



Bosch: How can industry and universities collaborate?

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How can industry and universities collaborate?

Outline



- Introduction of Bosch



- Bosch Corporate Research: contents, locations and scientific environment



- Bosch Automotive R&D Center Vietnam: scope, collaboration with Vietnamese Universities & challenges



01

Introduction of Bosch

Figures and facts

Bosch

Our company in figures

In 2022*



88.4

billion euros
sales revenue



3.7

billion euros EBIT
from operations



420,000

Bosch associates
worldwide at year-end
(approx.)



440

subsidiaries and
regional companies in
more than 60 countries

* preliminary figures

Bosch

Our business sectors



Mobility Solutions

52,6

Billion EUR sales
revenue



Industrial Technology

6,9

Billion EUR sales
revenue



Energy and Building Technology

7,0

Billion EUR sales
revenue



Consumer Goods

21,5

Billion EUR sales
revenue

Bosch

Our company around the globe

In 2022*



Europe



51%

share of sales



44.8bn

sales revenue



253,000

associates (approx.)



Asia Pacific**



31%

share of sales



27.5bn

sales revenue



118,000

associates (approx.)



Americas



18%

share of sales



16.1bn

sales revenue



49,000

associates (approx.)

* preliminary figures

** including other regions

Bosch

Our research and development

In 2021



6.1

billion euros
R&D expenditure



7.8%

R&D intensity



76,000

associates work
in R&D, including

38,000
software developers



128

R&D locations
worldwide

02

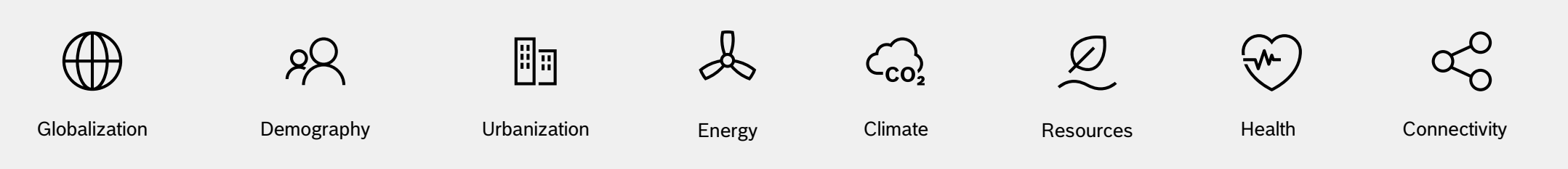
Bosch Corporate Research

Research contents

Bosch Corporate Research

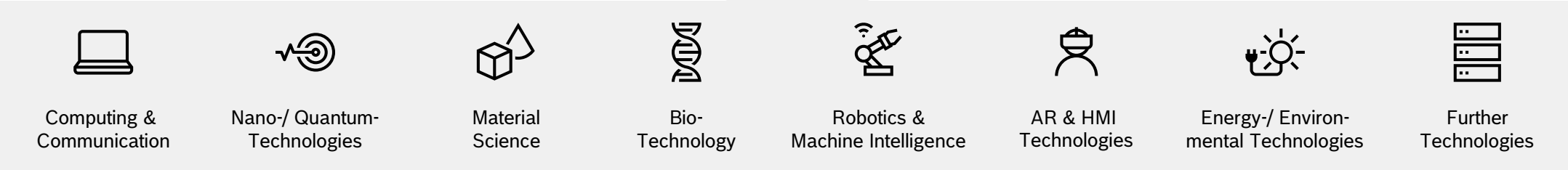
From megatrends & technologies to strategic focal points

Market Pull



12 Strategic Portfolios (SPF)

Technology Push



Bosch Corporate Research Strategic Portfolios (SPF)



Autonomous Intelligent Driving (AID)

Sensing, perception, prediction,
planning, systems & infrastructure
for L2-L4



Chemical Energy Converters (CEC)

Solide Oxide Fuel Cell (SOFC)
PEM fuel cell for EVs
Hydrogen Electrolysis



Electrified Mobility and Systems (EMY)

Electric drives
Power electronics
Integrated electrified products
Energy management



Healthcare Solutions (HCS)

Point-of-care lab diagnostics
Liquid biopsy
Next-gen sequencing

Bosch Corporate Research Strategic Portfolios (SPF)



IoT @ Life (IOT)

Enabling AIoT for mobile,
residential, tools and multi-domain
applications



Production Systems (PRS)

Production technologies
AI in production
Internet of production



Robotic Systems (ROB)

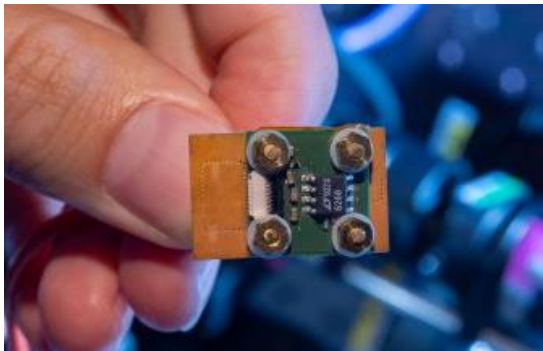
Consumer robots
Industrial service robots
Industrial robot arms



Sustainability (SST)

Circular economy
Climate change mitigation
Carbon dioxide removal
Sustainability big picture

Bosch Corporate Research Strategic Portfolios (SPF)



Smart Sensors & Hardware Systems (SSY)

MEMS

Quantum sensors

HMI technology

Smart Systems

Embedded AI hardware

Artificial Intelligence Methods (AIM)

AI data loop enablers

Natural language processing

Computer vision

AI method incubator

Information and Communication Technologies (ICT)

Software & systems engineering

Distributed infrastructure

Intelligent functions & services

Modeling, Simulation, Optimization (MSO)

Sustainable engineering

Virtual product design

Virtual validation

Use phase monitoring

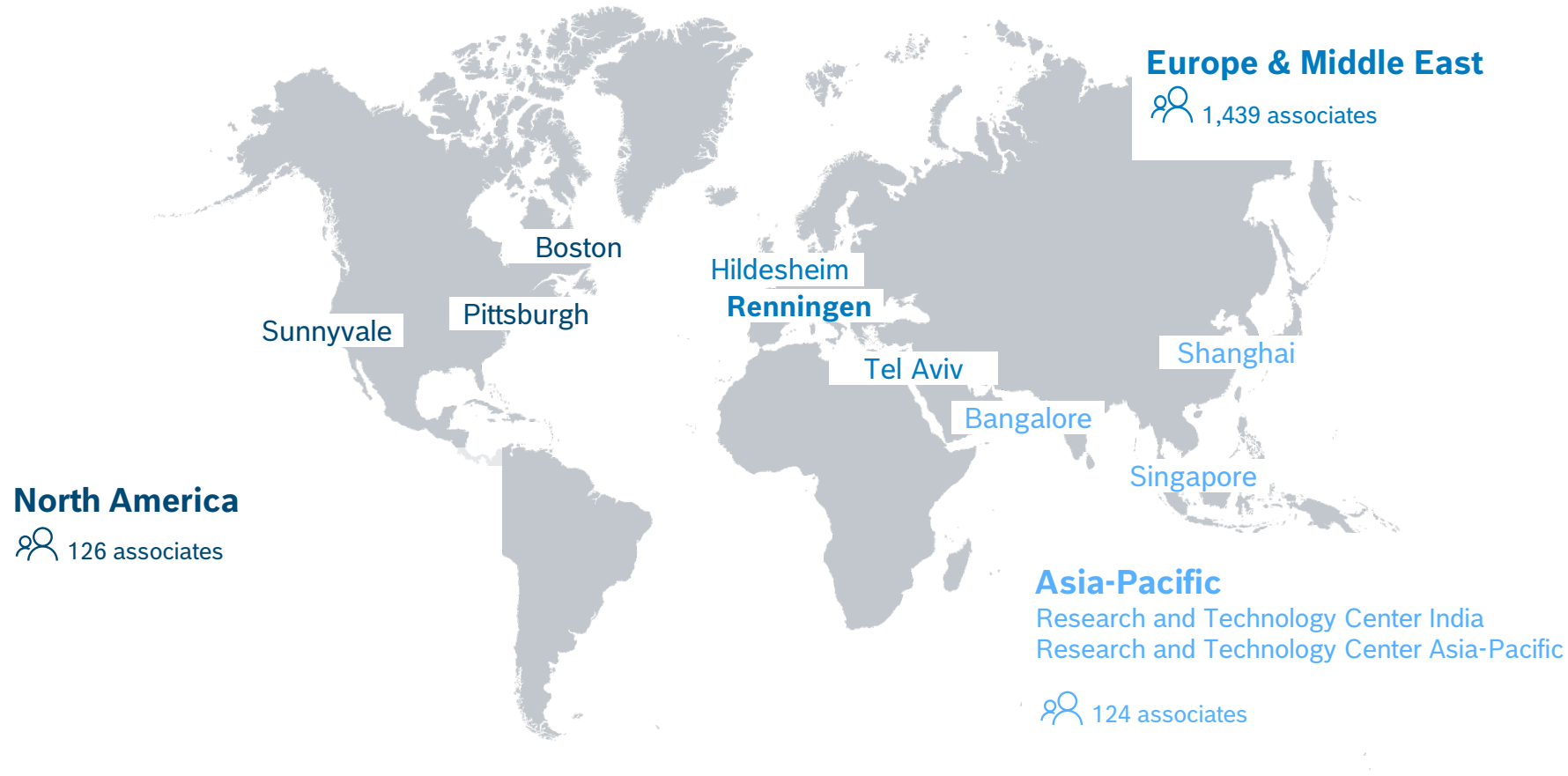
03

Bosch Corporate Research

Locations & Scientific environment



















Bosch Corporate Research: Locations

An eye for the big picture through a global presence



Bosch Corporate Research: Scientific Environment

University collaborations – connected to the best in the world

 America 47	 Carnegie Mellon University	 Harvard University	 Stanford University	 Michigan State University	 Boston University	 Georgia Tech
 Europe 34	 University of Freiburg	 Delta Lab University (CWI) Amsterdam	 University of Nottingham	 University of Stuttgart	 IoC Lab University of Tübingen	 Technical University of Wien
 Asia-Pacific 6	 Tsinghua University	 Tianjin University	 Huazhong University of Science and Technology			

Lighthouse & Large-scale-Collaborations

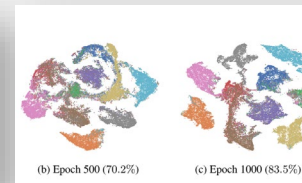
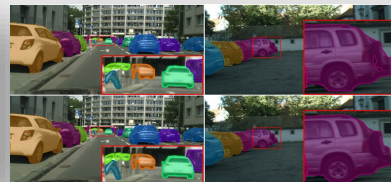
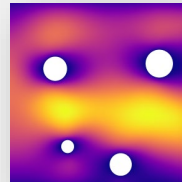
Exemplary collaboration



清华大学
Tsinghua University

Prof. Jun ZHU

- Strengthen the research of “**Safe, Robust & Explainable AI**” for Bosch global as well as the support to local critical needs (fuel cell design and automated driving, etc.)
- Creating significant amounts of **top-tier publications and IPs** to be utilized in industrial AI applications
- Collaboration makes Bosch gain access to talent pool of **top AI experts** in Tsinghua and attract top talents in overall China talent market



Source: Tsinghua university

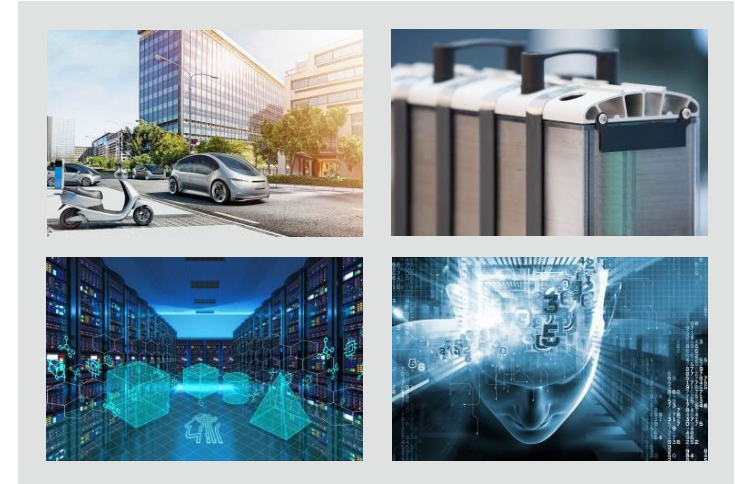
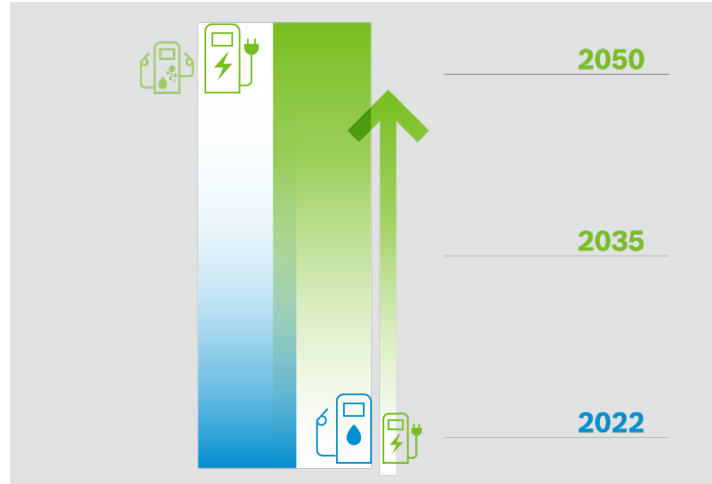
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Bosch Automotive R&D Center Vietnam

Scope, Collaboration with Vietnamese universities &
Challenges

Bosch Automotive R&D Center Vietnam

Scope



Automotive R&D Center HCMC

- Founded in 2014 as window to ASEAN market as well as to JOEM and COEM
- Focus on component engineering, Virtual engineering, Digitalization/AI
- Part of international development network for powertrain solutions at Bosch

Transformation to CO₂-neutral mobility

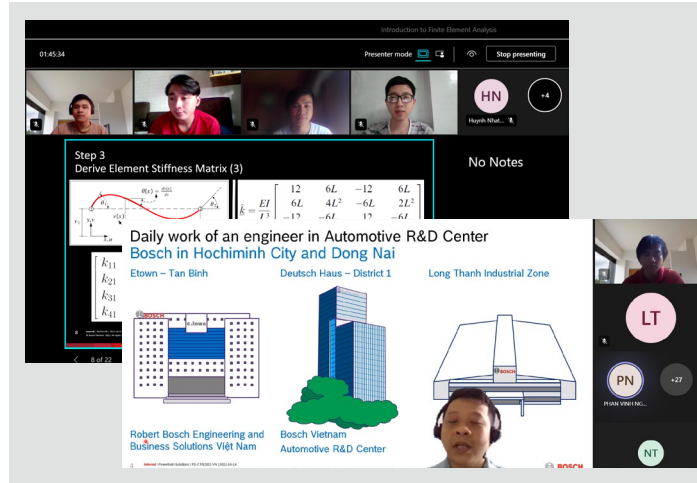
- Although the ICE* will remain important for a long time, the development of the electrified powertrain progresses very fast and impacts our working areas in Vietnam already now significantly

Relevant fields of research

- Electrified Mobility
- Hydrogen Technology
- Modeling, Simulation, Optimization
- Digitalization/AI

Bosch Automotive R&D Center Vietnam

Collaboration with Vietnamese universities in 2022 & 2023



Internship program

- Hire preselected and talented 3rd year students for a 2-6 month internship, supporting with career orientation and targeting on potential permanent employment.

Courses and webinars

- Regular sharing about technical knowledge, projects and everyday working life to come into discussion and support technical knowledge, skills and career orientation.

Information events at Universities

- Share and discuss about Bosch Vietnam, technology trends, technical deep dives and career opportunities.

Bosch Automotive R&D Center Vietnam

Collaboration with Vietnamese universities in 2022 & 2023



Transmission labs

- Opening of two Bosch labs in Vietnamese universities, integrate training program on Bosch technology into studies, promote cooperation between Bosch and universities in projects and research, identify and attract the best talents early.

Bosch Future Mobility Challenge

- Worldwide contest to attract highly talented and motivated students to automated driving engineering and engage them toward research activities: Take a complex project from the beginning to the end. Technical mentorship and sponsorship for universities from Vietnam.

PhD program in preparation

- Build up and nurture the various expertise at a higher level to prepare for future projects and products, enrich the expert talent pool for further growth, build strategic collaboration with universities in Vietnam.

Bosch Automotive R&D Center Vietnam

Challenges for an extension of collaboration

- Good coverage and excellence in the „right“ fields of research at Vietnamese universities
 - Hydrogen technology, electrification, virtual engineering, Digitalization/AI, ...
- Availability of related up-to-date infrastructure at universities, e.g. for testing
- Increasing speed of technological transformations in all areas

