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After studying chemistry at TUM, Wolfgang Herrmann completed his PhD in chemistry (1973) and his lecturer qualification (1978) at the University of Regensburg. He did further research at Pennsylvania State University, USA. In 1982, he took up a professorship at Johann Wolfgang Goethe-Universität in Frankfurt am Main. He returned to TUM in 1985, and has served as its President since 1995.

Digitalization as a Means of Economic and Social Empowerment

The ability to unlock the opportunities of digitalization calls for new technologies and, above all, skilled professionals. To train them at the forefront of scientific progress is the task of a leading university.

The digital world is global, incredibly fast, irreversible, and full to bursting with opportunities. In the wake of steam engines, mass production and the first industrial robots, we are now approaching the fourth industrial revolution – manufacturing within an Internet of Things, often referred to as Industry 4.0, or the Industrial Internet. This new age sees robots communicating with one another, workpieces communicating with assembly lines, and assembly lines with logistics, while company data is accessible from anywhere via the cloud. The miniaturization of computing components and the growing affordability of storage, coupled with increasingly powerful data networks, are enabling more and more social, economic and industrial activities to be digitalized.

However, technical change is always a double-edged sword, presenting us with both risk and opportunity. We can already guess the risks: surveillance, data theft, the ability to log our every action and interest. Here we will need to define and implement new ethical guidelines, rules, standards and mechanisms to protect us from both intelligence services and other players.

The opportunities, on the other hand, are large: In my view, digitalization is also about empowering all people and companies to shape a common future, both socially and economically. Digitalization allows faster, easier, direct access to target markets worldwide – it is international by nature. It enables new and creative combinations of human talents, well beyond regular job activities. The older generation, people who have withdrawn from working life, can actively participate as long as they have access to fast data highways. And the decisive factor for success will no longer be the location of a factory – for instance in an urban area – but access to high-speed Internet and the availability of specialized staff to develop and implement new software innovations and business models with partners all over the world. Alongside new technologies and algorithms, the economy particularly needs well versed professionals tapping the potential of digitalization. And their training takes place at the universities. So to invest in our universities is to invest in the future of our economy. A good example of a strong alliance between higher education and business is the German state of Bavaria's new digitalization center (Zentrum Digitalisierung Bayern), in which TUM plays a leading role. The role of this alliance is to bundle, coordinate and advance all of Bavaria's digital activities in the fields of higher education, research, innovation and technology, and IT security. For the first time, a comprehensive and coherent competence network will be established in our state, which will also enhance the effectiveness of regional strengths.

Digitalization does not just have economic ramifications; it also requires us to keep ethical considerations in mind. The rapid and far-reaching developments in our society call for urgent action. TUM stepped up to its ethical responsibilities by establishing a dedicated interdisciplinary research facility: the Munich Center for Technology in Society (MCTS). Not only does digitalization have implications for data protection and personal rights, it also could rapidly escalate into a social issue if whole regions are excluded from the exponential growth in data traffic. That is why, irrespective of the costs, high-speed, nationwide data networks are an essential infrastructure measure – in Germany as elsewhere. As a representative of the scientific community in the “Network Alliance Digital Germany” initiated by the Federal Ministry of Transport and Digital Infrastructure, I am also mindful of our duty to address the societal challenges posed by digitalization. □