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## Good start to the year: Bosch improves sales in all business sectors and regions

### New conceptions of mobility, new perceptions of technology

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- ▶ First-quarter sales in 2017 up 12 percent
- ▶ Target sales growth for 2017 between 3 and 5 percent
- ▶ Sales in 2016: 73.1 billion euros
- ▶ EBIT from operations in 2016: 4.3 billion euros
- ▶ Research and development expenditure: 7 billion euros
- ▶ Bosch CEO Denner: “Bosch is shaping tomorrow’s world.”

Stuttgart and Renningen, Germany – The Bosch Group has made a good start to the new business year. Sales of the supplier of technology and services rose 12 percent in the first quarter, and 11 percent after adjusting for exchange rates. All business sectors and regions picked up in the first three months of 2017, some significantly so. For the current year, in light of a subdued economic outlook and geopolitical uncertainty, Bosch aims to achieve sales growth of between three and five percent. And despite still heavy upfront investments in safeguarding the company’s future, result is set to rise. “Business success today gives us the leeway to shape tomorrow’s world,” said Dr. Volkmar Denner, the chairman of the Bosch board of management, at the annual press conference at Bosch’s [research campus in Renningen](#). “Take our existing business forward, open up new areas of business, occupy a technologically leading position – that is our strategy for the transformation process.” The focal points of this transformation are changes in the [mobility sphere](#) and [IoT connectivity](#). “As an innovation leader, we are shaping and driving transformation,” Denner added.

### Business year 2016: upfront investments on a record level

In 2016, Bosch Group sales rose to 73.1 billion euros. This is equivalent to 3.6 percent growth, or 5.5 percent after adjusting for exchange-rate effects. Negative effects from exchange rates came to some 1.3 billion euros last year. Earnings

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from operations before interest and taxes (EBIT from operations) came to 4.3 billion euros, and the EBIT margin from operations to 5.8 percent. The development in result in 2016 reflects the heavy upfront investments in securing the company's future. Last year, Bosch raised its research and development spending by just under 10 percent to 7 billion euros. As Prof. Stefan Asenkerschbaumer, the CFO and deputy chairman of the board of management, explained: "Bosch has to make considerable upfront investments in the transformation process, and at the same time safeguard high profitability over the long term." EBIT was impacted by negative extraordinary effects in 2016, and came to 3.3 billion euros.

### **New conceptions for mobility: zero emissions, zero stress, zero accidents**

The mobility sphere is on the brink of considerable upheaval. "Bosch will make a new kind of [mobility](#) possible, a mobility that is without emissions, without stress, and without accidents. It's no longer just a case of making better cars. We have to reinvent mobility," Denner said. He added that improving air quality in cities, where 70 percent of the global population will live by 2050, is a task that industry, politics, and society must tackle together. Referring to the current debate about driving bans for diesel vehicles, the Bosch CEO stressed that both targets and policies for better air quality have to be technology-neutral. "The creativity of our engineers must not be restricted to a particular technology by politics," Denner said. The Bosch CEO believes that further improvements to the internal-combustion engine offer huge potential. The RDE (real driving emissions) measuring procedure that will be valid from fall 2017 will help further reduce nitrogen-oxide emissions from vehicles. Bosch is currently working on some 300 RDE development projects. For gasoline-powered vehicles, the company has long championed the widespread use of particulate filters. Moreover, applying connectivity to transport can also help improve air quality. For the Greater Stuttgart area, Bosch has developed an assistant for multimodal transport. And from 2018, the [community-based parking](#) service developed by Bosch will feature in production vehicles.

### **The electrification of mobility: a combination of electricity and fuel**

Bosch is also investing a lot of effort in taking electric driving forward. A new [operating unit for electromobility](#) will bring together all the company's activities in this area. In addition to the billions invested in improving internal-combustion engines, the company is investing some 400 million euros each year toward achieving a breakthrough in electromobility. Most of this goes into battery research and development. Bosch is researching both current and future battery-cell technologies. The company has already won more than 30 electromobility-related orders. In 2016, it won a further 11 in China alone, the world's largest market for electromobility. From the start of 2018, the new Bosch Powertrain

Solutions division and its 88,000 associates will offer all powertrain technologies from a single source. “Whether fuel or electricity, Bosch will drive the powertrain in the future as well. For our customers, we are and want to be the number-one partner for engineering and technology,” Denner said.

### **The automation of mobility: business success**

When it comes to [automated](#) driving as well, Bosch can point to technological progress and business success. With [driver assistance systems](#), the company generated sales of more than a billion euros for the first time in 2016, as well as winning orders worth 3.5 billion euros. All in all, Bosch intends to grow faster than the market with driver assistance systems in 2017 – a market that is forecast to grow 30 percent. Some 3,000 Bosch engineers are now working on automated driving, 500 more than in the previous year. Together with [Daimler](#), Bosch is working to advance fully automated and driverless vehicles for city streets. The aim is for vehicles to drive completely autonomously in cities by the start of the next decade. One of the key components for this is the [Bosch AI onboard computer](#). Its artificial intelligence makes it the brain of the self-driving car. Before the decade is out, the company will have created a highly precise digital [map](#) on the basis of radar signals. Such a map is a key requirement for automated driving. In developing partnerships with Vodafone, Telekom, Huawei, and Nokia, moreover, Bosch is working on the infrastructure for automated and connected traffic. For example, it is carrying out tests to find reliable vehicle-to-vehicle wireless communication.

### **Connected mobility: the mobile butler**

This year will see the launch of the [Bosch Automotive Cloud Suite](#), a new platform for mobility services such as the wrong-way driver alert, predictive diagnosis, connected parking, and personal assistants. “The Bosch Automotive Cloud Suite is the key technological element for services related to the connected vehicle. We will use it to connect drivers, cars, automakers, and providers of other mobility services,” Denner said. The Bosch Automotive Cloud Suite combines the company’s automotive and IT expertise. PwC expects the global market for connected mobility to grow by nearly 25 percent annually in the years up to 2022, while Gartner estimates that 250 million connected vehicles will be driving on the world’s roads by 2020.

### **New perceptions of technology: intelligent and emotive**

Also by 2020, Bosch estimates that the global volume of the IoT market will grow 35 percent annually to 250 billion dollars. In 2016, the company already sold 27 million [web-enabled products](#). By 2020, all its new electronic products will feature connectivity. And in the future, services are also to be offered to accompany each product. The key to this is [artificial intelligence](#) (AI). Ten years from now,

nearly every Bosch product will be developed, manufactured, or equipped with artificial intelligence. Over the next five years, Bosch will be investing 300 million euros in its own center for artificial intelligence. And in the German state of Baden-Württemberg, Bosch is helping set up "[Cyber Valley](#)." This alliance of politicians, businesspeople, and scientists is intended to provide a boost for AI research. Together with the University of Amsterdam, Bosch is operating [Delta Lab](#), a research laboratory for deep learning. Bosch CEO Denner: "Artificial intelligence will make connectivity personal, something that can be experienced on an emotive level. [Digital assistants](#) will become increasingly clever, and relieve users of daily chores." Tractica forecasts that the number of people using digital assistants will triple to more than 1.5 billion by the start of the next decade.

### **The business year 2016 by region**

In **Europe**, the Bosch Group generated sales of 38.6 billion euros in 2016. Year on year, revenue increased 3.4 percent, or 4.8 percent after adjusting for exchange-rate effects. In 2016, these effects were unusually high, not least due to the depreciation of sterling. Following a very strong previous year, Bosch Group sales in **North America** declined 2.2 percent to 12.3 billion euros last year, or by 1.8 percent adjusted for exchange-rate effects. After years of declining Bosch Group sales in **South America**, the exchange rate-adjusted figures disclosed a 2.4 percent rise. In nominal terms, sales fell 5 percent to 1.4 billion euros. In **Asia Pacific**, Bosch recorded a hefty 8.3 percent increase in sales to 20.8 billion euros (exchange rate-adjusted 12 percent). Bosch now generates nearly 30 percent of its sales in Asia Pacific.

### **The business year 2016 by business sector**

Of the company's four business sectors, **Mobility Solutions** grew the strongest in 2016. Sales rose 5.5 percent (6.9 percent after adjusting for exchange-rate effects) to 43.9 billion euros. The sector's margin from operations came to 6.0 percent. The **Industrial Technology** business sector, and especially the Drive and Control Technology division, continued to face a difficult market environment in 2016. Sales fell 5.2 percent (4.2 percent after adjusting for exchange-rate effects) to 6.3 billion euros. When adjusted for the consolidation effects resulting from the sale of its large gearboxes unit, the fall in sales was only 1.5 percent. On an encouraging note, the business sector returned to profitability. Negative exchange-rate effects were especially in evidence in the sales disclosed by the **Consumer Goods** business sector. After adjusting for these effects, the business sector's sales grew 5.7 percent. Nominal sales growth was 2.6 percent, to 17.6 billion euros. The business sector's margin from operations rose one percentage point, to 8.2 percent. The **Energy and Building Technology** business sector achieved sales of 5.2 billion euros in 2016. Here too, exchange rates negatively affected sales. Adjusted for these effects, sales grew 4.5

percent. The nominal figure was 1.7 percent. The business sector's margin came to 4.3 percent in 2016.

### **Headcount: considerable need for IT and software-related personnel**

As of December 31, 2016, the Bosch Group employed some 390,000 associates worldwide. Headcount increased by 14,500 last year. Regionally, the workforce structure remained largely unchanged. The number of associates in Germany rose by 2,000 to 134,000. Most of the remaining headcount increase was in Asia and North America. The company currently has considerable staffing requirements for specialists and executives, especially with software and IT expertise. Even now, Bosch employs more than 20,000 [software engineers](#), just under 4,000 of them for the internet of things alone.

**Press photographs:** #970397, #989181, #695017, #452462, #1-CC-22103, #1-BBM-22089, #499674, #949878, #538121, #970394, #368351, #957662, #988670, #948725, #988862, #970384, #1002982, #368716, #957677

**Infocharts:** #1061695, #1061696, #1061697, #1061698, #1061699

### **Video materials:**

[How things become partners – the IoT is getting personal](#)

[Kuri – the intelligent home robot](#)

[The future of driving – gesture control with haptic feedback](#)

[Connected cars are becoming the third living environment](#)

[Community-based parking](#)

[Automated driving at Bosch](#)

[The manufacturing of the future with Industry 4.0](#)

[Bosch IoT film](#)

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*The Bosch Group is a leading global supplier of technology and services. It employs roughly 390,000 associates worldwide (as of December 31, 2016). The company generated sales of 73.1 billion euros in 2016. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected manufacturing. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to deliver innovations for a connected life. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is*

*“Invented for life.” The Bosch Group comprises Robert Bosch GmbH and its roughly 440 subsidiaries and regional companies in some 60 countries. Including sales and service partners, Bosch’s global manufacturing and sales network covers nearly every country in the world. The basis for the company’s future growth is its innovative strength. At 120 locations across the globe, Bosch employs some 59,000 associates in research and development.*

*The company was set up in Stuttgart in 1886 by Robert Bosch (1861-1942) as “Workshop for Precision Mechanics and Electrical Engineering.” The special ownership structure of Robert Bosch GmbH guarantees the entrepreneurial freedom of the Bosch Group, making it possible for the company to plan over the long term and to undertake significant upfront investments in the safeguarding of its future. Ninety-two percent of the share capital of Robert Bosch GmbH is held by Robert Bosch Stiftung GmbH, a charitable foundation. The majority of voting rights are held by Robert Bosch Industrietreuhand KG, an industrial trust. The entrepreneurial ownership functions are carried out by the trust. The remaining shares are held by the Bosch family and by Robert Bosch GmbH.*

*Additional information is available online at [www.bosch.com](http://www.bosch.com), [www.iot.bosch.com](http://www.iot.bosch.com), [www.bosch-press.com](http://www.bosch-press.com), [www.twitter.com/BoschPresse](https://twitter.com/BoschPresse).*

Bosch key data for the  
business year 2016



Figures in billions of euros	2016	2015	Change from previous year nominal (adjusted for exchange-rate effects)
<b>Total sales revenue</b>	<b>73.1</b>	<b>70.6</b>	3.6% (5.5%)
Percentage share of sales revenue generated outside Germany	80	80	
<b>Sales revenue of the business sectors</b>			
Mobility Solutions	43.9	41.7	5.5% (6.9%)
Industrial Technology	6.3	6.6	-5.2% (-4.2%)
Consumer Goods	17.6	17.1	2.6% (5.7%)
Energy and Building Technology	5.2	5.1	1.7% (4.5%)
<b>Sales revenue in the major regions</b>			
Europe	38.6	37.3	3.4% (4.8%)
- of which Germany	14.5	14.2	2.6%
North America (including Mexico)	12.3	12.7	-2.2% (-1.8%)
South America	1.4	1.4	-5.0% (2.4%)
Asia Pacific (including other regions)	20.8	19.2	8.3% (11.8%)
<b>EBIT (earnings before interest and taxes) as a percentage of sales revenue</b>	<b>3.3</b> 4.6	<b>4.6</b> 6.5	-1.3
<b>EBIT from operations as a percentage of sales revenue</b>	<b>4.3</b> 5.8	<b>4.6</b> 6.5	-0.3
<b>Research and development cost as a percentage of sales revenue</b>	<b>7.0</b> 9.5	<b>6.4</b> 9.0	0.6
<b>Capital expenditure as a percentage of sales revenue</b>	<b>4.3</b> 5.8	<b>4.1</b> 5.7	0.2
Depreciation of property, plant, and equipment	3.0	2.8	0.2
<b>Equity</b>	<b>36.1</b>	<b>34.4</b>	<b>1.7</b>
Equity ratio	44	45	
<b>Figures in millions of euros</b>	<b>2016</b>	<b>2015</b>	<b>Change from previous year</b>
<b>Unappropriated earnings (dividend of Robert Bosch GmbH)</b>	<b>138</b>	<b>142</b>	<b>-4</b>

<b>Associates As per December 31, 2016</b>	<b>2016</b>	<b>2015</b>	<b>Change from previous year</b>
<b>Bosch Group</b>	<b>389,281</b>	<b>374,778</b>	14,503
Europe	236,654	229,599	7,055
- of which Germany	133,974	131,994	1,980
Americas	42,627	41,037	1,590
Asia Pacific (including others)	110,000	104,142	5,858
<b>Associates in research and development As per: December 31, 2016</b>	<b>2016</b>	<b>2015</b>	<b>Change from previous year</b>
<b>Bosch Group</b>	<b>58,719</b>	<b>55,773</b>	2,946
Europe	34,887	32,143	2,744
- of which Germany	26,761	24,906	1,855
Americas	3,163	2,866	297
Asia Pacific (including others)	20,669	20,764	-95

May 4, 2017



**BOSCH**

May 4, 2017  
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**New conceptions of mobility, new perceptions of  
technology: Bosch is driving transformation**

A presentation by Dr. Volkmar Denner,  
chairman of the board of management  
of Robert Bosch GmbH,  
and Prof. Stefan Asenkerschbaumer,  
deputy chairman of the board of management,  
at the annual press conference on May 4, 2017

Check against delivery.

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Rarely, ladies and gentlemen, ...

... has it been as exciting to work for Bosch as it is now. Change, both in our business environment and within our company, is demanding our attention and rousing our competitive spirit. At this exciting time, I welcome you to our annual press conference. The speed and depth of this transformation are plain to see, particularly in mobility, but also across technological developments in general. The major catalyst for this change is connectivity – in our industry and in our company. It is changing business models, products, and not least the world of work itself. A desire simply to defend a leading market position in familiar areas of business is no longer enough. The transformation process is profound. We must become its driver and put ourselves on the vanguard wherever possible – in other words, we must seize the opportunities of the new. In that sense, Bosch is not merely a company in the midst of a transition, but one in the midst of an upheaval.

Today we will be presenting a number of examples that illustrate what we mean by this. But first, a look at the main points of today's press conference:

- In 2016, we continued on our growth trajectory, and this without any economic tailwind and despite negative exchange-rate effects. Our sales rose from 70.6 to 73.1 billion euros, while our EBIT from operations came to 4.3 billion euros.
- In 2017, we again want to grow faster than the markets that are relevant for us. Our sales have already risen by 12 percent in the first quarter. In view of global economic uncertainty, our aim is to achieve growth of between three and five percent for the year as a whole. Even as we continue to invest heavily in our future, we are looking to improve our margin.
- Beyond this year, we are plotting a course for sustainable success. In existing business areas, we want to expand our market and technology

leadership – from a position of strength. In many new areas, such as connectivity and artificial intelligence, we want to build up a competitive market position.

It is our longer-term objectives in particular, ladies and gentlemen, that bear witness to the dynamism of this transformation at Bosch. Our business environment is changing not only as regards technology and business, but also more than ever politically, or indeed populistically. Bosch is international on the basis of a deeply held conviction – we want one world and, above all, one Europe – without nationalism. Globalization benefits our business; the return of borders hurts it. And most importantly, our associates come from 150 different countries – companies like Bosch are “united nations” in their own right, and we want it to remain that way, even in the face of populist siren songs.

Our commitment to environmental protection and resource conservation is equally deep – so to us it seems paradoxical that the mayors of Mexico City, Paris, Athens, and Madrid chose a climate conference as the venue to announce a ban on diesel vehicles. Bans of this kind are even being discussed in countries such as Germany, countries which are likely to fall short of their own emissions targets. Regardless of the fact that a higher share of diesel-powered vehicles means less CO<sub>2</sub> from road traffic overall. And regardless of the fact that, following the introduction of the particulate filter, diesel engines emit almost no particulates. Even their nitrogen-oxide emissions have already been greatly reduced – and of course new laws demand that these limits must in the future also be complied with on the roads. Quite a lot remains to be done. In the world’s metropolises and here in Stuttgart, air-pollution control needs to be a central objective – for industry, politics, and society. But all the parties need to engage constructively in this debate, and stick to the facts. A ban on diesel vehicles would be a knee-jerk reaction that flies in the face of environmental and economic facts – it would harm not only jobs and trade, but also climate action itself. Of course, politicians are absolutely within their rights to mandate stricter emissions limits – but these should continue to be

technology-neutral. In other words, they should seek neither to promote nor to demonize a solution such as the diesel engine. The automotive industry, Bosch included, will do its fair share to keep air pollution under control. How? By making combustion engines as eco-friendly, and electrical powertrains as affordable, as possible. Some 50 percent of our research and development spending is aimed at conserving resources and protecting the environment – never has Bosch ingenuity been in as much demand as it is today. But the creativity of our engineers must not be restricted by politics – because it is precisely this creativity that could make vehicle bans technologically superfluous. We are already well on the way to achieving this, as I will show you later.

Let us look first of all at how our business is doing. Mr. Asenkerschbaumer will now give you an overview of how business developed over the past year as well as the outlook for the current year. After that, I will explore our strategic topics in greater depth.

### **Business figures: marked by the coming transformation**

Ladies and gentlemen,

Before Mr. Denner discusses our strategic focal points, I would now like to turn to the financial figures for 2016 and give you our outlook for 2017. In many respects, the figures reflect upfront investments for the coming transformation. To give you the news upfront, in 2016 the Bosch Group made further progress. Against the backdrop of only moderate growth in the global economy, Bosch achieved good growth and we notched up a series of successes. One of the major challenges we face in the coming years will be to achieve a balance between the upfront investments necessary for the transformation and an equally necessary high level of profitability. After all, it will be quite some time before many of these upfront investments pay off.

But first things first. Let us take a look back at the economic environment around the world. In 2016, the global economy once again achieved only

moderate growth. Global GDP rose by just 2.5 percent. In the second half of the year, economic activity picked up in Asia, and especially in our core market of automobile production. Worldwide, this grew by 4.5 percent – much more strongly than originally expected. In contrast, developments in our other core markets tended to be moderate, as shown by indicators such as global production in the mechanical engineering sector, private consumption, and global construction activity.

Turning now to our business figures, the Bosch Group's sales revenue climbed 3.6 percent year on year in 2016, to 73.1 billion euros. Unlike in the previous year, there were no significant consolidation effects. However, reported sales were burdened by 1.3 billion euros in exchange-rate effects. Setting aside these effects, our sales rose by 5.5 percent. In other words, we achieved good sales growth in 2016, Meeting our declared target range of 3 to 5 percent for sales growth. Indeed, after adjusting for exchange-rate effects, we even surpassed it slightly.

The Mobility Solutions business sector reported the strongest growth in 2016. Here, we increased sales by 5.5 percent; adjusted for exchange-rate effects, growth was 6.9 percent. We benefited from strong demand for gasoline direct injection systems, driver assistance systems, and display systems. Following a comprehensive restructuring, our Electrical Drives division is now on a growth trajectory with new products. The e-bike business continued to develop very strongly. It is an example of a successful start-up.

The Industrial Technology business sector, and especially the Drive and Control Technology division, is still struggling in a very difficult market environment. Sales once again declined – by 5.2 percent in nominal terms to 6.3 billion euros, a drop of 4.2 percent allowing for exchange-rate effects. However, the impact of a baseline effect cannot be underestimated: at the end of 2015, we disposed of our large gearboxes business. In addition, the market for packaging machinery did not develop as we had expected.

The Consumer Goods business sector was once again successful. In 2016, its sales revenue came to 17.6 billion euros. In nominal terms that equates to just 2.6 percent growth, but adjusted for currency effects it was 5.7 percent. We are very satisfied with the way business has developed at BSH Hausgeräte. The focus there is on connectivity and the expansion of its international business, particularly in growth markets such as China and India. Meanwhile, the Power Tools division, too, developed well once again. The division's success is thanks to its consistent focus on the user. Users are involved in the development of new products and services from the beginning.

We are giving the Energy and Building Technology business sector a clear customer focus on products and solutions for private customers, product solutions and services for commercial customers, and business process management. In 2016, we created a specific division for this latter area: Bosch Global Service Solutions. This builds on our Security Systems division's existing service network. The new division got off to a flying start with double-digit growth. In terms of products, 2016 was a very successful year for connected boilers. Overall, this business sector was particularly affected by the exchange-rate burden. In euro terms, sales rose by just 1.7 percent to 5.2 billion euros, but allowing for exchange-rate effects growth was 4.5 percent.

Let us take a quick look at developments by region. In Europe, still responsible for over half our sales, we achieved 3.4 percent sales growth to 38.6 billion euros, or 4.8 percent allowing for exchange-rate effects. Exchange-rate effects here were unusually high, not least due to the depreciation of sterling. In North America, we felt the full force of the slowdown. Sales revenue slipped 2.2 percent, or 1.8 percent adjusted for exchange-rate effects. Happily, though, we finally achieved exchange-rate adjusted growth in South America, at a rate of 2.4 percent. The fact that nominal sales fell by 5 percent is in large part due to the continuing depreciation of the Brazilian real. Once again, sales growth was strongest in Asia Pacific, where sales revenue grew

by 8.3 percent to reach 20.8 billion euros. We now generate around 28 percent of our sales there. After adjusting for exchange-rate effects, we managed to increase our sales by 12 percent.

That brings me to our result. On aggregate, we generated an EBIT from operations of 4.3 billion euros, which equates to an operational EBIT margin of 5.8 percent. As we said at the start of the year, when we presented our preliminary figures, EBIT is down year on year. The difference between this figure of the disclosed EBIT of 3.3 billion euros results in large part from depreciation and amortization in connection with the full acquisition of the former joint ventures BSH Hausgeräte and Automotive Steering, which were fully consolidated for the first time in 2016. Last year, positive one-off effects from the acquisition helped compensate for the charges from this depreciation and amortization. Other effects include investment write-downs and charges arising from legal proceedings relating to antitrust and emissions issues.

As I said at the beginning, we face the challenge of making significant upfront investments for the coming transformation while maintaining a consistently high level of profitability. These upfront investments include increasing expenditure on research and development as well as high levels of capital expenditure with an impact on depreciation and amortization. Then there are numerous other upfront investments in initiatives relating to digitalization and in projects that aim to increase the efficiency of our shared services.

What is more, we are realigning our traditional areas of business in response to changing requirements and markets. Bosch Rexroth is undergoing a comprehensive restructuring in the face of lower market volumes. We announced adjustments to this effect last year and at the start of 2017. At the same time, we are making great efforts to drive forward promising areas such as Industry 4.0. Additional adjustments are necessary, for instance with regard to electric steering in our Automotive Steering division. Furthermore, the carve-out of the Starter Motors and Generators division involved considerable costs. Two days ago, we signed a deal to sell the division. We are pleased to have found

the right partners for the division in the shape of the Chinese industrial enterprise Zhengzhou Coal Mining Machinery Group and China Renaissance Capital Investment.

Following this detailed explanation, I would now like to turn briefly to the development of result by business sector. Mobility Solutions achieved an operating result of 2.6 billion euros. This is down on the previous year. I have already spoken about the pressures faced. Encouragingly, Industrial Technology returned to profitability, with an EBIT of 44 million euros. Our Consumer Goods business was very successful. Despite exchange-rate burdens, the Energy and Building Technology business sector managed to maintain the previous year's result.

Let us now look in more detail at capital expenditure as well as research and development expenditure. We increased our research and development expenditure by some 0.6 billion euros to seven billion euros, or 9.5 percent of sales, compared to 9 percent in the previous year. Our upfront investments are particularly noticeable in this area. Among other things, they focused on expanding driver assistance systems, car multimedia, and sensor technology.

We also further increased our capital expenditure. In 2016 this amounted to 4.3 billion euros; the capex ratio rose to 5.8 percent of sales revenue. We expanded our capacity in a number of areas. Here, too, the Mobility Solutions business sector was particularly noteworthy: capital expenditure rose to 3.3 billion euros, compared with 3.1 billion euros in the previous year. We also greatly increased capital expenditure in Consumer Goods to 720 million euros from last year's 650 million euros.

I will now turn just briefly to the structure of the statement of financial position. There were no major changes here. It remains sound, with an equity ratio of 44 percent. Moreover, we have liquidity as reported in the statement of financial position of 16.7 billion euros, compared with the previous year's 14.4 billion euros.

So what are the prospects for the future?

Our forecasts for the global economy assume a slightly higher rate of growth of 2.8 percent, compared to the 2.5 percent mentioned for 2016. But the risks are significant, given political developments and increasingly protectionist tendencies. The latter trend is by no means a new development. It has been growing ever since the end of the global financial crisis, as WTO statistics show. This is not a question of customs duties, but rather of issues such as local-content regulations, licenses, and product standards.

Despite a good start to 2017, with sales growth of 12 percent in the first quarter, our forecast for the Bosch Group is cautious, given the uncertainty of the business environment. All our business sectors have grown rapidly in the first quarter. Mobility Solutions has led the way, with growth well into double figures. Once again this year, we will be making major upfront investments for the coming transformation. Nonetheless, following a drop in 2016, we want our margin to return to its 2015 level. Our aim is to strengthen our profitability, since the transformation ahead of us is more of a marathon than a sprint. And with that, I would like to hand back to Mr. Denner.

## **Strategy: Bosch must stay ahead of possible disruptions**

...Thank you, Mr. Asenkerschbaumer. As promised, I will now explore the strategic question of Bosch's transformation in greater depth. It is a transformation that goes deeper for this company than any other since the beginning of the age of electronics over 50 years ago. To a great extent, it is driven by changes in our business environment. Above all, we see two major areas of disruption:

- First, the challenges for road traffic I mentioned earlier. These are driving change in our core mobility business. It is now no longer simply a question of building better cars. We need new conceptions of mobility.
- Second, technological change on the internet of things. Together with artificial intelligence, this will change the way each and every one of us lives – and we are convinced that it will be a change for the better. Personal assistants are one example.

If they are well understood, changes like these are the best thing that can happen to a company that is a market and technology leader. They trigger our entrepreneurial sensors and drive our competitive spirit. However, for a company like Bosch, such changes are a dual challenge:

- On the one hand, we must further develop our existing, very successful businesses.
- On the other, we need to be quick to seek out new businesses, so we can stay ahead of possible disruptions.

## **The transformation of traffic: Bosch is working on a new kind of mobility – emissions-free, accident-free, stress-free**

It is above all in Mobility Solutions, our biggest business sector, that we must tackle this dual challenge. Road traffic as we know it will undergo radical change. First and foremost, the environmental requirements placed on cars are growing, as I said. We must strike a balance between mobility and air quality – most importantly in major cities, which will be home to nearly 70 per cent of the world's population by 2050. In the short term, nitrogen-oxide emissions from diesel engines in real driving conditions must fall further. This is the only way that automakers will be able to comply with Euro 6 standards, which are mandated by the new laws on real driving emissions, or RDE for short. To support them, we have developed a raft of initiatives, from injection technology to exhaust-gas treatment. What will be decisive, however, is how they are calibrated for each type of vehicle. Bosch is currently running almost 300 RDE projects – there can be no clearer expression of the intensity of our development efforts. We are doing all we can to help keep the air clean and limit global warming. We can only hope that other sources of emissions are tackled with the same intensity.

This goes for particulates, too. Road traffic is responsible for only 12 percent of particulate emissions. Once the particulate filter was introduced, the particulate emissions from diesel engines became negligible. Such filters will also be installed in spark-ignition engines. With injection pressure increased to 350 bar in gasoline direct injection systems, this will also solve the particulate issue in gasoline engines. Of course, in all the talk of particulates, one fact tends to be overlooked: The majority of automotive emissions come not from the exhaust, but from brake and tire wear. That is why Bosch is also developing the iDisc, a brake disc with a special coating that generates considerably less brake dust.

Bosch is in any case working not just under the hood to keep the air clean. We are equally concerned with making traffic efficient – which is precisely

why our mobility solutions are more than just automotive technology. We have developed a mobility assistant for the Greater Stuttgart area – an app that lets users plan, book, and pay for journeys that involve different modes of transport. And we want to bring daily traffic congestion caused by the search for parking in our cities down by 20 percent. To this end, we have developed a range of solutions for connected parking – including cars that identify parking spaces as they drive past and send this data over the internet to a real-time parking map.

We call this solution community-based parking; having announced it two years ago, the first production projects will start work next year. So we're as good as our word. A reduction in the tiresome, time-consuming search for parking is yet another way we are helping keep the air clean.

At the same time, these examples shed light on a new kind of mobility – the car as a part of the internet of things as well as road users that switch flexibly from cars to bikes, trains, or buses. What will Bosch's role be in this mobility of the future? For decades, our 3S program to help make driving safer, cleaner, and more economical has served us well. The systems in question have enjoyed lasting success – sales of our gasoline direct injection systems are up 15 percent this year, and those of our ESP anti-skid system 10 percent. In the future, cars will be electrified, automated, and connected – also with other modes of transport. Our objectives go beyond the hood, and they are no longer relative but instead absolute. We no longer want to reduce driving hazards, we want to cut them to zero. No emissions, no accidents, no stress – that is our vision of the relaxed mobility of the future.

We are putting plenty of power into driving the transition to electromobility, too. Powertrain Solutions is the name of the new division that will pool our strengths in gasoline and diesel systems as well as in electric drives. We are pursuing a dual goal here, also to secure jobs during the transformation: our systems for internal-combustion engines make us number one in the market, and we want to stay that way – but we also want to attain this position as a

supplier in the electromobility field. We are making progress on all sides: More than 30 electromobility projects featuring Bosch technology are already in production. In 2016, we won 11 orders in China alone – already the world’s biggest market for electric cars. Our development efforts are directed at making electrical powertrains suitable for the mass market. This is an objective we are pursuing on two paths. First, we are increasing the efficiency of the powertrain system by integrating the transmission, power electronics, and motor into one electric axle. Second, we are looking into ways of doubling the energy density of batteries from their 2015 level by 2020. In all this, there is one thing we have not lost sight of. The internal-combustion engine itself can be an alternative powertrain, eco-friendly and CO<sub>2</sub>-neutral. The requirement for this is synthetic fuels produced using renewable energy, or synfuels, as they are called. We are also committed to encouraging their wider use.

Our progress in automating driving is especially rapid. In recent weeks, we took two strategically important steps, both of them focused on the start of the next decade:

- First, we are entering into a development partnership with Daimler in order to enable automated driving in cities, in other words in highly complex driving situations. Success in this first decisive step will bring us closer to a revolution in personal mobility.
- Second, together with Nvidia we are building the “AI onboard computer” – the very brain of self-driving cars. With the help of artificial intelligence, we are making cars clever enough to interpret and predict the behavior of other road users.

In addition, before this decade is out we will have managed to create an essential prerequisite for automated driving: an ultra-accurate map that also contains the readings from our radar sensors. We are working on this together with TomTom, as well as with the Chinese providers AutoNavi, Baidu, and NavInfo. This radar signature will enable self-driving cars to determine their location with precision. Bosch has a total of almost 3,000 engineers working on automated driving – an increase of 500 over the last year. Driver assistance is already a major growth business for Bosch: it was only in 2016

that our sales first passed the billion-euro mark – while orders last year were worth 3.5 billion euros. In 2017, the market for driver assistance systems will grow by some 30 percent. At Bosch, it will grow even faster.

Finally, we believe that making driving connected is a key competence, since it not only supports electrified and automated driving, but also enables web-based services for all those traveling from A to B. By the start of the next decade, the market for connected mobility will grow by almost 25 percent each year; by 2020, it is expected that 250 million vehicles will be part of the internet of things. That is why we will be launching the Bosch Automotive Cloud Suite next year. It is a software platform that can be understood as the heart of connected mobility. The suite will enable both us and our customers to quickly establish new mobility services – whether predictive diagnostics or online parking. A vehicle in the exhibition outside demonstrates several such applications, for instance access to the smart home. Once the Automotive Cloud Suite is launched, we will introduce functions like these one by one. Connecting cars with houses is something that a company like Bosch, which is at home in both realms, is predestined to do.

Seen from this perspective, the car is not just something to be driven, but also a kind of personal assistant supporting the driver. The basic technology for this is also integrated into our show car – and now I would like to show you a short film about this technology...

Drivers can talk with their virtual assistant just as they would with a passenger – only this passenger responds to the driver's instructions and carries them out. In the process, it learns to understand the driver's habits and preferences better all the time – fetching information from the cloud, a smartphone, or the smart home as necessary. Fundamentally, this kind of assistant can accompany users not just in the car but also in the kitchen, in the garden, or when doing DIY – making it technology invented for all areas of life.

## **The transformation of technology: Bosch is using artificial intelligence to make connectivity an emotive experience**

Here, at the very latest, is where the second major driver of our transformation becomes apparent: the rapid pace of technological development, which is also the catalyst for change at Bosch. Progress with the internet of things (IoT) and with artificial intelligence (AI) is relevant to almost all Bosch businesses. We are putting all our energies into driving this progress. We sold 27 million web-enabled products in 2016 – and it is our stated aim to make every new electronic product connected and develop related services. We now expect that in ten years' time, every new Bosch product will either be developed and produced with artificial intelligence or will itself have AI. The one relates to the other: artificial intelligence makes connectivity a personal, even emotive experience. It enables us to create technologies that support people in their everyday lives, that learn from data, and that relieve their users of the burden of daily chores.

The potential of these new technologies can also be seen in economic forecasts. We estimate that the worldwide market for the internet of things will grow by 35 percent each year until 2020, reaching a value of 250 billion U.S. dollars. The global semiconductor market offers another clear indication. Chips for the internet of things are the strongest drivers of growth, even ahead of mobile telephony and automotive applications. Not least, the number of digital assistants will triple to over 1.5 billion by the start of the next decade.

Against this backdrop, Bosch is further expanding its strengths in the interplay between connectivity and artificial intelligence:

- At the start of this year, we established the Bosch Center for Artificial Intelligence, or BCAI for short. It is spread across sites in Renningen, Palo Alto, and Bengaluru. We can build on a solid base of expertise here, for

instance in image analysis, as used for video surveillance in our security systems. Furthermore, we presented Kuri, our home robot with elements of artificial intelligence, at CES in Las Vegas. The BCAI will initially focus above all on supporting the development of automated driving and connected manufacturing.

- We are strengthening our “3 S’s” for connectivity: sensors, software, and services. Sensors – we are the world’s largest manufacturer of micromechanical sensors. Software – we employ more than 20,000 software engineers, nearly 4,000 of whom are working exclusively on the internet of things, an increase of almost 1,000 in a single year. Services – we are developing not just new technology, but also entire business models. We are currently evaluating some 100 projects, of which one in three is already either in the roll-out or ramp-up phase. Our Coup e-scooter service is one example. The importance of projects like these must not be underestimated, since services and applications will make up more than half the market for the internet of things in a few years’ time.

But it would make no sense for Bosch to try to open up the connected world on its own. Our motto here is openness; we want to collaborate and enter into partnerships. For example, we offer microservices from our Bosch IoT Suite software platform not only on our own cloud but also through Amazon Web Services and IBM Bluemix. The logic of the connected world points to partnerships like the ones we have entered into with GE, SAP, and Software AG. Not only things, but also companies are becoming connected – in three steps: first, joint development in open source communities; second, reciprocal use of technical components; and third, joint projects like the ones we are engaged in for Industry 4.0.

Connected manufacturing in particular can only be the result of a combined effort. At Bosch, we are pursuing a clear vision: we want Industry 4.0 to make the entire value stream more efficient, from suppliers to end customers. We see this area as one that will increasingly offer business opportunities:

- As a leading user, we can improve our productivity. In 2016 at our Feuerbach plant, for instance, we tested the maintenance support system – and found that it reduced production downtimes by 20 percent and increased machine availability by 5 percent.
- As a leading provider, we are translating our expertise from in-house applications into external sales. In this respect, the innovation we recently showcased at Hannover Messe is significant: it is the very maintenance support system I just mentioned. We are noting an increase in customer inquiries about our Industry 4.0 solutions. The target we have set remains the same: to achieve cumulative additional sales of more than a billion euros from new products and services for connected manufacturing by 2020.

Industry 4.0 is going to take hold in factories, then, but there is one factor that must not be neglected: people should always be the central consideration. Whatever the economic benefits, it is important to us to see our associates as key players in connected manufacturing. Relieving them of routine work and giving them more time for creative tasks is the crucial success factor for Industry 4.0 at Bosch. We want humans and machines to work together in intelligent teams – and we have taken this as the organizing principle for our apprenticeships, which are available in 30 countries around the world. In Germany, for instance, we provide robotics training to all our technical apprentices at our Blaichach plant, while in Homburg we have set up a learning island on sensor- and software-based maintenance. For Bosch, Industry 4.0 is more than technology, it is inextricably interwoven with Work 4.0.

**Change at Bosch: combining  
the power of a large company with the agility of a start-up**

Ladies and gentlemen, I now come to the close of my talk. Regardless of whether we are discussing changes in our industry, in technology, or in the world of work, this process of change is sensitizing and motivating our workforce. What has become clear is that Bosch has the power of a large company and yet in many areas it demonstrates the agility of a start-up. So before connectivity, automation, and artificial intelligence change everything in the sectors we are active in, we are changing ourselves. Bosch is a company with many strengths. One of them is the ability to continuously evolve in order to remain successful in the future.



## **“Just driving” was yesterday – the personal assistant is tomorrow**

Bosch’s new show car shows how quickly the future of driving is becoming a reality

April 28, 2017

PI 9651 BBM Fi/Ks

- ▶ Connected, automated, and personalized: Bosch has a new take on mobility and is turning the car into people’s third living space
- ▶ New user interfaces ensure more security, more comfort, and fewer distractions when driving
- ▶ Cars are becoming personal assistants on four wheels

Stuttgart – My home, my workplace, my car: connectivity is turning cars into a third living space alongside people’s own home and their office. Bosch is showing what that actually means, and what it will be like to drive a car in the future, with its new show car. It offers intuitive operation and is always online, connected with its surroundings, and driving itself. “The connectivity of cars with their surroundings and with the internet is a key challenge for future mobility,” says Dr. Dirk Hoheisel, member of the board of management of Robert Bosch GmbH. Automated and connected functions in cars not only make each journey safer and more comfortable, they also turn the car into a truly personal assistant. “In this way, we are making connectivity a personal experience and giving people more time for actual living, even while driving their car,” Hoheisel says.

### **Intelligent display and user interfaces**

More individuality and easier operation become apparent as soon as you get into the show car. The driver monitor camera recognizes the driver and adjusts the steering wheel, mirror, and temperature accordingly. In fact, as if by magic, the car also sets the color scheme of the display and automatically loads appointments, favorite music, the latest podcasts, and the navigation destination that the driver programmed while still at the kitchen table. The camera is always alert during driving, too, especially when the driver’s eyes get a little heavy. It detects fatigue and microsleep at the wheel, both of which are often the cause of

serious accidents. It is usually possible to spot the onset of these early on from movements of the eyelids. The system determines the driver's ability to concentrate, or degree of tiredness, and issues a warning if necessary. This makes driving even safer. What is more, the driver tiredness detection system constantly monitors the driver's steering behavior so it can intervene directly in the event of abrupt movements.

The human machine interface (HMI) turns cars into personal assistants on four wheels. This interface between people and vehicles provides drivers with important information when it is needed and is an attentive alert companion in every situation. In the future, thanks to more personalized communication, automated and connected functions will offer intuitive, comfortable, and safe operation, and drivers will be able to set them to meet their personal requirements – whether in a traffic jam, in urban traffic, or on a family outing. To this end, the show car presents gesture control with haptic feedback. It uses ultrasonic sensors that produce a noticeable resistance whenever the driver performs a gesture in precisely the area that the camera records. This makes gesture control even easier to use and less distracting for drivers, since they can change the information on the display, accept phone calls, or call up a new playlist without touching it. An innovative touch display in the show car also makes it safer and more convenient to use fingertip control. The display provides a haptic response by vibrating each time the driver's fingertips touch it. This means drivers can sense different structures that feel like real buttons on what is in fact a flat surface. That way, they can easily find the desired function on the display, for instance to adjust the volume of the music, without looking away from the road.

### **Mobility with smart connectivity: Cars are turning into people's third living space**

The show car also demonstrates how cars are turning into people's third living space thanks to automation and connectivity. According to Bosch's "Connected car effect 2025" study, automated driving could enable people who drive a lot to make better use of some 100 hours of their time each year. Once the car detects that automated driving is possible and the driver agrees to hand over control, the car takes over – safely and smoothly. Since the show car is an active part of the internet of things, drivers can carry their digital lives over into their car; perhaps sending e-mails to the office colleagues or video chatting with friends. All this is possible in the time automated driving saves. Flexible display concepts really come into their own here. Drivers can simply gesture to seamlessly switch like magic between various displays of e-mails, chats, videos, and automated and connected functions.

## **Connected with the smart home, the repair shop, and the whole world**

What about planning your evening meal when on the road? Connectivity can help here, too – this time with the smart home. Mykie, the Bosch kitchen assistant, can suggest recipes online in the car. A glance from the car into the connected refrigerator will show whether the necessary ingredients are ready at home. Connectivity between cars and smart homes comes into play even before the journey starts: as soon as drivers enter the car, a display shows them the status of their own home. Has a window still been left open? Is the door locked? It takes just a gesture or a fingertip on the display to automatically lock the doors and monitor the status at home. Moreover, the connected car is also linked to the repair shop. It notifies drivers when an inspection is due, it schedules an appointment at the repair shop upon request, and it can ensure the necessary spare parts are in stock when it gets there. This level of comfort extends to parking: in Bosch's community-based parking service, cars use the sensors in parking assistants to report available curbside spaces. This information is sent via the cloud to a digital parking map and provided to other vehicles.

**Press photographs:** #834474, #1057876, #1057878, #1057879, #1057880, #1057881, #1068140, #1068141

### **Further information:**

You can find more information about Bosch HMI solutions [here](#).

You can find more information about the Bosch study "Connected Car Effect 2025" [here](#).

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*Mobility Solutions is the largest Bosch Group business sector. According to preliminary figures, its 2016 sales came to 44.0 billion euros, or 60 percent of total group sales. This makes the Bosch Group one of the leading automotive suppliers. The Mobility Solutions business sector combines the group's expertise in three mobility domains – automation, electrification, and connectivity – and offers its customers integrated mobility solutions. Its main areas of activity are injection technology and powertrain peripherals for internal-combustion engines, diverse solutions for powertrain electrification, vehicle safety systems, driver-assistance and automated functions, technology for user-friendly infotainment as well as vehicle-to-vehicle and vehicle-to-infrastructure communication, repair-shop concepts, and technology and services for the automotive aftermarket. Bosch is synonymous with important automotive innovations, such as electronic engine management, the ESP® anti-skid system, and common-rail diesel technology.*

*The Bosch Group is a leading global supplier of technology and services. The company employs roughly 390,000 associates worldwide (as per December 31, 2016). According to preliminary figures, the company generated sales of more than 73.1 billion euros in 2016. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT company, Bosch offers innovative solutions for smart homes, smart cities, connected mobility, and connected manufacturing. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to create solutions for a connected life, and to improve quality of life worldwide with products and services that are innovative and spark*

*enthusiasm. In short, Bosch creates technology that is “Invented for life.” The Bosch Group comprises Robert Bosch GmbH and its roughly 450 subsidiaries and regional companies in some 60 countries. Including sales and service partners, Bosch’s global manufacturing, engineering, and sales network covers nearly every country in the world. The basis for the company’s future growth is its innovative strength. At 120 locations across the globe, Bosch employs 55,800 associates in research and development.*

*Additional information is available online at [www.bosch.com](http://www.bosch.com), [www.iot.bosch.com](http://www.iot.bosch.com), [www.bosch-press.com](http://www.bosch-press.com), [www.twitter.com/BoschPresse](https://twitter.com/BoschPresse).*



## **An adorable family member** Bosch start-up Mayfield Robotics to begin shipping home robot Kuri at the end of 2017

May 4, 2017

PI 9592 RB Cwi/KB

- ▶ Interaction enables a personal relationship between people and robots
- ▶ Kuri combines personality, awareness, and mobility
- ▶ U.S. market launch scheduled for December 2017
- ▶ Forecast: Market volume of 9 billion dollars for home robots in 2020

Stuttgart, Germany / Redwood City, United States – She can read children goodnight stories, play their parents' favorite songs, and knows who is in front of her thanks to facial recognition capabilities. Kuri, the home robot developed by the Bosch start-up Mayfield Robotics, is more than a gadget. She engages with the people around her on an emotive level through interaction. As a result, a personal relationship develops between humans and robot, turning Kuri into another member of the family. Home robots represent a market with potential. The Tractica market research institute expects global market volume to amount to 9 billion dollars in 2020. "For generations, people have dreamed of having their own home robot. We have worked hard to make this dream more of a reality," said Mike Beebe, co-founder of Mayfield Robotics.

### **Personality packed with technology**

Kuri learns from her interactions with her surroundings. She can draw connections, perceive her environment, and respond to questions with gestures, head movements, and noises. Kuri's ability to establish relationships lends her personality. Behind her clean design, the robot is powered by high-performance hardware and features from the fields of smartphones, gaming, and robotics:

- A camera and microphone enable parents to check via smartphone whether everything at home is okay while they are away.
- Stereo speakers plus WiFi and Bluetooth connectivity make it possible to play music.

- Various sensors detect edges and objects. Kuri knows exactly where she is in the house and avoids running into objects.
- The home robot can be added to a smart home network.
- When it is time to recharge the battery, Kuri will return by herself to her charging pad and take a time out.

### **From the Bosch company to their own start-up**

Kuri made her first appearance at CES in Las Vegas in January 2017. She will debut in the U.S. at the end of December. The start-up Mayfield Robotics specializes in the development of home robots. It is based in Redwood City, California, and has a current workforce of some 50 engineers and designers. Sarah Osentoski, Kaijen Hsiao, and Mike Beebe established Mayfield Robotics in 2015. Osentoski and Hsiao had previously worked at the Bosch research center in Palo Alto, California. The company is supported by Bosch Start-up GmbH, whose mission is to advance the entrepreneurial thinking of Bosch associates and to help them establish their own businesses.

**Press photo:** #835418, #948725

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*Mayfield Robotics is the maker of Kuri, a new kind of intelligent home robot. Born out of the Bosch Startup Platform, the company is a wholly owned subsidiary of Robert Bosch North America Corporation. Founded in 2015 by Sarah Osentoski, Kaijen Hsiao and Mike Beebe, the company is based out of Redwood City, California. For more information, visit [www.mayfieldrobotics.com](http://www.mayfieldrobotics.com), and to pre-order Kuri, visit [www.heykuri.com](http://www.heykuri.com).*

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## Press Release

Kitchen experience of the future

### **BSH develops concepts for tomorrow's kitchens**

- **BSH steps up investment in research and development with the focus on digital technologies**
- **Connected solutions and services offer growth potential**
- **Personal kitchen assistant concept opens up the world of artificial intelligence**

**Munich, May 4, 2017 (bsh) – Controlling appliances remotely, operating them with facial expressions or speech, and a wealth of additional services – tomorrow's kitchen is connected and offers a variety of multimedia options. The ideas and future concepts for this are forged in the innovation hub at BSH Hausgeräte GmbH. One such example is Mykie – “my kitchen elf”. Mykie adds a personal assistant to BSH's vision of the connected kitchen. As a kitchen specialist, he provides everyday support and transforms cooking into an experience.**

#### **Digital solutions open up strong growth potential worldwide**

BSH is the first home appliance manufacturer to connect the entire home appliance portfolio with its open Home Connect system. The Mykie kitchen assistant concept fits into the home appliance portfolio of different brands connected via Home Connect, and hence also into the attractive partner network of the digital ecosystem offering a variety of services that can be accessed online.

#### **Winking kitchen assistant enables shared cooking experiences**

Mykie is operated by means of voice recognition. As a personal assistant, he listens to the user, responds with a facial expression, answers questions, and provides help for a range of everyday topics and queries. For example, Mykie knows what's in the fridge right now, how much longer the pizza still has to bake in the oven, or which recipe steps have to be followed. Mykie projects these steps conveniently and clearly onto the kitchen wall and sends the recommended appliance settings from the recipe directly to the connected appliances. Apart from controlling the home appliance functions, additional services, such as accessing online entertainment offers, are also offered. Thanks to an integrated camera, Mykie can also bring several users together virtually if desired, thus enabling shared cooking experiences, regardless of where the individual users happen to be.

**Mykie development stage**

BSH Hausgeräte GmbH presented the smart kitchen assistant concept at the International Consumer Electronics Fair (IFA) in Berlin in 2016. Experience on the expectations consumers have regarding an assistant in the kitchen environment is currently being collected within different cooperation ventures and market research studies. The information from this will be incorporated successively into the next development phases. A precise date for the market launch of Mykie has yet to be fixed.

Additional press materials are available in the newsroom at: <https://www.bsh-group.com/newsroom/press-releases>

You can now find out about current topics at BSH worldwide at: <http://stories.bsh-group.com/en/>

With annual sales of around €13.1 billion in 2016 and more than 58,000 employees, BSH Hausgeräte GmbH is one of the global leaders in the home appliance sector. BSH manufactures at around 40 factories, operates over 80 companies and has a presence in around 50 countries.

BSH is a company of the Bosch Group.

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## Artificial intelligence – five questions, five answers

January 2017

PI 9488 RB DH/KB

### 1. What is artificial intelligence?

Artificial intelligence describes a process by which machines learn to learn. Or to put it differently: computer systems imitate human intelligence. Artificial intelligence is a simulation of intelligent behavior on the basis of pretermind or learned examples.

### 2. How does artificial intelligence work?

An AI system recognizes its surroundings with the help of cameras and sensors. It discovers correlations in this contextual data and then derives actions from them. For example, An AI system in a car can recognize pedestrians on the sidewalk, calculate the probability of someone crossing the road, and if necessary initiate evasive maneuvers.

### 3. What is deep learning?

Deep learning is a category of machine learning and a major foundation for artificial intelligence. Machines use deep learning to gather knowledge of their own from their experience of events. To do this, artificial neural networks are arranged in successive levels that use progressively more complex characteristics. Typical everyday applications include speech recognition in smartphones or traffic-sign recognition in vehicles.

### 4. What is the difference between artificial intelligence and algorithms?

An algorithm is a rule, expressed in an IT language, that consists of a series of instructions with which to solve specific tasks. Artificial intelligence is often made up of algorithms. However, an algorithm is not automatically an example of artificial intelligence.

### 5. What are the benefits of artificial intelligence for people?

Examples of artificial intelligence at work include automated driving and driver assistance systems. The latter can help avert accidents. Artificial intelligence is also making inroads into industry. For instance, collaborative robots can use sample data and machine learning to quickly pick up new tasks that they need to

perform in conjunction with humans. There is no longer any need for complex manual programming, which saves both time and money. An additional benefit for factory workers is that their robot colleague can perform any monotonous or dangerous tasks.

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## Seven facts about artificial intelligence:

January 2017

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### 1.) The cradle of artificial intelligence

The term “artificial intelligence” was coined at a workshop held as part of a research project on artificial intelligence at Dartmouth College in New Hampshire in 1956. Today, the Dartmouth Conference is considered the inaugural meeting for research into artificial intelligence.

### 2.) The great unknown

Big data is a concept that most Germans know nothing about. According to TNS Infratest, 74 percent have never heard of it, while only 9 percent feel able to offer an explanation of what the phrase means. Big data refers to huge amount of data, which is captured, analyzed, and processed. It is the basis for artificial intelligence.

### 3.) Learning from millions of images

Deep learning is an aspect of machine learning that relies on a multi-layered neural network inside a computer, with a structure reminiscent of the human brain. While a small child needs only experience a few cats to then recognize all cats as such, the computer needs to see millions of cat pictures before it can recognize a cat.

### 4.) Smart assistants

The market research organization Gartner predicts that by 2024, some 10 percent of activities with the potential to endanger human lives will be performed by smart systems. One example is assistance systems in vehicles. These will enable future vehicles to communicate more effectively, detect their surroundings more accurately, process data more rapidly – and eventually drive completely autonomously.

### 5.) As clever as a human being

Experts are expecting to create an artificial intelligence that is on a par with human intelligence before the end of this century.

## **6.) Bosch Center for Artificial Intelligence**

In the period to 2021, Bosch will invest some 300 million euros in the Bosch Center for Artificial Intelligence, with around 100 experts researching artificial intelligence at three locations (Bengaluru, Palo Alto, and Renningen).

## **7.) Future Bosch products will be intelligent**

Ten years from now, scarcely any Bosch product will be conceivable without artificial intelligence. Within just five years, products featuring artificial intelligence are expected to account for 10 percent of Bosch sales.

### **Contact person for press inquiries:**

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## **Bosch revolutionizes the working environment for its researchers** Renningen research campus: Bosch's own "Stanford"

May 4, 2017

RB MK/Na

For more than 130 years, the history of Bosch has been a story of innovative strength – and every day, some 390,000 associates give that story fresh impetus with their know-how and their ideas. New products and services are constantly being “Invented for life.” Technology is being developed to improve quality of life and to help conserve resources. For example, vehicle assistance and safety systems developed by Bosch have saved many lives. Products such as app-controlled robotic lawnmowers make life more pleasant. The foundation for this innovative strength is a working culture that promotes satisfaction, creativity, and productivity. Particularly clear expression is given to this culture through the architecture and workplace design of the new research campus in Renningen, near Stuttgart, Germany. It is the headquarters of Bosch corporate research and advance engineering.

### **Short distances for connected disciplines and easy collaboration**

To physically and technically connect specialists and visionary thinkers from various disciplines in the best possible way, both trusted and new ideas were put into practice in planning the campus. One further aim was to create a university campus atmosphere. Some 1,400 creative minds who were previously scattered across three locations in the greater Stuttgart area now work on campus, side by side. On the site of a disused airfield, there now stand a twelve-story main building, eleven laboratory and workshop buildings, and two service buildings. To keep the distances between them as short as possible, the buildings themselves are linked by covered bridges and walkways. Daily work routines also played a part when planning who should work in each of the buildings, with a project team polling associates to find out who works most intensively with whom. This information was fed into software in order to calculate a network matrix that illustrated the relationships between departments. The more intensive the collaboration between given areas, the closer they were physically located in Renningen.

### **Space for creativity: focus on associates**

Another special feature in Renningen is how the workplace design is tailored to associates' needs. The project team responsible broke down the work processes in the innovation process into individual elements, and then defined three phases: creativity, concentration, and communication. On this basis, and taking into account associates' requests, an entirely new office world has taken shape. It provides space for people to come up with ideas while ensuring there is room for associates working in widely differing disciplines to share their thoughts.

### **Communication zones: spontaneous, informal meetings**

In addition to the individual workspaces, a total of 270 large and small meeting rooms distributed throughout the campus buildings set the tone by making space for focused work and teamwork. They include focus rooms where people can concentrate on their work undisturbed, and special project rooms. The project rooms are used for lengthy periods of time. Researchers can not only visualize their ideas with colorful notepads, but also write on the walls and windows. That way, teams can always pick up their work where they left off. On average, associates need walk only ten meters to reach the nearest meeting room. The research campus places particular importance on what are known as communication zones. These specially-designed rooms encourage the spontaneous exchange of ideas and ensures that talks are held in a creative atmosphere. The zones are also ideal for work away from one's desk. Some communication zones are designed like a living room or lounge, while others offer the opportunity to play table football or ping-pong. This is a deliberate attempt to foster serendipitous encounters that will provide impetus for new ideas and solutions.

### **“Platform 12”: a creative area for inspiration and ideas generation**

On the top floor of the main building, “Platform 12” is a giant creative area. At one remove from the rules and structures of everyday work, this is somewhere associates can inspire each other. In the main room – the “base” – 1930s furniture is juxtaposed with state-of-the-art technology, including 3D printers and smart-boards. In the future, the smart-boards will allow researchers to communicate live with colleagues around the world – in Palo Alto, say, or Singapore. In addition, there are workbenches and materials with which to build models. Artists from the international art academy Akademie Schloss Solitude work here, too, providing a practical counterpoint to the often theoretical, conceptual work of the researchers.

### **Inside and out: everywhere is a workspace**

Associates can use the entire campus as a place of work, including its green spaces and water features. With wi-fi available everywhere, it is no surprise that desks are free of fixed-line telephones. Thanks to voice over internet, associates can take calls on their laptops or smartphones, wherever they happen to be. As a result, anyone who doesn't want to work in an office or a lab can simply grab their laptop and smartphone and head out into the park. In Renningen, too, what counts is not presence in the office but actual results.

### **Balancing work and leisure time: flexible working and fitness options**

For Bosch, it is not just workplace design but also a flexible, family-friendly working culture that enables a healthy balance between people's work and private lives. This includes a multitude of working-time models, including working from home, part-time work, and job sharing. For associates who work in a think tank like corporate research and advance engineering, it is particularly easy to work from home or set working hours flexibly.

A dedicated fitness studio featuring courses led by qualified instructors opens its doors early in the morning. The location's multipurpose hall serves as an after-work venue for badminton players and football teams, but it is also somewhere associates can go during the day to come up with new ideas. A bright, friendly company restaurant and café is an inviting space for associates to have lunch, network, or unplug themselves from day-to-day work. Meanwhile, in cooperation with the city of Renningen, Bosch offers young families – including those not living in Renningen – spots for their little ones in local daycare facilities.

### **Internet:**

Bosch as an employer: <https://www.bosch-career.de/en>

Milestones of flexible working culture at Bosch: <https://bit.ly/1bSJ7QM>

Work-life balance at Bosch: <http://bit.ly/1ex6rDa>

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