Architects of a more secure, connected world
Introduction to Arm

Arm is the world’s leading designer of key technologies that are used in semiconductor computer chips.

We design the processors used in over 95% of the world’s smartphones sold each year; and our technology can also be found in many other devices from digital TVs to automotive systems to smart sensors and to the data centers that run the cloud. Our technology is everywhere.

Arm was acquired by SoftBank Group Corp. (SBG) in September 2016, and is now a fully owned subsidiary of SBG. Arm's operations are independent from the rest of the SBG, although Arm now works closely with other SBG companies, and Arm provides insight into longer term technology trends that may benefit SBG.

Arm expects its customers to ship another 100bn chips over the next four years.
Working Across the Globe

Arm is headquartered in Cambridge, UK, and has 40 offices in 19 countries, with major R&D centers in the UK, US, China, Israel, France, Norway and Sweden.

Arm also invests in technology businesses all over the world, and in 2016 launched a technology fund with HOPU to encourage more technology start-ups in China. As of March 31, 2017, Arm employed 4,852 people of whom 3,960 are technical staff with 892 supporting and enabling staff.

>70% of global population reached by Arm technology

<table>
<thead>
<tr>
<th>Region</th>
<th>Offices</th>
<th>Employees</th>
<th>Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>9</td>
<td>1,080</td>
<td>165</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>10</td>
<td>1,937</td>
<td>6</td>
</tr>
<tr>
<td>Rest of Europe</td>
<td>12</td>
<td>829</td>
<td>257</td>
</tr>
<tr>
<td>Asia</td>
<td>9</td>
<td>1,006</td>
<td>51</td>
</tr>
</tbody>
</table>

4,852 Total number of employees working across 17 countries

479 Total number of Arm processor licensees

77 Nationalities work for Arm

>70% of global population reached by Arm technology
Market overview

Overview of the semiconductor industry

The semiconductor industry develops the chips that manage all of the world’s electronic devices. PCs, mobile phones and even modern washing machines have some form of chip providing their intelligence. Each generation of chip is typically smarter than its predecessor, enabling more capable and more efficient consumer and embedded electronic products.

As consumer-electronic products and industrial equipment have become more sophisticated, the chips that control them have become more complex and costlier to develop.

Over many years, the semiconductor industry has disaggregated into specialist companies that focus on each stage in the creation, design and manufacture of a silicon chip. This allows each company to invest and innovate in the area where they can add the most expertise in the value chain.

Arm is one these specialist companies providing the design of key technology components within the chip. Arm then licenses these designs to the overall chip designers and manufacturers.

Arm works closely with all the leading companies within the semiconductor ecosystem to ensure that its technology works well with other companies’ products, that silicon chip designers can quickly build low-power and high-performance chips, and that OEMs can create complex programs using a combination of third-party and in-house operating systems and applications.

As silicon chip designs become more complex it is expected that the semiconductor industry will continue to license semiconductor IP. As the global leader, Arm is well-positioned to benefit from this trend.

The market in 2016

In 2016, approximately 850 billion silicon chips were manufactured.* Of these, some 49 billion contained a processor. The processor is the brain of the chip, and controls not just the operation of the chip, but also the operation of the product that the chip goes into. Arm estimates that the total value of chips with processors sold in 2016 was about $123 billion, and that by 2025 the value of this market will have grown to about $178 billion.

Arm processor designs were in over 17 billion chips, a 34% market share. About 45% of the Arm-based chips went into mobile devices.

In recent years we have also started to gain share in important growth markets such as networking infrastructure and embedded intelligence.


Main growth markets for the semiconductor industry in 2017 and beyond:

› Mobile computing
› Networking infrastructure
› Energy-efficient servers
› Embedded intelligence
› Automotive
› Other markets
Growth opportunities 2016-2025

Mobile computing
The mobile computing market includes smartphone, tablets and laptops. It is one of Arm's most important markets because it is a very large market, contains many chips that could be Arm-based, and Arm has a very high share of some of the key components.

Arm's strategy is to maintain a high share in the main application processor by developing more advanced processors for next generation mobile devices.

The smartphone market grew at 5% in 2016, with the tablet and laptop market declining slightly. Arm increased its share from 85% to 90%. More of these smart mobile device contained Arm's latest Armv8-A processors and Mali graphics processors, and more had a higher core-count. Together these technologies help to increases Arm's royalty revenue per device.

Networking infrastructure
Networking infrastructure equipment moves data around the world. It includes cellular base stations, WiFi hotspots, corporate networks, cable-TV distribution, video-on-demand servers and the entire infrastructure of routers and switches that connects the internet together.

Network operators want to offer new services to consumers and enterprises. This will require more intelligent and flexible networks and so more sophisticated computer chips. Arm has licensed its technology to all of the major semiconductor companies that make chips for this market and is now working with them to deploy their chips in next generation networks.

In 2016, Arm's share continued to increase, growing to 17% of the chips going into networking infrastructure. Arm continued to see new design wins which will help to grow our share in the future.

The journey to 2025
Arm expects the number of smartphones sold each year to continue to grow at around 2% on average, and that technology trends such as augmented reality and artificial intelligence will create further opportunities for more advanced technology in future generations of mobile devices.

The journey to 2025
Arm expects its share to continue to increase, initially in wireless infrastructure such as remote radio heads and basestation technology, and to also gain share in routers and switches, and potentially in the server equipment in the core of the network.
**Growth opportunities 2016-2025 continued**

**Automotive**

Cars are becoming mobile super-computing platforms. More sensors and cameras are being included to assist the driver with lane detection, reading roadside signage and identifying potential hazards or people crossing the road. In time, driver assistance may lead to a fully automated vehicle.

During 2016, the market for automotive chips grew in value by 10% to $11 billion. However, there is much greater growth expected in the future as many of the new more intelligent functionality will require very advanced chips.

Arm processors are very suitable for automotive applications as we provide a range of technologies including:

- Low-cost, smart processing needed for sensors and cameras
- Management of real-time safety-critical applications such as braking systems and engine management
- Advanced decision-making needed for a self-driving vehicle

**Embedded intelligence**

Many of the products and services we use every day are enabled by small smart microcontrollers. For example, microcontrollers can be found in the control panels and electric motors in air-conditioning systems and elevators, the remote controls for TVs, and electronic passports and credit cards.

The market for microcontrollers and smartcards grew 10% to around $23 billion. The average selling price of these chips was around 85 cents, which allows them to be integrated into low-cost products and make almost any device smart.

These tiny computers are also being combined with sensors and wireless radios, thereby adding new functionality to existing products and even creating entirely new ones for consumers, enterprises, agriculture and infrastructure. Collectively, these technologies are referred to as the Internet of Things (IoT). Although this is still a nascent market, it is expected to become very large.

**The journey to 2025**

Most of the companies building chips for future automotive applications have now licensed Arm processors, and Arm expects to gradually gain share as cars become smarter.

A large opportunity, combined with relatively low barriers to entry, is attracting many semiconductor IP companies that wish to compete for market share. Arm is well positioned for this market as we have already licensed our technology to many of the companies that currently sell microcontrollers.
Energy-efficient servers

Servers are powerful computers that sit at the heart of many large corporations. In recent years, the server market has been moving away from general-purpose servers, primarily used by individual enterprises, to cloud computing, in large data centers. Some companies are now looking to build application-specific chips for these data center servers. Through being optimized for a single application, these chips can be much more efficient and effective than a general-purpose chip. This new approach to building server chips is creating an opportunity for Arm’s Partners to gain share.

In the past year, Amazon announced that they had started to deploy Arm-based chips in AWS, and Microsoft announced that they planned to deploy Arm-based chips within Azure. In addition the Barcelona Supercomputing Center and Riken announced that their next generation supercomputers would be based on Arm server chips.

Other markets

As well as the main markets listed above, many billions of chips also go into other digital electronics devices such as consumer electronics (digital TVs, video cameras, games consoles etc.) and in enterprise equipment (printers, security cameras, phone systems, manufacturing and laboratory equipment, etc.) and in a wide range of other applications that are too numerous to list out.

In 2016 this market grew to $41 billion.

With 100’s of semiconductor companies supporting 1000’s of relatively small markets, Arm’s wide range of standard processors are flexible enough for many different applications. And by using a standard, already-proven processor semiconductor companies can reduce this development cost and time, and therefore increase their profitability from niche markets.

The journey to 2025

Arm expects that application-specific chips will become an increasingly important approach within cloud computing, and this will create more opportunity for Arm-based server chips.

Arm expects to continue to gain share across a wide range of end markets.

The journey to 2025

Growth strategy
Gain share

Growth strategy
Gain share, increase royalty per device
To date, artificial intelligence (AI) has required big supercomputers to run algorithms such as image recognition, speech recognition and language translation. However, we are developing light-weight and faster versions of these algorithms will be able to run in smart watches, smartphones, security cameras and digital personal assistance, bringing AI into our daily lives.

AI is also being combined with advanced robotics. This is enabling robots to move from manufacturing and heavy machinery into new applications in the home, vehicles and hospitals. Robots with AI work alongside people to make us more effective, such as enabling a human surgeon to operate more precisely, and on patients that may be many miles away.

Read more in our blogs: community.arm.com
Computer vision

Many applications such as self-driving cars and augmented reality require a computer to be able to “see”, which means that it can identify objects, and can understand the relative position and motion of each object and itself. The computer can then make decisions about what action to take next such as displaying certain information on a screen or taking emergency action.

Read more in our blogs:
community.arm.com
Augmented reality

By combining virtual reality technology with computer vision, a headset will be able to overlay graphical information onto the real-world as a dynamic heads-up display. This technology will benefit a wide range of applications from design and manufacturing, to surgery and dentistry, to gaming and education. It could also replace the screen on a smartphone as the information currently shown on the screen could be projected directly into the eye.

Read more in our blogs: community.arm.com
Internet of Things

Protecting computers against viruses, malware and hacking has been a worry for consumers, enterprises and governments for many years. The internet of things, connected self-driving cars, and artificial intelligence will connect billions of devices to the internet. This will create a huge challenge to protect all of these devices from attack. Meeting this challenge will require layers of security technology from the chip to the device to the services that run on the device.

Read more in our blogs: community.arm.com
Creating sustainable value

Arm is the world’s leading semiconductor intellectual property (IP) supplier. The technology we design is at the heart of many of the digital electronic products sold in the world.

What we need to execute our business model

People and expertise
4,852 Full time employees

R&D investment
£349m Invested in research and development (normalized)

Technology collaboration
8,500 Engineers and industry experts attended Arm’s annual technology conferences and symposia

How Arm creates value

Arm employs engineers designing advanced technology for computer chips. We invest in R&D programs, hiring more engineers and investing in productivity tools as future generations of technology become increasingly complex.

Arm licenses the technology designs to semiconductor companies for use in their chips. Arm receives an upfront license fee, and also a royalty payment for every chip that contains Arm technology. By designing the technology once and licensing many times, Arm can cover its own R&D costs.

Arm’s customers can use the designs they have licensed in multiple chips, increasing the value to them, and generating additional royalty revenue for Arm. Arm’s designs can ship for many years. One of our very early designs, from 1993, is still shipping today.

The value we create

Arm-based chips shipped in 2016
17.7bn

Licenses signed
1,442 Cumulative licenses signed

Revenue
$1,689m Revenue in 2016

Profits
£312m IFRS EBIT

Patents
4,500 Patents owned or pending
Strategy for long-term growth

Arm’s strategy is to invest in technologies that will create long-term sustainable growth.

**Strategy for long-term growth**

**Gaining or maintaining share in long-term growth markets**

Arm intends to retain its high share within mobile devices, and to increase share in networking infrastructure, server, embedded intelligence and automotive applications.

**Increase value of Arm technology in smart devices**

Arm is investing new advanced technology that will generate additional licensing opportunities and a higher royalty per chip.

**Generate new revenue streams from adjacent markets**

The Internet of Things is a potentially huge market consisting of billions of sensors and devices all connected together. Arm expects a large proportion of devices with in the Internet of Things will be Arm-based, and is exploring additional technologies and services that could generate new revenue streams in the future.

**Key performance indicators**

- Maintain or gain share in target end markets
- Increase royalty per device by developing and deploying new technology
- Increasing investments in R&D by hiring more technical heads
- Increasing investments in new technology areas

Read more on pages 12-13
How we performed

**Gaining or maintaining share in long-term growth markets**

**KPI:** Gaining or maintaining share in target markets

<table>
<thead>
<tr>
<th>Arm-based chip shipments</th>
<th>2016</th>
<th>2021 target</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>9.3</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>10.7</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>12.9</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>15.1</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>17.7</td>
<td></td>
</tr>
</tbody>
</table>

In 2016, Arm’s customers reported around 18 billion chips shipped, a 17% increase over 2016.

By comparison, industry volumes grew 6% in the equivalent period. This demonstrates Arm’s increasing relevance to equipment manufacturers as they choose Arm-based chips over chips containing proprietary processor designs. Arm’s share of chip market volumes rose to 34%, up from 32% in the previous year.

**Mobile computing >95%**

The mobile computing market includes smartphones, tablets and laptops; more than 90% of these devices sold in 2016 used Arm technology in the high-value applications processor chip which runs the operating system. This is up from around 85% in 2015.

**Servers <1%**

Arm-based servers chips continued to ship in 2016, albeit in relatively low volumes. However, we saw several important design wins in 2016 especially in high-performance computers for research and academic applications.

**Networking infrastructure 17%**

All of the main vendors of networking chips have licensed Arm technology for future products. In 2016 we saw some very high-value Arm-based chips start to ship, which deliver much higher royalty revenue per chip than most Arm-based chips.

**Embedded intelligence 30%**

The microcontroller sector is decades old, and many microcontroller vendors still supply chips which are based on ageing proprietary architectures. Chips based on Arm technology have been gradually displacing these older designs, and in 2016 we achieved a 30% market share up from 25% the previous year.

**Increase value of Arm technology in smart devices**

**KPI:** Increase royalty per device by developing and deploying new technology

**Penetration of technologies**

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2021 target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smartphones with more than four cores</td>
<td>35%</td>
<td>50%</td>
</tr>
<tr>
<td>Smartphones based on Arm’s Mali graphic processor</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Smartphones based on Armv8-A</td>
<td>70%</td>
<td>100%</td>
</tr>
</tbody>
</table>

From smartphones to dashboards in cars, today’s consumer devices can access the internet and view complex content via rich user interfaces. These devices typically contain several Arm-based chips to run the operating system, process sensor data and interface with communication networks.

The latest generation of smart devices can incorporate advanced technologies such as multiple Arm processors per chip and graphics processors to provide acceleration for games and the user interface. Devices with more Arm content typically provide higher royalties, so the growing demands for compute performance leads to a growing revenue opportunity for Arm.

During the year, the number of chips sold containing our Cortex-A technology rose 25%. Nearly all smartphones sold in 2016 had a Cortex-A family processor in the main chip. Of these, around 70% were based on our latest processor architecture, Armv8-A (up from about 50% in 2015); around 50% also contained Mali graphics processors (up from 40%); and 35% deployed chips with more than four cores (up from 10%), which enables responsive performance without compromising battery life.
Generate new revenue streams from adjacent markets

**KPI: Increasing investments in R&D by hiring more technical employees**

<table>
<thead>
<tr>
<th>Year</th>
<th>Technical</th>
<th>Non-technical</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>2,392</td>
<td>(1,652 / 740)</td>
</tr>
<tr>
<td>13</td>
<td>2,833</td>
<td>(1,761 / 872)</td>
</tr>
<tr>
<td>14</td>
<td>3,294</td>
<td>(2,370 / 924)</td>
</tr>
<tr>
<td>15</td>
<td>4,064</td>
<td>(3,262 / 802)</td>
</tr>
<tr>
<td>16</td>
<td>4,852</td>
<td>(3,960 / 892)</td>
</tr>
</tbody>
</table>

Our people design our products, deliver them to our customers, and support the ecosystem of Partners which brings that technology to market.

We invest in our people through hiring the brightest and best graduates as well as seasoned industry experts, developing them and providing a supportive culture to maximize their capability and potential.

In 2016, Arm increased headcount by a net 788 people. Some of our new colleagues came from acquisitions, with the majority being new hires into the business. Overall, most new joiners were engineers to increase our research and development capability. Headcount grew in all areas of the business, and an increasing proportion of our engineers are working on processor technologies for servers and networking devices.

**KPI: Increasing investments in new technology areas**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of engineers invested in longer-term development projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>161</td>
</tr>
<tr>
<td>13</td>
<td>209</td>
</tr>
<tr>
<td>14</td>
<td>275</td>
</tr>
<tr>
<td>15</td>
<td>488</td>
</tr>
<tr>
<td>16</td>
<td>616</td>
</tr>
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</table>

Arm is best known for the digital technology it provides to semiconductor companies, however more than 600 of our R&D engineers spend their time researching new markets and developing new technologies. In 2016 we announced Mbed Cloud – a technology that we are investing in as the starting point for another driver for Arm’s growth.

**Mbed Cloud**

Arm launched Mbed Cloud, a solution for securely managing IoT systems in November 2016. Examples of IoT systems include smart lighting which can vary its brightness according to traffic levels, smart irrigation systems which can adjust how much water they disperse according to the moisture content of nearby soil, and smart factories that can place orders with suppliers automatically when store rooms run low of stock.

Each IoT system could have hundreds of thousands of low-cost end points which communicate with remote servers in a secure manner. Provisioning and managing a large number of secure connections is a complex task.
Investing for growth

Investing in R&D today will lead to increased revenues and profits in the future.

<table>
<thead>
<tr>
<th></th>
<th>2015 FY</th>
<th>2016 FY</th>
<th>Change %</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Licensing (m)</td>
<td>602</td>
<td>601</td>
<td>0%</td>
<td>1</td>
</tr>
<tr>
<td>Technology Royalty USD (m)</td>
<td>833</td>
<td>974</td>
<td>17%</td>
<td>2</td>
</tr>
<tr>
<td>Software and Services USD (m)</td>
<td>124</td>
<td>114</td>
<td>-8%</td>
<td>3</td>
</tr>
<tr>
<td>Total Revenue USD (m)</td>
<td>1,559</td>
<td>1,689</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Total Revenue GBP (m)</td>
<td>1,041</td>
<td>1,271</td>
<td>22%</td>
<td>4</td>
</tr>
<tr>
<td>Exchange Rate</td>
<td>1.50</td>
<td>1.33</td>
<td></td>
<td></td>
</tr>
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</table>

Adjusted EBITDA 2014

<table>
<thead>
<tr>
<th></th>
<th>2015 FY</th>
<th>2016 FY</th>
<th>Change %</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of Sales GBP (m)</td>
<td>35</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D Expenditure GBP (m)</td>
<td>229</td>
<td>349</td>
<td></td>
<td></td>
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<tr>
<td>SG&amp;A Expenditure GBP (m)</td>
<td>214</td>
<td>273</td>
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<td></td>
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<tr>
<td>Total Costs GBP (m)</td>
<td>478</td>
<td>667</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Adjusted EBITDA GBP (m)</td>
<td>563</td>
<td>604</td>
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</table>

IFRS EBIT

<table>
<thead>
<tr>
<th></th>
<th>2015 FY</th>
<th>2016 FY</th>
<th>Change %</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depreciation and Amortization GBP (m)</td>
<td>45</td>
<td>55</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td>Other operating expenses GBP (m)</td>
<td>76</td>
<td>237</td>
<td>318%</td>
<td>6</td>
</tr>
<tr>
<td>IFRS EBIT GBP (m)</td>
<td>442</td>
<td>312</td>
<td>-29%</td>
<td>7</td>
</tr>
</tbody>
</table>
Our vision for Total Computing is to create a near universal platform for Arm-based technology. By uniting the possibilities of compute, we can help realize the full promise of the Internet of Things, ensure the sustainability of our business, and empower a more connected world tomorrow.