Quantum Computing and Entrepreneurial Innovation: Opportunities, Disruption, and Ethics

Eslem Güngör
TED Istanbul College Foundation Private High School

***Abstract*—The rapid advancement of generative artificial intelligence (GenAI) since 2023 has fundamentally reshaped entrepreneurial ecosystems, redefining how innovation is generated, scaled, and governed. Unlike earlier forms of automation, generative AI systems actively participate in ideation, product development, market analysis, and strategic decision-making, accelerating innovation cycles while simultaneously introducing unprecedented disruption across industries. This study examines the strategic integration of generative AI within entrepreneurial ecosystems through a multidimensional framework that encompasses innovation acceleration, market transformation, and ethical governance. By synthesizing insights from entrepreneurship theory, digital innovation, and responsible AI research, the paper analyzes how startups, investors, and support institutions leverage generative AI to reduce entry barriers, enhance creative capacity, and reconfigure competitive dynamics. At the same time, it addresses emerging ethical and governance challenges related to data ownership, algorithmic bias, labor displacement, and regulatory uncertainty. The study argues that sustainable value creation in the post-2023 business landscape depends not only on technological adoption, but on the alignment of generative AI strategies with ethical governance mechanisms and ecosystem-level coordination.**

Entrepreneurship has historically been driven by technological breakthroughs that reshape markets, lower entry barriers, and redefine competitive advantage. From the rise of digital platforms to advances in artificial intelligence, each technological wave has altered how startups create value and scale innovation [4]. Quantum computing represents the next frontier in this evolution, offering fundamentally new computational paradigms that challenge the limits of classical information processing [3]. Although still in its early stages of development, quantum computing is increasingly viewed as a potential catalyst for entrepreneurial innovation across multiple high-impact sectors.

Unlike classical computers, which process information in binary states, quantum computers operate on quantum bits that can exist in multiple states simultaneously [2]. This capability enables the exploration of vast solution spaces in parallel, making quantum systems particularly well-suited for problems involving optimization, probabilistic modeling, and complex pattern recognition. For startups operating in domains where computational constraints limit performance—such as financial modeling, logistics coordination, and medical data analysis—quantum

Digital Object Identifier 10.62802/4mjhs818

Date of publication 29 12 2025; date of current version 29 12 2025

Published by the ABA Yayıncılık