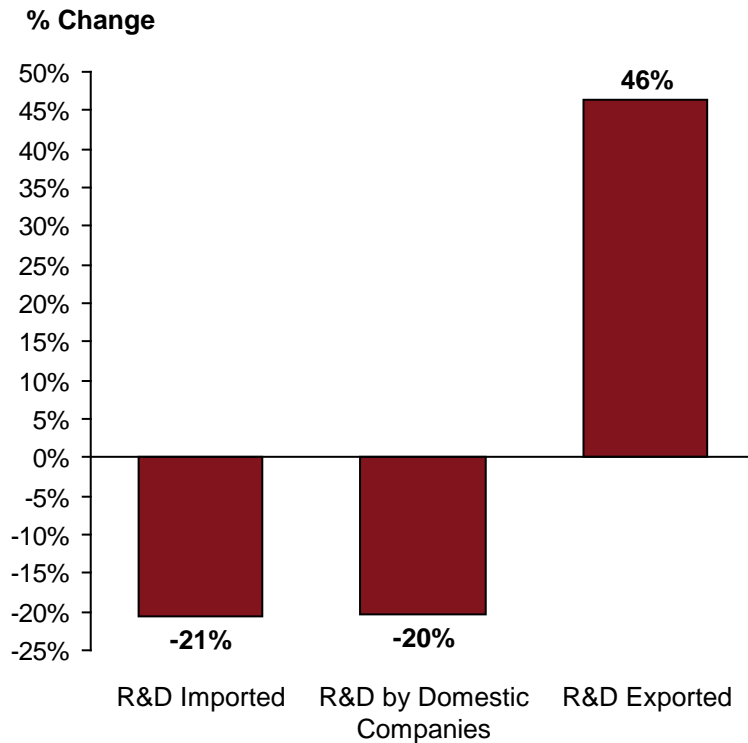
2007 vs. 2015 \$US Billions



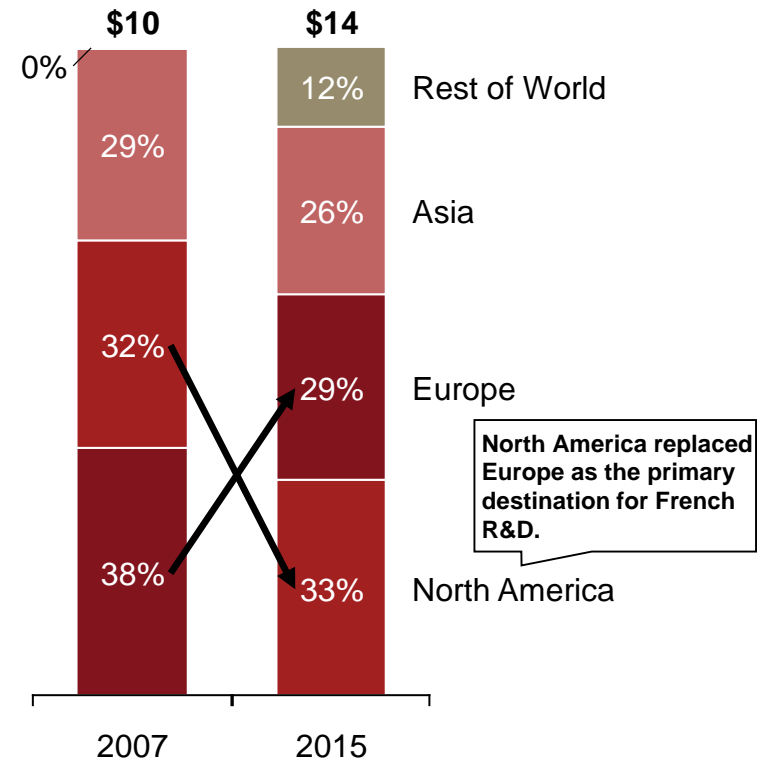
Source: Strategy& 2015 Global Innovation 1000 analysis

***In fact, France only saw positive growth in exported R&D, but those exports were not to other European countries.***

**% Change in R&D Spending in France**  
2007-2015



**French HQ Firms' R&D Export Allocation**  
2007 & 2015 \$US Billions

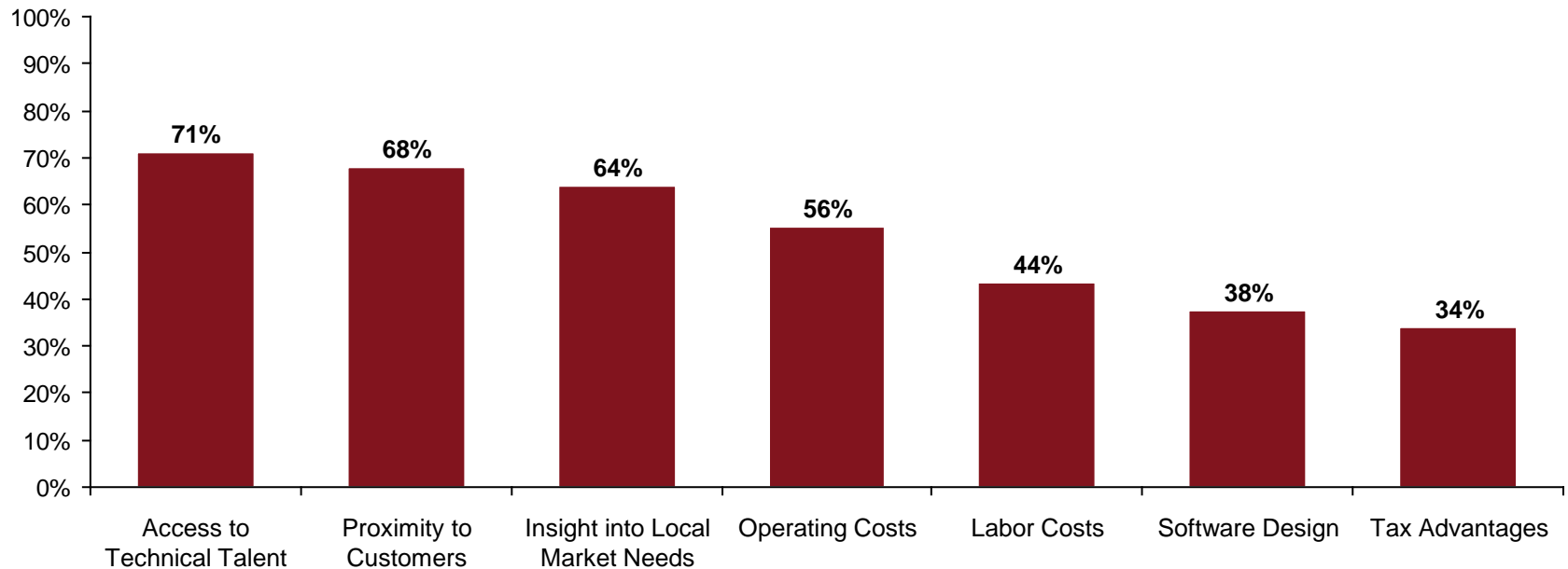


Source: Strategy& 2015 Global Innovation 1000 analysis

# ***R&D professionals ranked access to talent and proximity to customers as top factors in choosing where to conduct R&D***

## **The Most Important Attributes When Considering Where to Conduct Your R&D**

n = 369



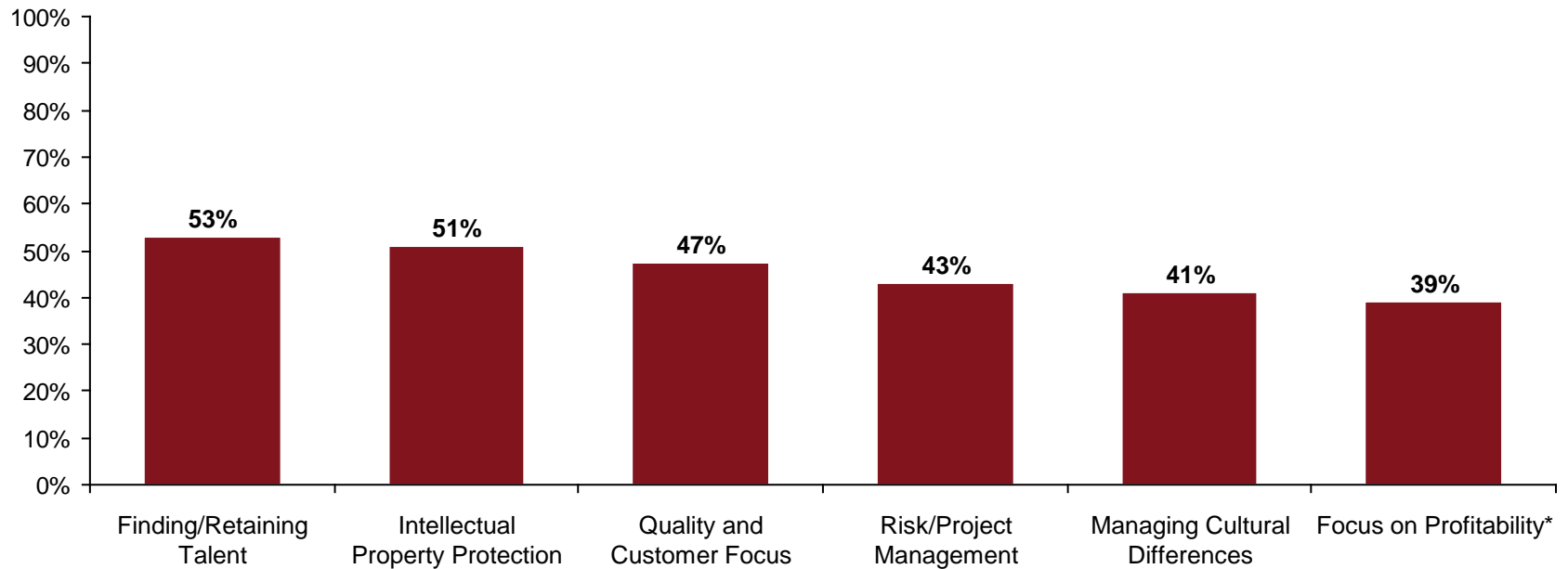
Source: Strategy& 2015 Global Innovation 1000 survey data and analysis



# ***R&D professionals ranked attributes related to managing employees most challenging when conducting R&D abroad***

## **The Most Challenging Attributes When Conducting R&D Outside of Home Country**

n = 369

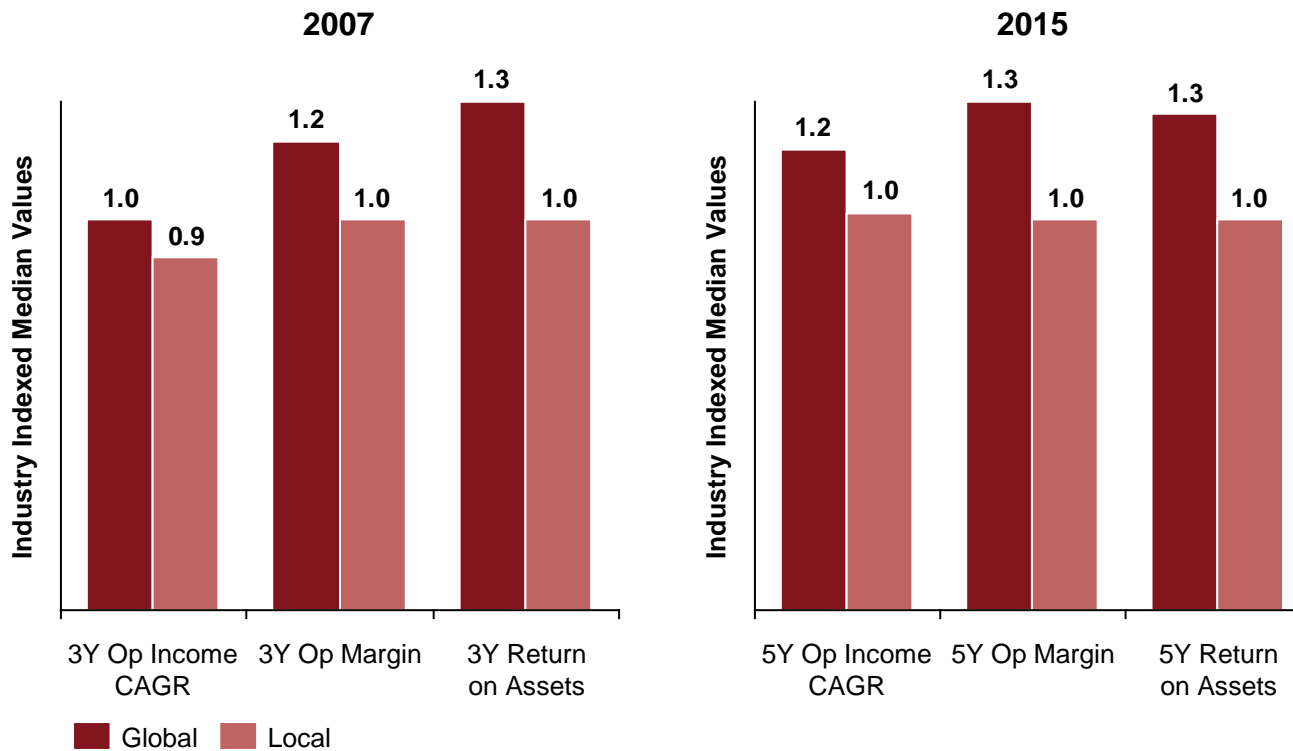


Source: Strategy& 2015 Global Innovation 1000 survey data and analysis

\* Focus on profitability includes those who voted for "Currency risk" and "Return on investment"

# ***In both 2007 and 2015, companies investing in R&D globally performed ~20% better over local R&D spenders***

**Global R&D vs. Local R&D Driven**  
Median of OI CAGR, Op Margin, and ROA



**Discussion**

- Global R&D Driven companies invest more than 60% of their R&D spend on facilities outside their home country annually.
- Local R&D Driven companies invest less than 60% of R&D spend on facilities outside their home country annually.

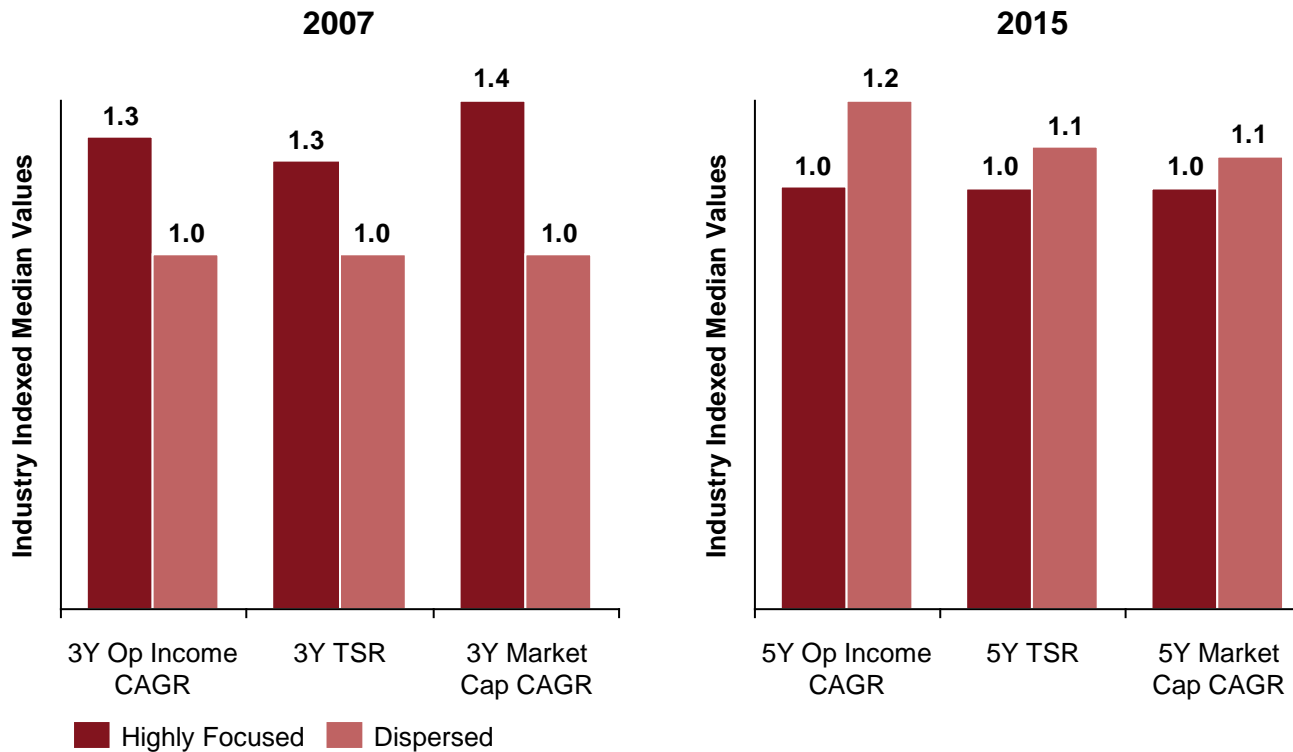
Source: Strategy& 2015 Global Innovation 1000 analysis

Note: In 2015, 38.57% is the median R&D spend at home among the universe of 207 companies studied; % of R&D spend in home countries ranges from 0 to 100%; Companies selected for the study are top 100 R&D spenders overall, the top 50 spenders in Auto, C&E and Health, and the top 20 in industrials and software.

# Unlike in 2007, companies with more dispersed R&D footprints now outperform companies with focused ones

## Highly Focused vs. Dispersed R&D Footprints

Median of OI CAGR, TSR, and Market Cap CAGR



### Discussion

- Highly Focused R&D Footprint players have the smallest number of R&D sites, after indexing against sales.
- Dispersed R&D Footprint players have a widespread network of R&D locations.

Source: Strategy& 2015 Global Innovation 1000 analysis

Note: In 2015, highly focused R&D footprint companies have less than 1.3 sales indexed R&D location, (1.3 representing the 25% percentile in the universe of 207 companies); Number of indexed R&D locations range from 0.03 to 40.77; Dispersed R&D Footprint companies have more than 1.3 sales indexed R&D location.



**For the complete study and more  
information on the annual  
Strategy& Global Innovation 1000 study**

**Please visit:**

**<http://www.strategyand.pwc.com/innovation1000>**

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