Bosch Product Engineering System
Managing Company-Wide Innovation

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Robert Bosch GmbH, Germany
Some 45,700 researchers and developers work at Bosch: at 94 locations worldwide, in a single network.

Each working day, Bosch files 18 patents on average.

Over the past five years, Bosch has invested more than 20 billion Euros in research and development.

Our objective: to develop innovative, useful, and exciting products and solutions to enhance quality of life – technology that is “Invented for life.”
Robert Bosch GmbH

2014 key figures

<table>
<thead>
<tr>
<th>Bosch Group</th>
<th>48.9 billion euros in sales*</th>
<th>290,000 associates</th>
<th>360,000 associates as per April 1.15**</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Mobility Solutions</th>
<th>68% share of sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Technology</td>
<td>32% share of sales</td>
</tr>
<tr>
<td>Energy and Building Technology</td>
<td></td>
</tr>
<tr>
<td>Consumer Goods</td>
<td></td>
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</tbody>
</table>

* without BSH Hausgeräte GmbH (formerly BSH Bosch und Siemens Hausgeräte GmbH) and Robert Bosch Automotive Steering GmbH (formerly ZF Lenksysteme GmbH).
** including BSH Hausgeräte GmbH and Robert Bosch Automotive Steering GmbH.
A History of Innovations which ... ...became global standards

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1902</td>
<td>High-voltage magneto, spark plug made engines reliable.</td>
</tr>
<tr>
<td>1913</td>
<td>Complete electrical systems made cars driver-friendly. Electric starter was integrated in 1914.</td>
</tr>
<tr>
<td>1927</td>
<td>Diesel injection for motor vehicles spawned a revolution. First added to passenger cars in 1936.</td>
</tr>
<tr>
<td>1978</td>
<td>ABS antilock braking system keeps vehicles under control during braking.</td>
</tr>
<tr>
<td>1995</td>
<td>ESP® electronic stability program 80% fewer skidding accidents if all cars had ESP®.</td>
</tr>
</tbody>
</table>
A History of Innovations which ... 
...became global standards

1997: Common-rail high-pressure diesel direct injection
30% less fuel consumption, 25% less CO₂, 50% more torque.

2000: Gasoline direct injection DI-Motronic
By injecting the fuel directly into the combustion chamber, the DI-Motronic substantially reduces gasoline consumption.

2007: Start-stop system
8% less fuel consumption, 8% less CO₂ in urban driving.

2009: Predictive emergency braking system
helps to prevent serious rear-end collisions.

2010: Hybrid drive
Roughly 25% less fuel consumption and CO₂. Offered in conjunction with diesel engine since 2011.

2012: Motorcycle stability control MSC
Safe braking and acceleration on straight stretches of road and in curves.

1Compared with gasoline engine fitted with conventional port fuel injection
<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1895</td>
<td>Junkers – gas bath boiler</td>
<td>Energy efficient thanks to 1892 patented “Kalorimeter” and freely placeable – independent from position of the chimney.</td>
</tr>
<tr>
<td>1985</td>
<td>Junkers condensing boiler</td>
<td>Reached 98% efficiency by additionally utilizing the heat in the water vapor.</td>
</tr>
<tr>
<td>2002</td>
<td>Bosch Security Systems</td>
<td>Bosch merges its activities in building security and transmission systems together with business services in one division “Security Systems”.</td>
</tr>
<tr>
<td>2012</td>
<td>Energy-Plus-House</td>
<td>Concept by Bosch Thermo-technology. Expected spill-over of energy: some 1,500 kWh per year.</td>
</tr>
<tr>
<td>2014</td>
<td>Fuel-cell heater</td>
<td>Europe-wide field trial with more than 70 appliances.</td>
</tr>
</tbody>
</table>
A History of Innovations which ...
...became global standards

1932
Bosch electric rotary hammer drill eliminated the need for a compressed air supply.

1933
Bosch refrigerator enabled food to be kept fresh in the home.

1958
Bosch washing machine made life easier.

2003
Bosch Ixo cordless drill with lithium-ion battery fits into your pants pocket; has everything except a power cord.

2012
Bosch washing machine with intelligent automatic dosing i-DOS®.

2014
Bosch’s first connected home appliances are on the market.
Robert Bosch GmbH

Innovations – Invented for Life

Active Safety Modulation
Antilock Braking System (ABS), Traction Control System (TCS), Electronic Stability Program (ESP®), Automated parking brakes (APB), etc.

Active Safety Actuation
iBooster, Vacuum booster, Hydraulic booster, Tandem Master Cylinder, etc.

Passive Safety and Sensors
Airbag Control Unit, Integrated Safety Unit (ISU), Passive safety sensors, Active safety sensors, Pedestrian protection, etc.

Driver Assistance
Predictive emergency braking, Evasion assistance, Lane assistance, Driver monitoring, Park and maneuver assistance, etc.

Two-Wheeler Safety
Motorcycle ABS
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We are Bosch | BES Mission Statement

Our **objective** – what we want to achieve

In the spirit of Robert Bosch, we aim to secure our company’s future by ensuring its strong and meaningful development and preserving its financial independence.

Our **motivation** – what drives us

Invented for life: we want our products to spark enthusiasm, improve quality of life, and help conserve natural resources.

Our **strategic focal points** – what will help us succeed

- Focusing on customers
- Shaping change
- Striving for excellence

Our **strengths** – what we do well

- Bosch culture
- Innovation
- Outstanding quality
- Global presence

Our **values** – what we build on

- Future and results focus
- Responsibility and sustainability
- Initiative and determination
- Openness and trust
- Fairness
- Reliability, credibility, legality
- Diversity
Passion for Engineering:
Empowering our creativity and our courage to break new ground, we develop fascinating products delivering outstanding quality at attractive costs.

Create value
We focus on exciting our customers and users with innovative and reliable products along the customer journey. Thus we are an appreciated partner delivering valued solutions.

Understand products
We create our products based on understood customer/user needs and requirements. We fully understand our product designs and production processes, using suitable models describing their properties.

Lead by content
We – the engineering leaders and the empowered teams – complementarily share the accountability for our product designs. We shape team work that inspires passion for engineering.

Strengthen competences
We strive for mastery of our technical topics and methodical approaches supported by continuous learning and networking. We naturally share our knowledge within Bosch.

Work smart and agile
Evaluating the type of tasks, we actively shape the cross-functional and international collaboration using agile and lean principles. We ensure clarity of tasks and transparency in workflows.
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Benefit of BES

BES...

... provides orientation thru development processes as a framework and structure for content-driven engineering and content-driven leadership

... creates order by describing coordinated engineering methods and their application

... stimulates engineering work thru focus on technical models with cause-effect relationships and thru freedom for innovative solutions

Product quality with respect to

- Function
- Cost
- Time to Market

Development/extension of the knowledge base
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Success Factor: Infrastructure

Stock chart development of EURO STOXX50 “Best Innovator Winners”

Source: A.T. Kearney 2014

Note: Best Innovator is the unweighted average of all publicly traded winners in France and Germany between 2005 and 2012.
Source: A.T. Kearney, Thomson Reuters Datastream
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Strategic Planning and Innovation Process

Legend:
IG Innovation Gate
Success Factor: Number of Ideas

Innovation is like kissing 1000 frogs only 1 in a thousand may turn into a prince Arthur Frey, 3M, Inventor of the “Post It”.

Success Ratio: approx. 1 : 200

Data Source: Fraunhofer-Gesellschaft / Kienbaum 2005
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Bosch innovation platform

- **IG 0**: Idea generation
- **IG 1**: Pre-Study
- **IG 2**: Concept Study
- **IG 3**: SoD

**Generation and collection of innovation ideas by means of challenges**

- Generation and collection of innovation ideas by means of challenges
- All associated with access to Bosch Connect

**Management of GB Innovation pipeline:**
- Assessment, elaboration, documentation and analysis of innovation ideas and projects
- Innovation Manager, Experts, Management
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Objectives of the Bosch innovation platform

➤ Increase innovation strength by involving all employees into the idea generation and evaluation by means of innovation challenges
➤ Strengthen cross divisional innovation projects
➤ Create transparency in the innovation process

Guiding Principles

➤ Address and involve of the most creative and competent employees in a targeted way, irrespectively of the location
➤ Appealing and comfortable user interface; seamless integration in Bosch Connect
➤ Direct feedback to idea owner regarding the status of the idea
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Innovation search fields

Idea generation

Search field

Inno challenge

All associated with access to Bosch Connect
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Central „landing page“ in Bosch Connect
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Innovation challenges

Sample Data
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Innovation challenges

Mobile Apps for the Connected Cars

Wireless access points, 3G, 4G - we are totally connected.
How can the car become more integrated through mobile apps, to this powerful infrastructure?

Wireless availability, 3G and 4G connectivity is now pervasive throughout modern cities and towns. When you are travelling in your car, you are connected. This offers tremendous opportunity for car makers to enrich the driving experience. We have a powerful infrastructure upon which we can deliver new technology. The question is, what should we do?

Can you think of useful mobile applications that would really help drivers? Or can you think more broadly about how the car itself can use the pervasive connectivity that it has?

In 2015 we wish to present a range of new and exciting innovations on the auto expo in Las Vegas. We have a team of developers ready to prototype the best ideas. If your idea is

Add Your Idea

Click
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Innovation challenges

Contribute Idea

CAMPAIGN

Mobile Apps for the Connected Cars

Wireless access points, 3G, 4G - we are totally connected. How can...

PLEASE DESCRIBE YOUR IDEA

Title *

Please provide a snappy title for your idea.

See which cars are available for quick hire rental

Description *

Lots of services are available in major cities now, that let you quickly rent a car. I don't know how this works exactly, but I've heard it is quite common in London now. But what if there was an app that could locate these special cars, and hide you to the nearest one? I'm not sure how you get access to them, I heard there was some kind of machine on the side street to get the keys from.

Similar Ideas
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**Idea Pre Evaluation**

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**Bosch Connect**  |  **Profile**  |  **Community**  |  **Idee-Kampagnen**  |  **Anwendungen**

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**Idee-Kampagnen**

Mobile Apps for the Connected Car

Ich bin Teilnehmer

Ich bin Jury Mitglied

Alle Ideen-Kampagnen

Meine Idee-Entwürfe

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**Evaluation of innovation challenge**

**PREVIEW**

**DEWERTUNG DURCH MICHAEL DIAZ**

PREVIEW OF EVALUATION REVIEW

Strategic Fit (Low / Medium / High)

Comment (New)

necessary budget 222222

within TCP 107 **✓**

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**Sample Data**
Generation and collection of innovation ideas by means of challenges

Management of GB Innovation pipeline: assessment, elaboration, documentation and analysis of innovation ideas and projects
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Success Factors Online Idea Generation

- Embed online idea generation in a holistic innovation concept
- Professional preparation of each phase of the innovation challenge
- Build the bridge between ideation and implementation