

PATENTING QUANTUM TECHNOLOGIES & MARKET POWER: A QUANTITATIVE ANALYSIS

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What has been the patenting trend over the 20 years for quantum technologies? Which countries and organizations are leading the quantum patenting activity? What claim formulations are being used to protect these inventions? In how many and what jurisdictions have they been protected? Without more evidence-based IP research to address these types of questions, it is perilous for legal scholars and policymakers to presume they can propose reforms to existing IP regimes with reasonable chances of achieving desirable social outcomes.

Perceived underprotection is traditionally understood to cause a lack of economic incentives to innovate in nascent technical fields. In the absence of viable alternatives, it is generally assumed that patent rights, as well as other forms of IP rights, are needed to attract the significant investment required to fund the capital-intensive R&D efforts necessary to encourage innovation and dissemination in high-risk technical fields such as quantum computing. That said, the overprotection of technologies and information may also cause market barriers and hamper healthy competition and sector- and industry-specific open innovation. Empirical studies looking at the real-world patenting activity can provide valuable evidence to help guide this general inquiry.

This contribution puts previous qualitative findings on potential patent overprotection of applied quantum technologies to the test. Using quantitative methods, we will analyse if, and to what extent, IP overprotection, and in particular patent protection, could pose a problem in the technical field of quantum computing. Based on our findings we discuss in which ways this could require particular attention of exceptions, exemptions and strictly enforced patent thresholds in this area, or whether there is a need to reform of existing IP or competition law regimes for quantum technologies to avoid or repair an unwanted concentration of market power. In addition, we debate and theorize to what extent our findings concerning quantum computing can be applied to quantum sensing, and quantum network technology, to achieve maximum results in terms of societal welfare, equally distributed on a global scale. Combining qualitative and quantitative outcomes, our contribution investigates the need for articulated quantum-innovation policy mechanisms tailored to the quantum technology ecosystem anno 2022, which includes quantum-AI hybrids.