

# B 3 Autonomous systems


Using algorithms and methods of artificial intelligence, autonomous systems are able to solve complex tasks independently. They learn on the basis of data, and can act largely without human intervention even in unfamiliar situations.

Autonomous systems are developed for many areas of application\* – artificial intelligence forms a basis for this as a cross-cutting technology.

Energy

Health

Autonomous vehicles



Autonomous driving promises a massive reduction in the number of accidents by avoiding human error, and offers an opportunity to develop new mobility concepts.

Agriculture

Industrial production



Autonomous systems make it possible to accelerate production and make it more flexible. Furthermore, autonomous systems reduce downtime by means of predictive maintenance.

Hostile environments



Underwater, in the aftermath of earthquakes, after accidents in nuclear power plants or during their decommissioning – autonomous systems make it possible for work steps to be executed without endangering people.

Smart Home



Intelligent building services can save energy, maximize comfort for the inhabitants, and gear power consumption to the time-related cost structure of the electricity supply.

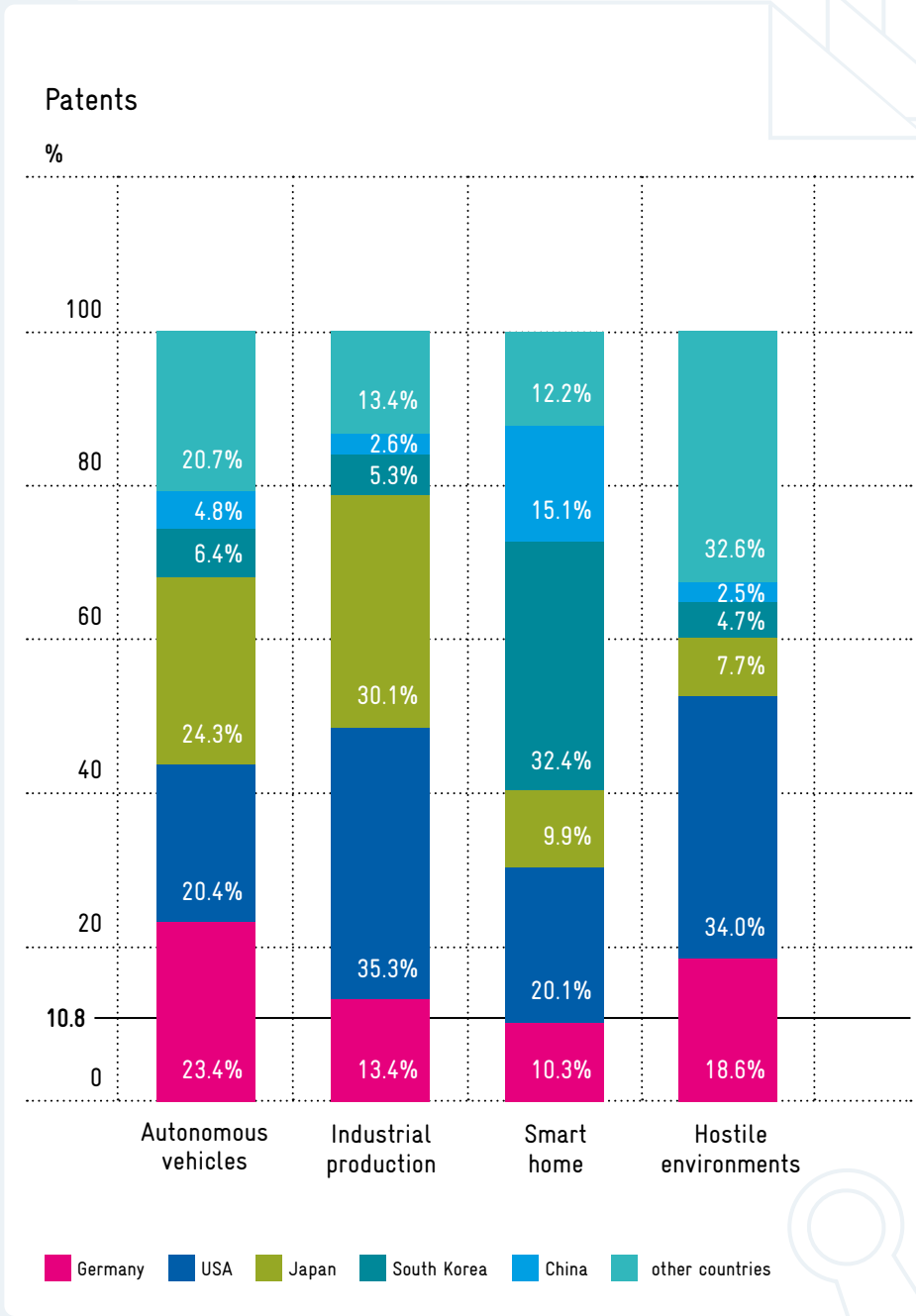
Artificial intelligence



Artificial intelligence (AI) is a research field of computer science dealing with systems that are capable of solving complex problems even in unfamiliar environments. AI is a cross-cutting technology that is of great importance for autonomous systems.

Germany's share of transnational patents by international comparison for the four examined areas of application of autonomous systems, 2002–2016

Compared to the proportion of transnational patent applications by German inventors (horizontal line) in all sectors, Germany reveals a particular specialization in the application areas autonomous vehicles and hostile environments. Germany is a world leader here: about level with the USA and Japan in autonomous vehicles, and in second place behind the USA in the field of hostile environments.



Source: \*Dumitrescu et al. (2018).  
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Source: own calculations based on Pötzl and Natterer (2018) and Youtie et al. (2018). Cf. also table C 6–2.