

The route to a trillion devices

The outlook for IoT investment to 2035

June 8 2017

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Technology
Investors



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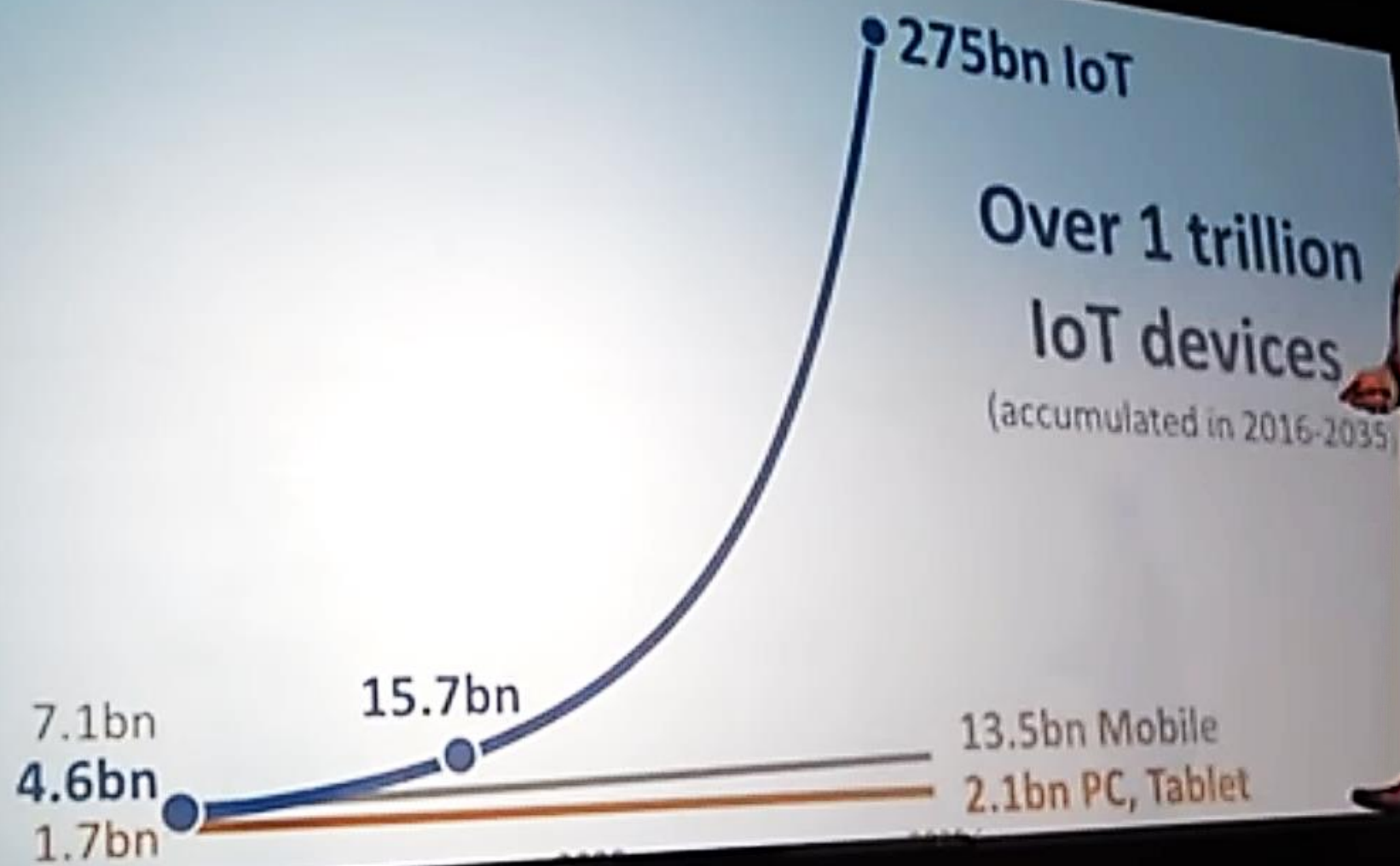


Philip Sparks

Senior Manager Investor Relations, ARM

- Engineer in the nineties
- Analyst in the noughties
- IRO in the teenies

Connected Device Forecast

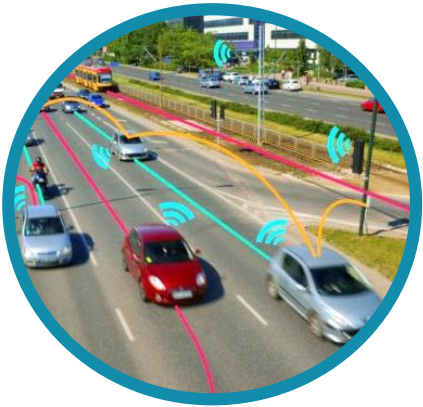


The macroeconomics of IoT

Four decades from now...

Global population
10 billion people

Life expectancy
100 years



Infrastructure



Energy



Agriculture

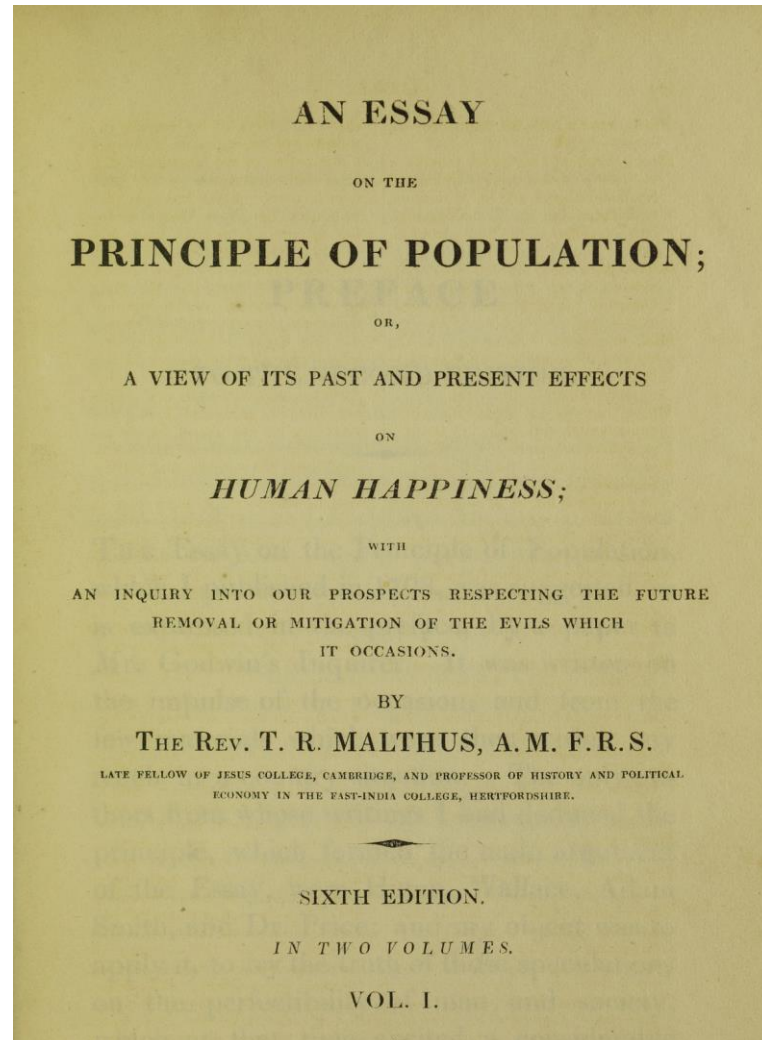


Health

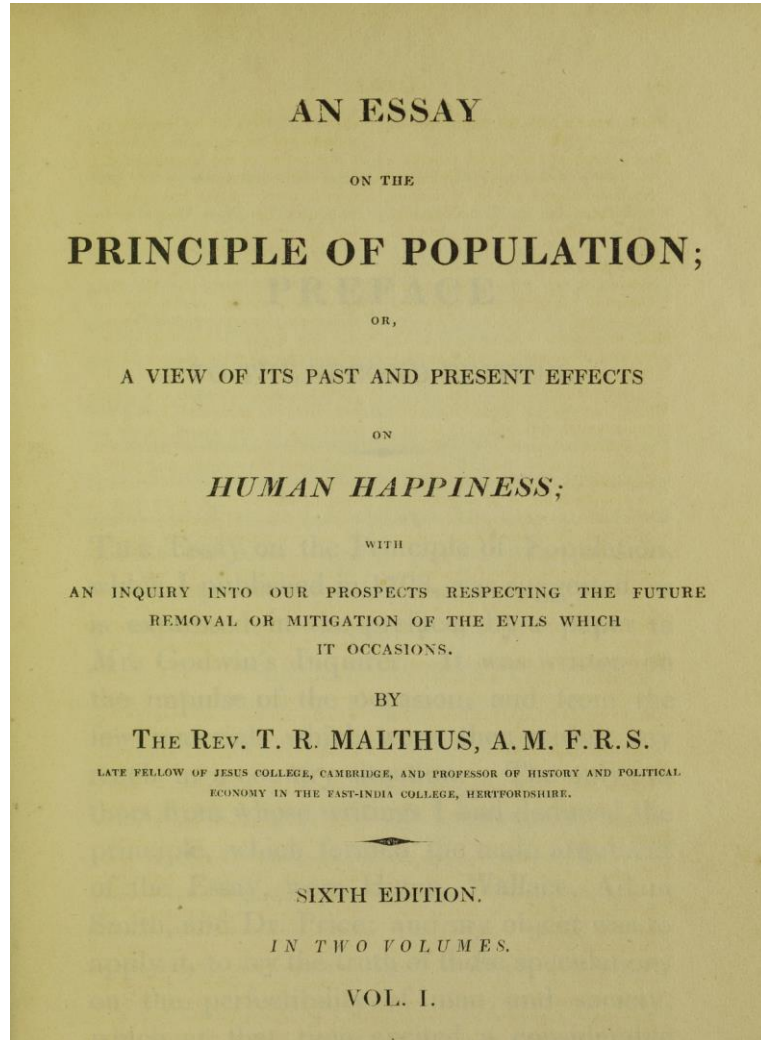


Care

Malthus vs Technology



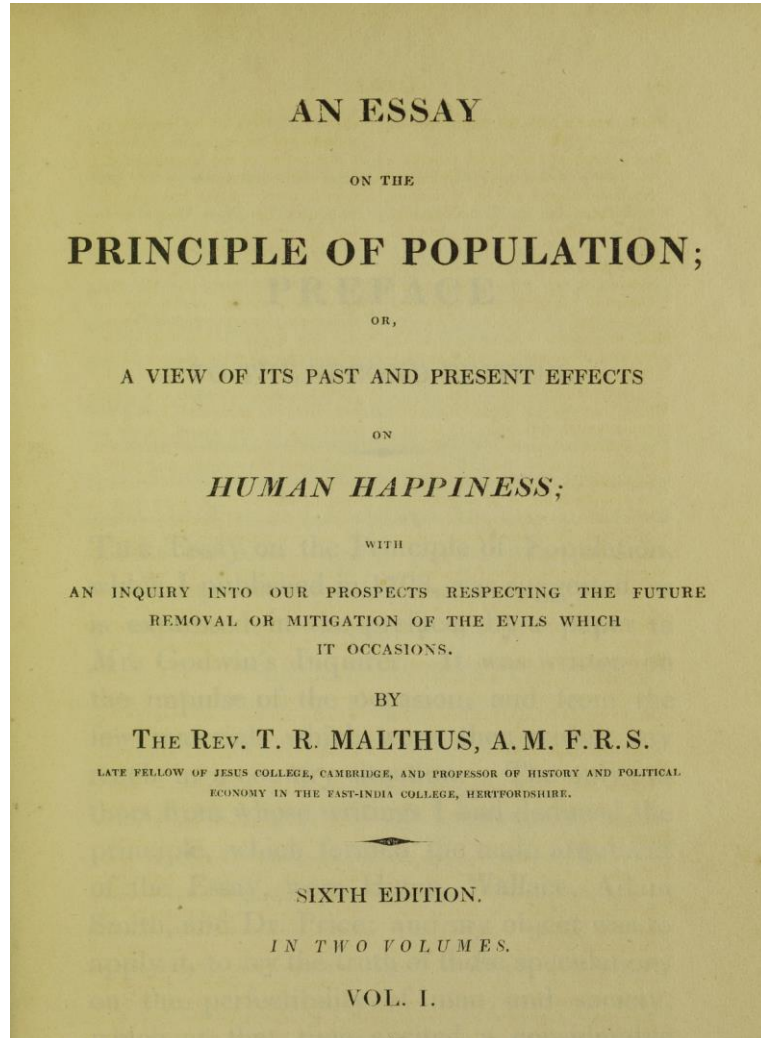
Malthus vs Technology



Game-changing tech in the 19th Century

- Factories, blast furnaces, oil drilling
- Internal combustion engines, automobiles
- Railways, cruise liners
- Vaccines
- Information Technology
 - Electricity
 - Morse code / transatlantic telegrams
 - Telephones
 - Radio

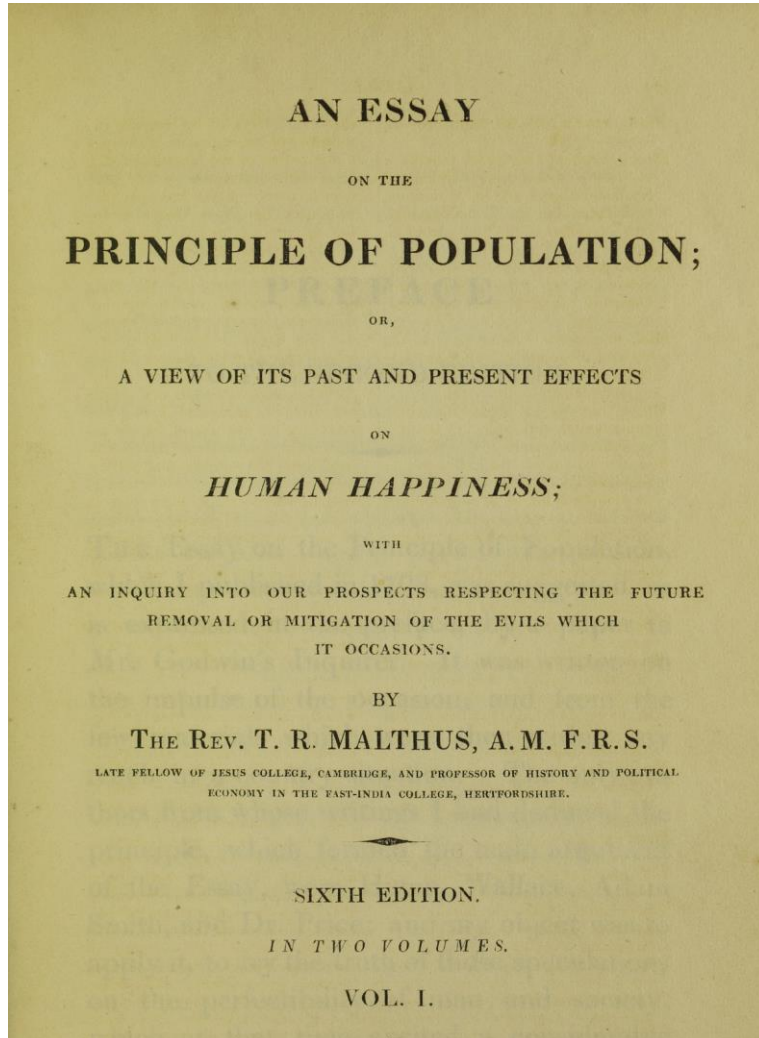
Malthus vs Technology



Game-changing tech in the 20th Century

- Assembly lines, consumerism
- Jet engines, aeroplanes
- Space exploration
- Antibiotics
- Information Technology
 - Television
 - Transistor / silicon chip
 - Personal computer / Internet
 - Mobile phone

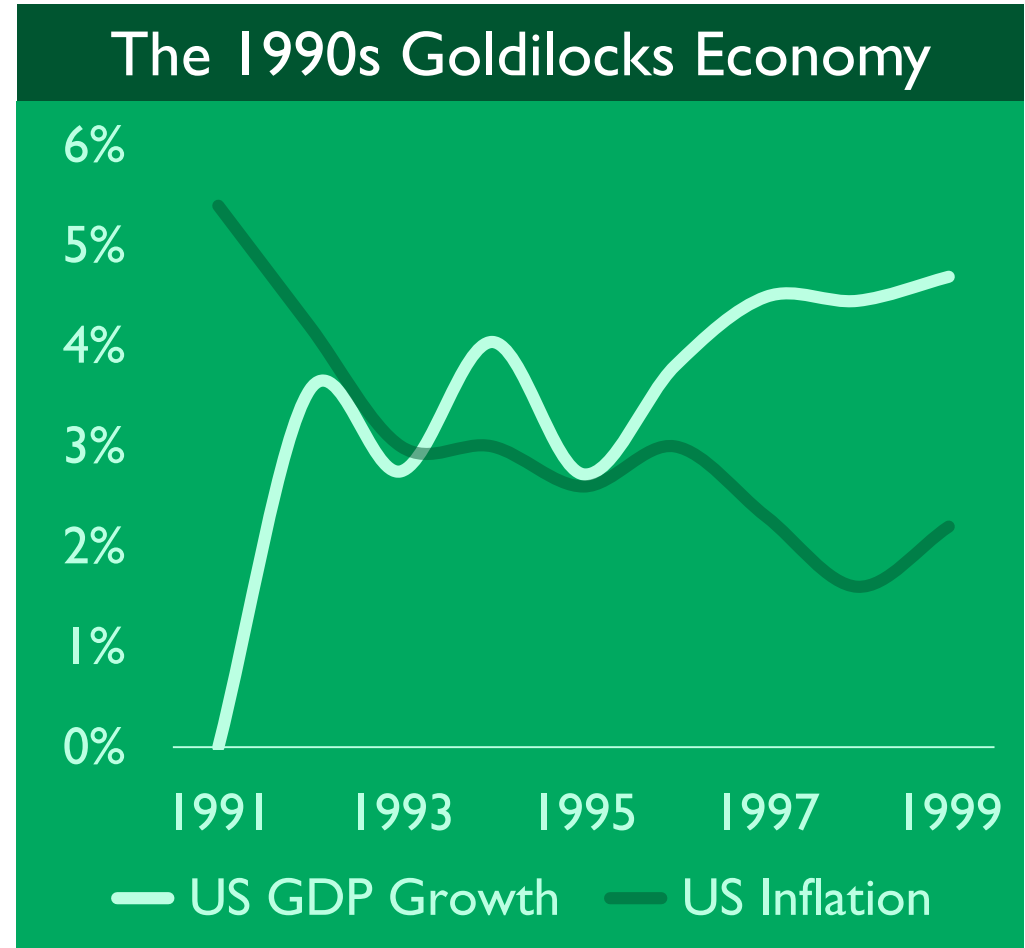
Malthus vs Technology



Game-changing tech in the 21st Century

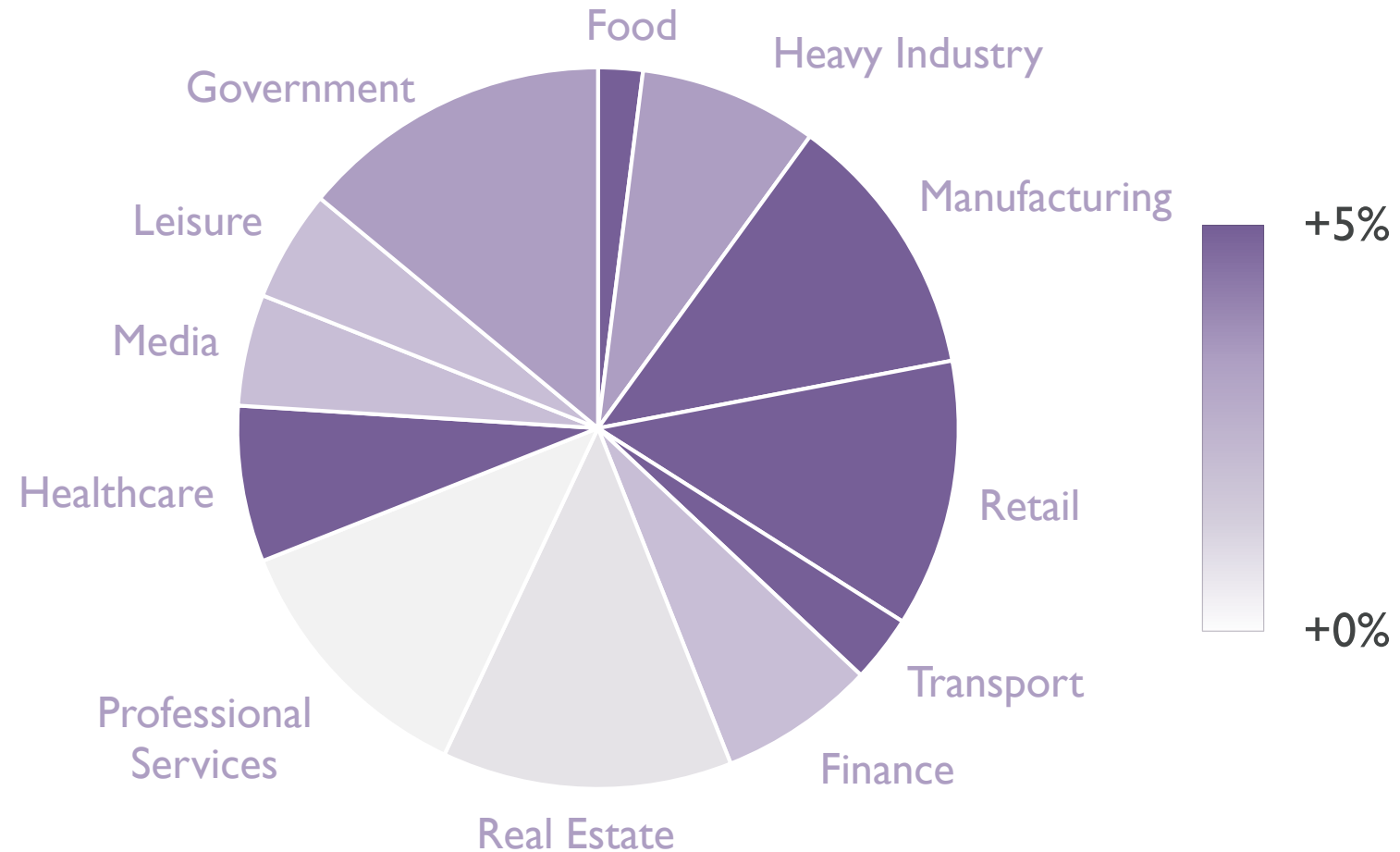
- 3D printing, nanotechnology
 - Renewable energy, electric vehicles
 - Genetic science
 - Personalised medicine
-
- **Information Technology**
 - Smartphone
 - Artificial Intelligence
 - Internet of Things
 - Autonomous vehicles and robots

Technology adoption boosts productivity



IoT will boost economic output

- IoT could add **3% to global GDP** by 2035
- Equivalent to **\$5 trillion** of additional output



Sector contribution to GDP by value add
Based on data from US Bureau of Economic Analysis
The colours depict potential sector output boost from IoT (ARM estimates)

The microeconomics of IoT

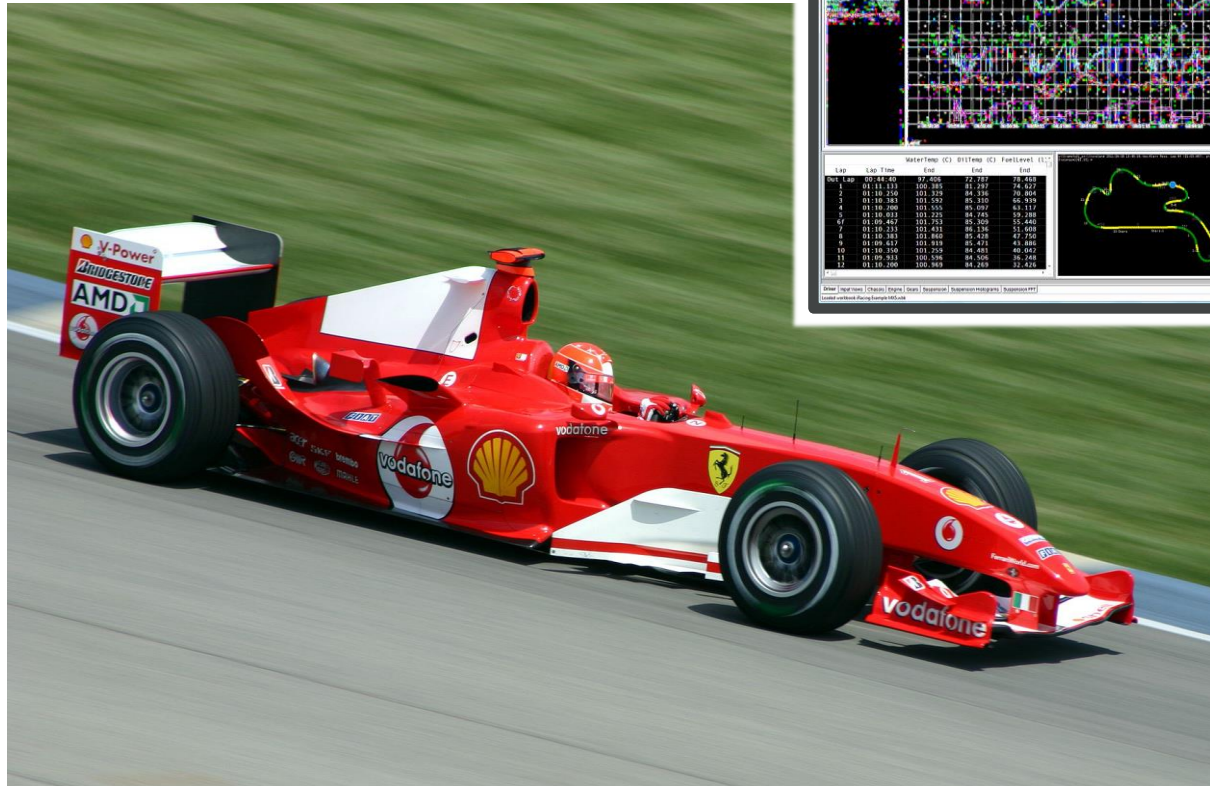
The Information Profit Margin

Value of Data > Cost of Data

- Revenue growth
- Customer loyalty
- Operational efficiency
- Waste reduction
- Risk control

- Device electronics
- Device installation
- Device management
- Network access
- Data centre hosting
- Analytics software

As the cost of data falls, the opportunity for IoT expands



1997

Unit price: \$10m

Production: <80 pa

Source Rick Dikeman - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=24471>

As the cost of data falls, the opportunity for IoT expands



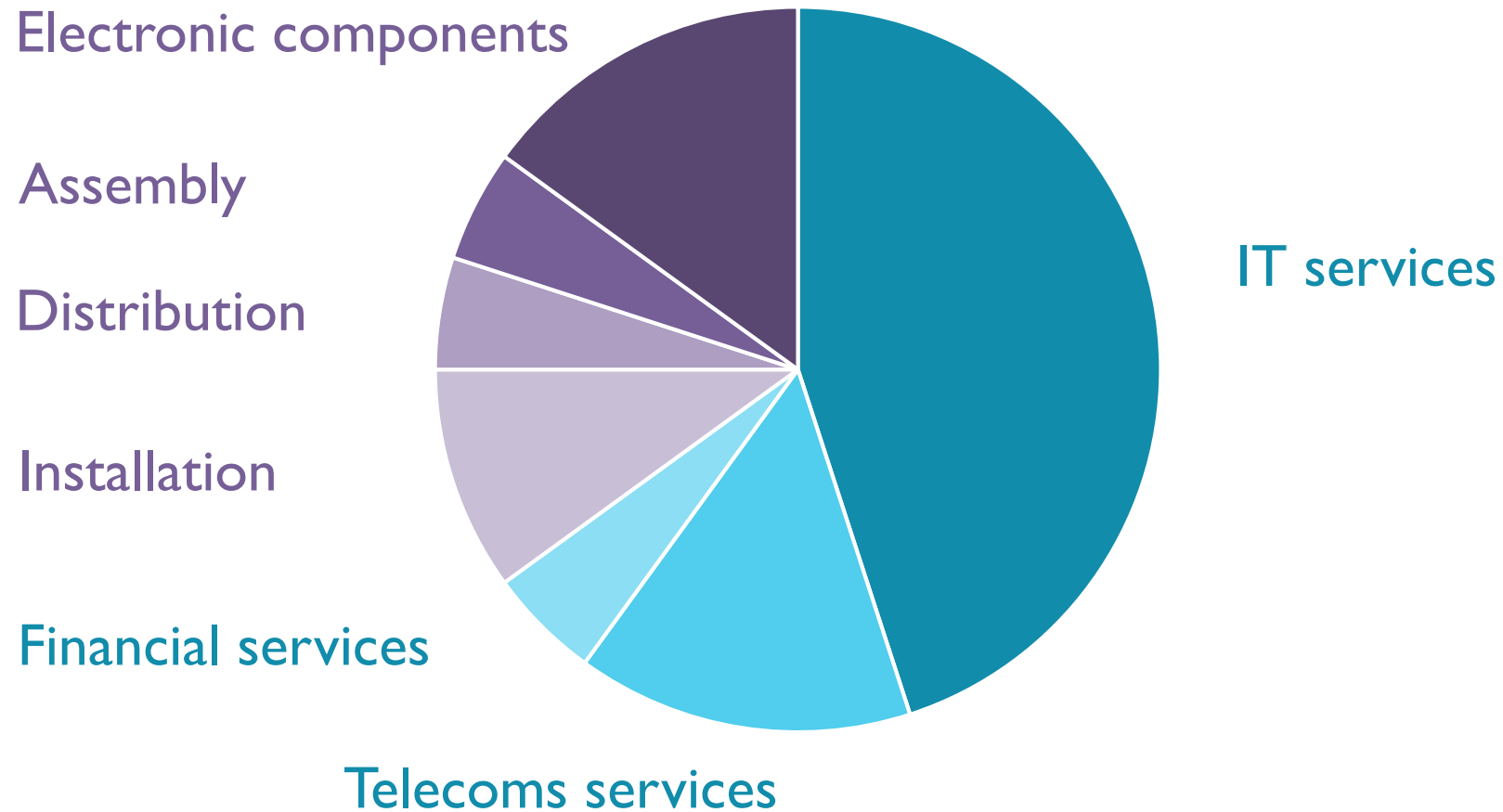
2017

Unit price: \$10k

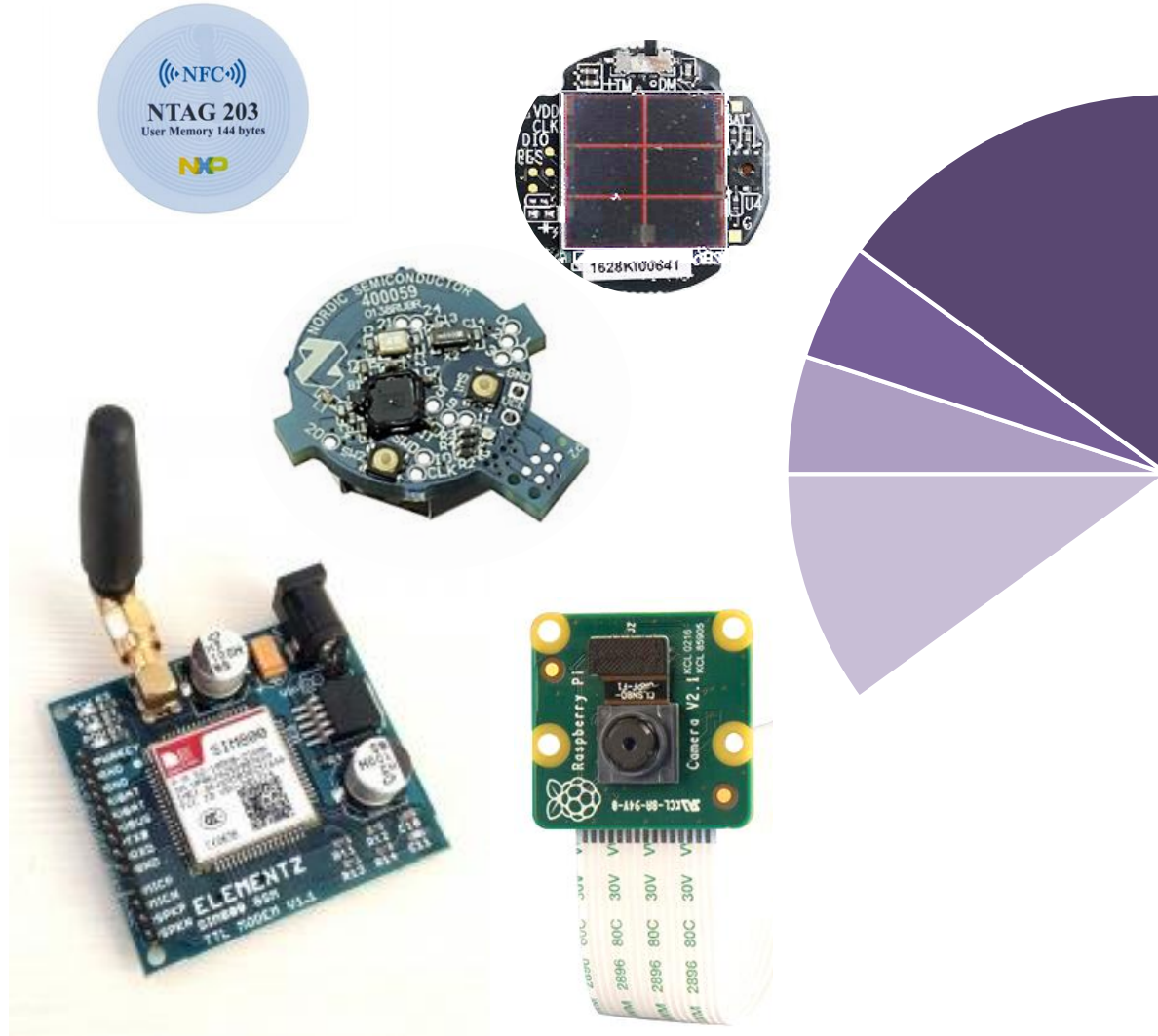
Production: >80m pa

Source: Skoda, Verisk Data Exchange

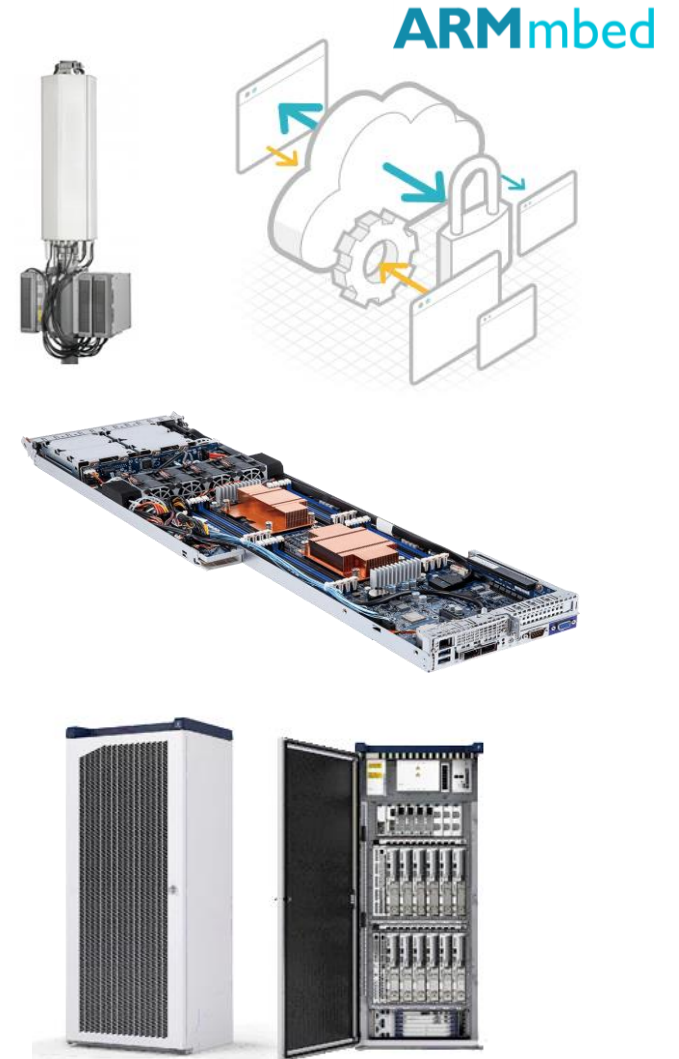
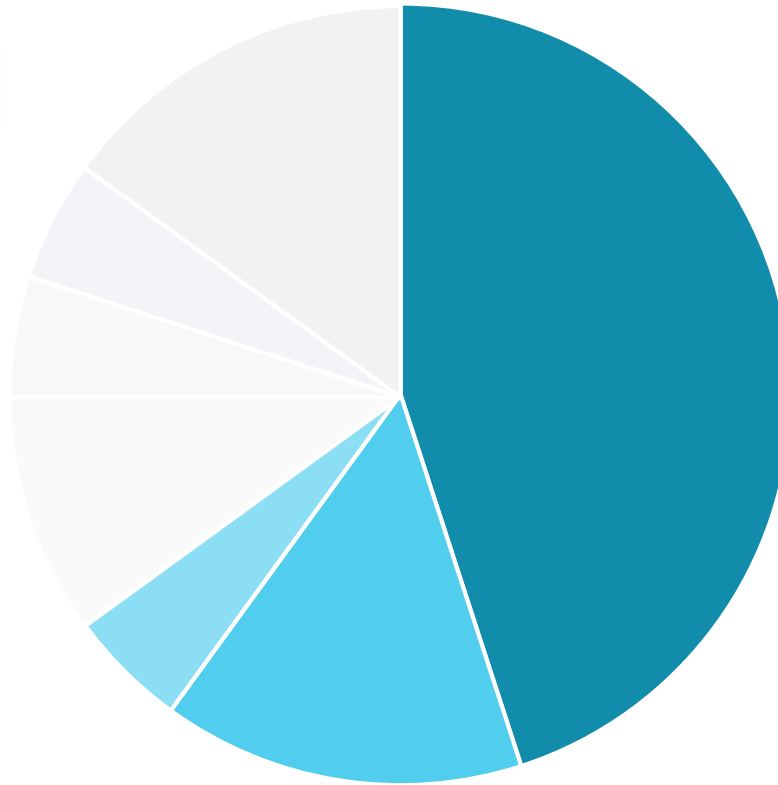
Whole-life costs of a 'typical' IoT system



Whole-life costs of a 'typical' IoT system



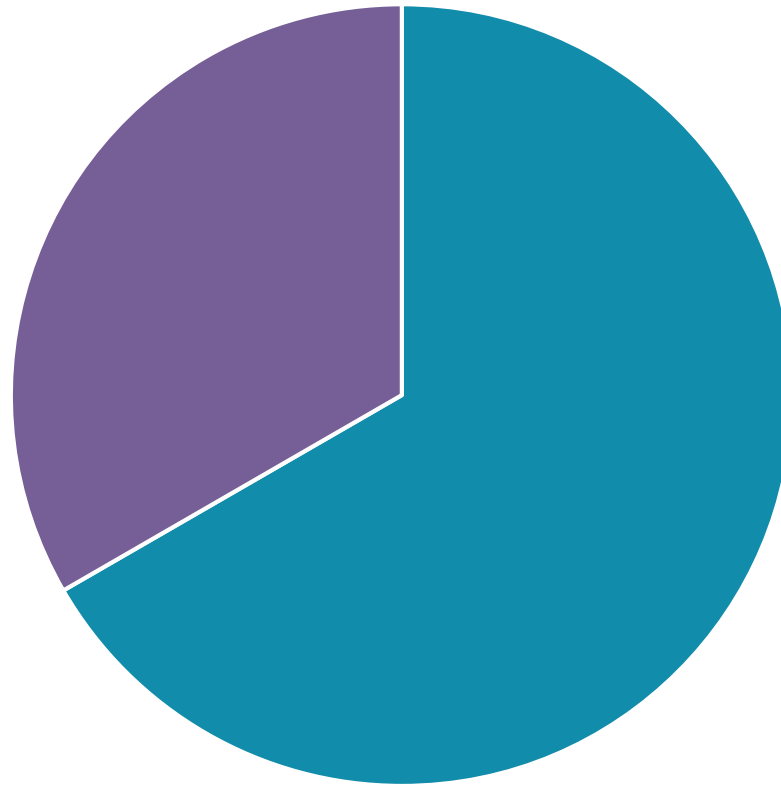
Whole-life costs of a 'typical' IoT system



Whole-life costs of a 'typical' IoT system

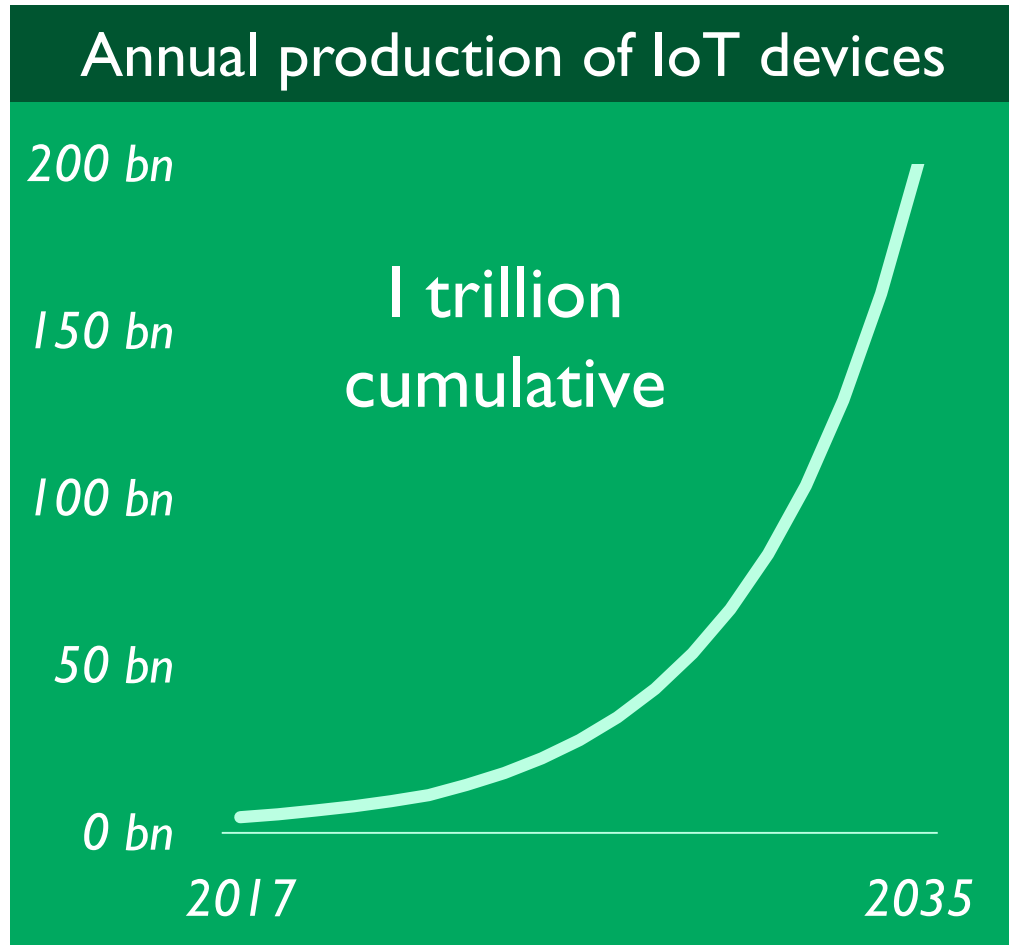
IoT
Hardware

IoT
Services



65% cost
reduction
by 2035

A trillion devices, a trillion dollars per annum by 2035



- Deployment of IoT systems adds **3% to global output by 2035** equivalent to **\$5 trillion pa**
- Spending on IoT systems to reach **\$1tn pa** by 2035
- Cumulative spending on IoT modules between 2017 and 2035 surpasses **\$750bn**

The route to a trillion devices



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The route to a trillion devices



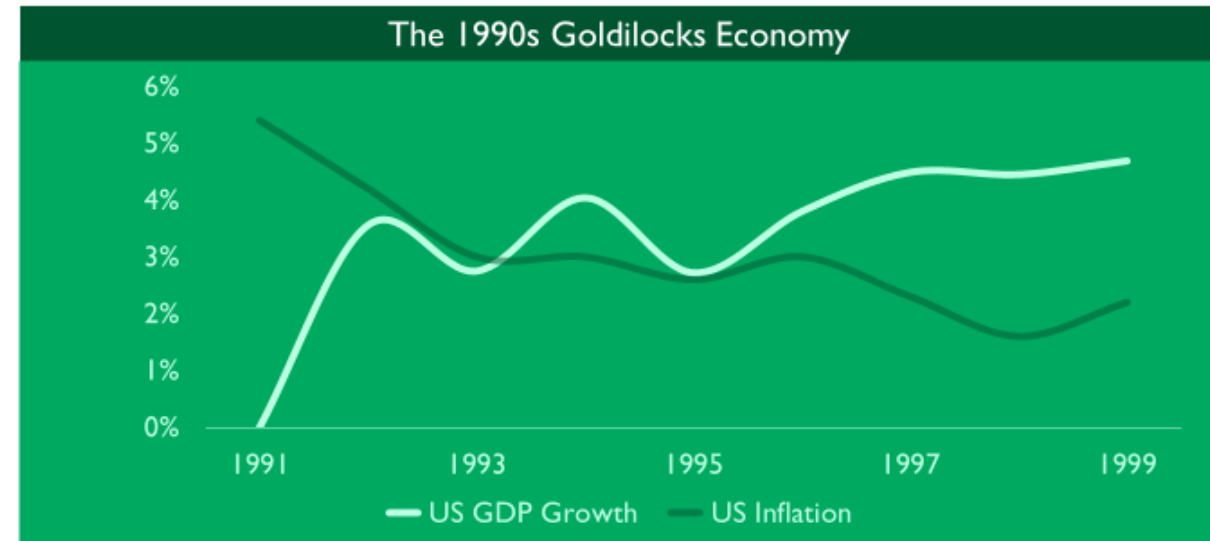
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Technology adoption boosts productivity



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Source: World Bank, US Bureau of Labour Statistics

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In the 1990s, rapid adoption of Internet technologies led to strong GDP growth with low inflation

The route to a trillion devices



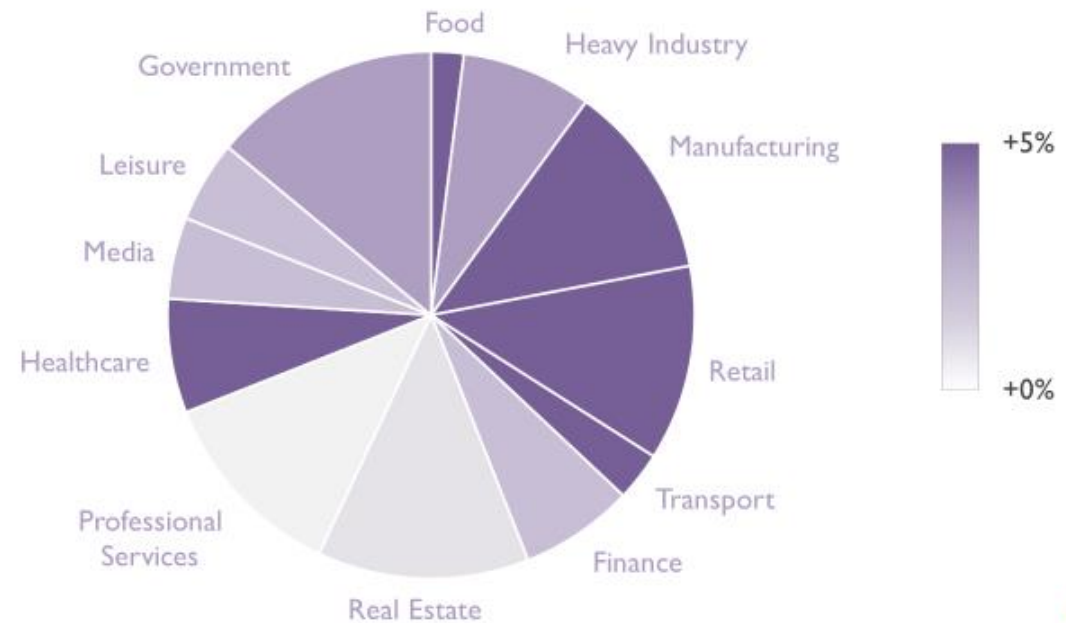
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IoT will boost economic output



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Sectors that consume physical resources and have logistical complexity have much to gain from IoT

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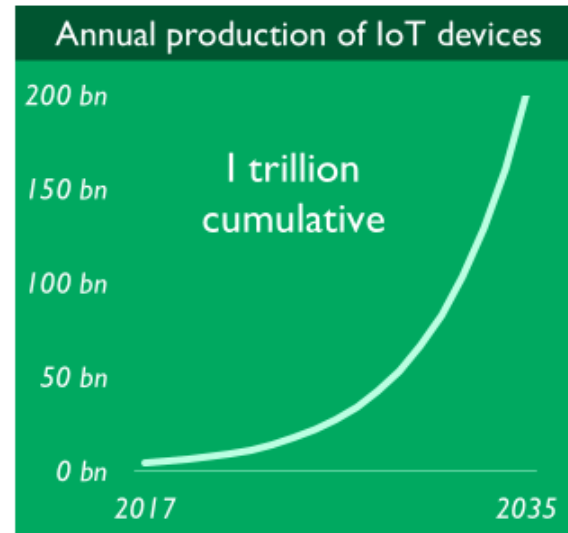
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There are thousands of use cases for IoT,
and a great diversity in solutions

The route to a trillion devices



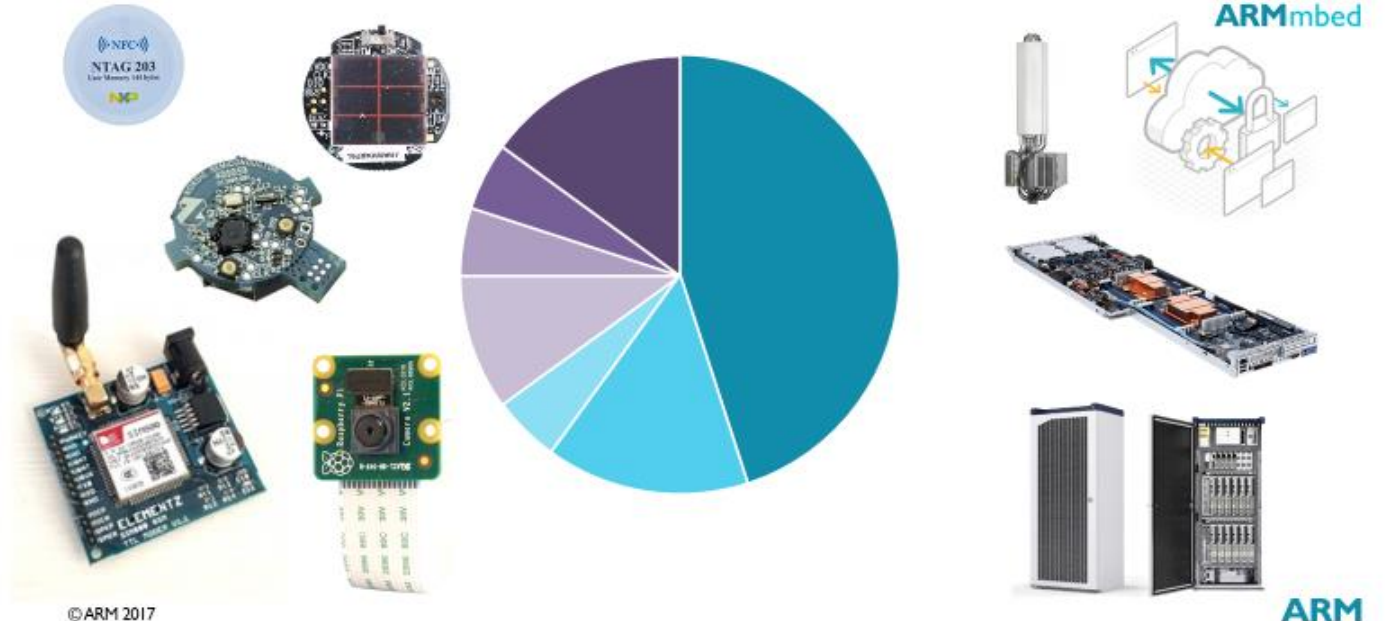
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Whole-life costs of a 'typical' IoT system



Our definition of IoT investment covers spending on IoT electronics and data services

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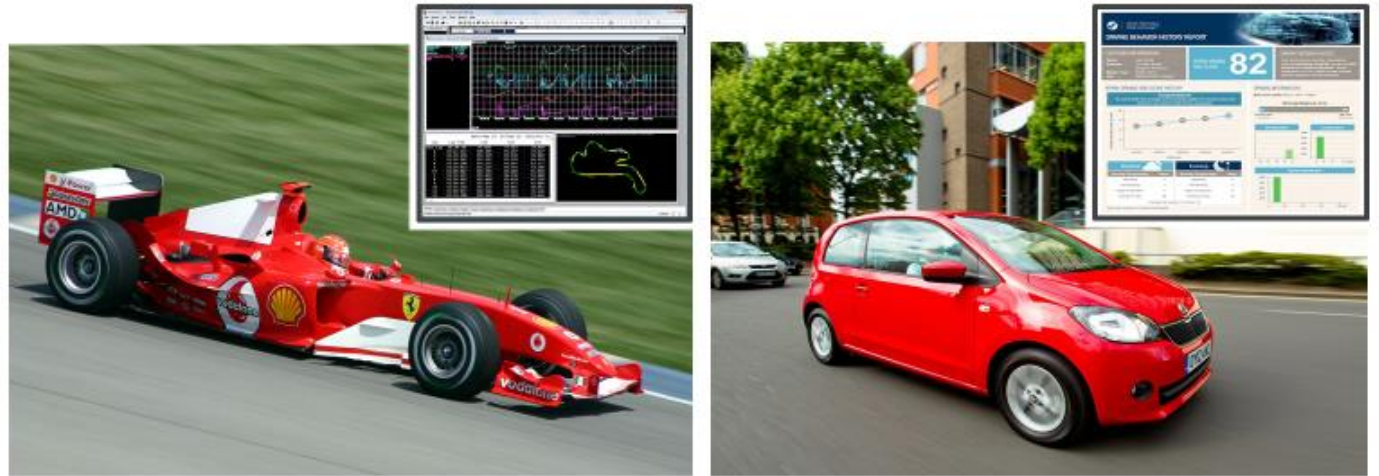
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As the cost of data falls, the opportunity for IoT expands



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More IoT systems will be deployed as the cost comes down,
and systems evolve from bespoke to standardised

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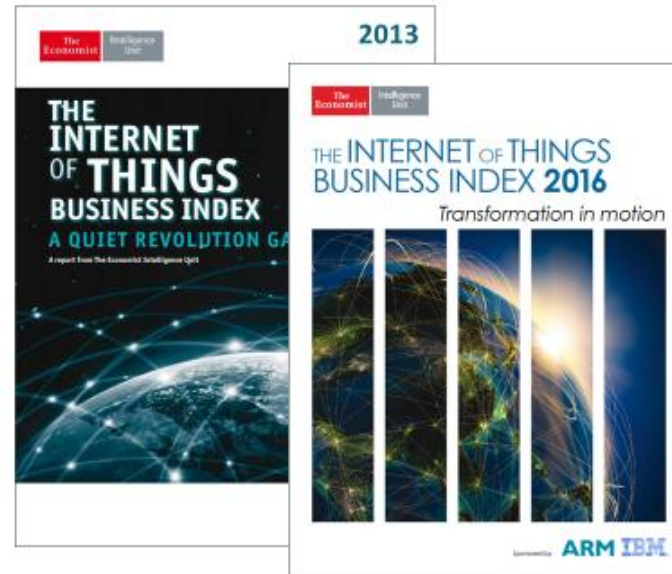
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Economist IoT business index report 2017



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“Executives believe
IoT is crucial to their
company’s long-term
success”

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In the last three years, executives have discovered IoT security is a complex issue, but appetite for IoT is as strong as ever

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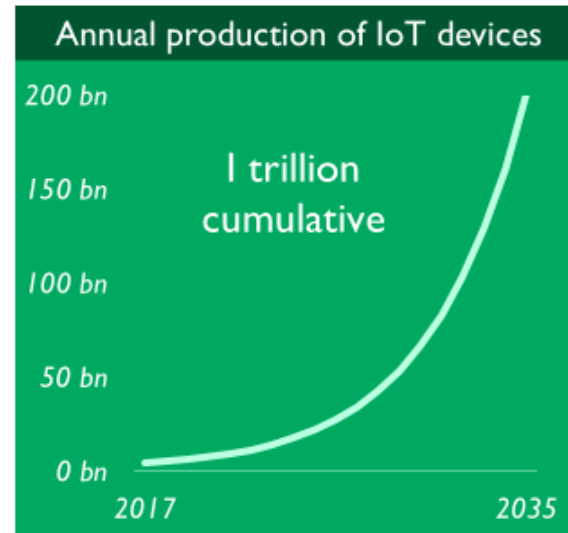
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Some IoT devices run sophisticated AI and be 'always-on', others will be ultra-low cost and communicate intermittently

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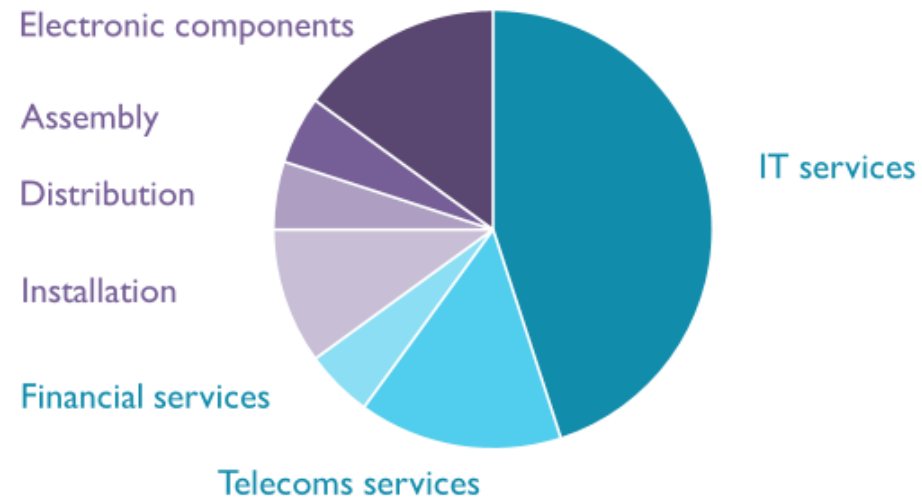
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The revenue opportunity for technology companies



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In 2035, hardware, software and telecoms companies will generate \$1 trillion of revenue from IoT



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