



Prof. Dr. Michael Dowling was named to the Professorship for Innovation and Technology Management at the **University of Regensburg** effective July 1, 1996 and retired from this position in April 2024. Previously he had been an Assistant Professor and Associate Professor with tenure at the University of Georgia, USA.

Prof. Dowling was born in 1958 in New York, USA. He studied at the University of Texas in Austin (Bachelor of Arts in Chemistry with High Honors), Harvard University (Master of Science in Management and Public Policy) and University of Texas at Austin (Doctor of Philosophy in Business Administration). He has worked at the International Institute for Applied Systems Analysis in Laxenburg, Austria and with McKinsey & Company in Düsseldorf Germany.

Since 2014 he has been the Chairman of the Board of the MÜNCHNER KREIS, a non-profit supra-national association dedicated to the impact of digitalization on business and society. <http://www.muenchner-kreis.de/>

Prof. Dowling was elected a member of acatech – the German National Academy of Science and Engineering in 2015.

His research interests include the strategic management of technology, high technology entrepreneurship, and the relationships between technology, public policy and economic development.

Titel: The Business of Quantum

Quantum technologies represent a transformative leap in science but also in business. In recent years, quantum computing has evolved from a niche research area to a highly competitive technological frontier, with exponential growth described by Dowling's and Neven's Law (Moore's Law of Quantum) illustrating rapid advancements in processing power.

Significant global investments and efforts are driving this evolution. Major companies like IBM, which has a vast quantum network with over 410,000 users and numerous industrial collaborations, and start-ups are leading the development of scalable quantum solutions. Countries such as China and the USA are vying for leadership, with China building robust quantum infrastructure and making strategic advancements in an attempt to dominate the field. But European Centers of Excellence are also developing.

The quantum market is now seen as a strategic sector, with billions of dollars in global investments. This burgeoning ecosystem is supported by established corporations, innovative start-ups, and academic partnerships. The applications of quantum technologies are vast, spanning areas like quantum-enhanced machine learning, cybersecurity, optimization, communication and sensing. However, it also introduces risks, particularly to current encryption systems, including blockchain security, necessitating a shift toward quantum-safe encryption methods.

The rise of quantum technologies highlights the urgent need for a specialized workforce. Interdisciplinary education and training programs are essential to prepare talent capable of combining expertise in physics, computer science, and industry-specific applications. Academia and industry must collaborate to design new training programs and curricula to support this rapidly expanding field.

Efforts to standardize quantum technologies are also crucial for market development. The intellectual property landscape in quantum technologies is expanding, with growing interest in patenting aimed at commercialization. This presentation underscores the transformative potential of quantum technologies across industries while stressing the need for global collaboration to address its opportunities and challenges effectively.