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VDE calls for a focus on the key technologies microelectronics and photonics

- **Promoting microelectronics and photonics in a targeted manner and strengthening Germany in future-oriented fields such as communications, artificial intelligence, Industry 4.0, mobility, and quantum technologies**
- **Both key technologies are critical infrastructure: switching the focus to photonic-electronic integration in particular will create huge chances for Germany to catch up in microelectronics through photonics and become the global market leader**
- **VDE warns of shortage of experts amid declining university admissions for electrical engineering**

(Frankfurt am Main, 1/22/2021) Today the technology organization VDE released two position papers calling for the targeted promotion of the key technologies microelectronics and photonics. “We are facing a paradigm shift. Germany and Europe must now seize the opportunities of photonic-electronic integration in future-oriented fields such as communications, artificial intelligence (AI), Industry 4.0, mobility, and quantum technologies,” according to VDE. The global market is extremely competitive. The efficient processing, distribution, and storage of information is decisive for the digitalization of our economy and society as well as the associated business models. Integrated photonic transceivers on microchips offer enormous potential for improvement here with regard to the attainable data rate, range, energy efficiency, and compactness. By 2025, the market for silicon photonic components alone is estimated to reach \$3.5 billion. The German photonics industry generated revenues of €37.5 billion in 2019. And there is no upper limit to the growth rate.

Chip shortage shows dependence of German industry

Microelectronics is now beginning to reach its technical production limits and requires photonics in processor technology, data communications, and sensors as a necessary supplement. Only through the intelligent integration of electronics and photonics can both technologies reach their

full potential and keep up with rapidly rising data rates and new applications such as the Internet of Things, Industry 4.0, autonomous vehicles or quantum technologies. However, to stay competitive on the lucrative global market and ensure its long-term prosperity, Europe, and especially Germany, have a lot of catching up to do, meaning they must greatly increase their commitment to establishing their own microchip manufacturing with strong research and development. “The system-relevant chip industry affects the entire national economy. The current crisis in the automotive sector shows just how dependent our industries are on semiconductor manufacturers in Asia and the United States,” VDE explains. A central component of the call to action is the coordination of a European industry policy, and Germany must play a leading role in its establishment. Germany and Europe can win back their technological sovereignty – if only they have the political will to do so.

Don't hesitate, facilitate. And do so with a long-term vision.

The measures taken up to now have not been enough because the United States and Asia in particular, above all Japan, China, and South Korea, have recognized the strategic importance of microelectronics and have been massively supporting its advancement for years. This is now compounded by the huge leverage effect of photonics, which must be expanded. Particularly in the field of high tech, there are major risks. Companies often do not tackle new topics head on, but adopt them later once they have achieved a certain level of maturity. “Germany is often at the head of the pack when it comes to the best ideas. It is not sufficient, however, to simply implement them in innovative products. Europe now has a choice. It can either continue half-heartedly on its current track or draw up its own “Electronics for Europe” master plan with a coordinated industry policy and corresponding startup financing,” says VDE. While Germany is still a top player in photonics at present, this opportunity cannot be squandered, the organization warns.

Fewer university admissions in electrical engineering: lack of engineers slows down research

Europe's chance of attaining its technological sovereignty is also dependent on whether there is enough expertise, or human capital. After all, no country can be expected to innovate without specialists and their know-how. “And here, especially, we urgently need to improve. University admission numbers for electrical engineering and information technology are on the decline. According to current admissions figures from Germany's Federal Statistical Office, 14.5 percent fewer first-semester students have registered for programs in electrical engineering and information technology this year compared with the previous year. In mechanical engineering (-9.6 percent) and computer engineering (-4.8 percent), the declines were not as dramatic,” VDE warns. Germany can by no means afford to have a shortage of electrical engineers. “Our industry is still rapidly hurtling towards an expert shortage. In the face of the demographic shift –

thousands of electrical engineers will retire in the next few years – and the digital transformation, which has been accelerated by the pandemic, the gap to be filled by new electrical engineers will only grow larger. COVID-19 is not changing this at all,” VDE explains. Once again Asia, especially China, is showing the rest of the world how it’s done. Elementary schools introduce children to programming and electronics through games. Meanwhile, technology is completely absent from learning plans in German elementary schools. Computer engineering is also far from being a mandatory subject in secondary schools, and technology does not appear on the curriculum at all.

For editorial teams:

The two VDE position papers “Hidden electronics” and “Photonic-electronic integration – key technology for communications and sensors” are available free of charge in the VDE shop at www.vde.com/en.

About VDE:

VDE, one of Europe’s largest technology organizations, has stood for innovation and technological progress for over 125 years. This makes VDE the only organization worldwide combining science, standardization, inspections, certification, and application consulting under one roof. VDE has been synonymous with the highest safety standards and consumer protection for over 100 years. We are dedicated to fostering research and young talent as well as lifelong learning with on-the-job further training opportunities. 2,000 employees at over 60 locations worldwide, more than 100,000 volunteer experts, and approximately 1,500 companies work within VDE to create a future worth living in: networked, digital, and electric. We are building the e-dialistic future.

VDE (Verband der Elektrotechnik Elektronik und Informationstechnik e.V.) is headquartered in Frankfurt am Main, Germany. More information at www.vde.com/en.

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