RESEARCH ARTICLE

Quantum Computing Optimization for Large-Scale Supply Chain Networks

James Morrison, Priya Sharma, Chen Liu

Published: 2026-05-01 | GAST

Abstract:

This paper investigates the application of quantum computing algorithms to solve complex supply chain optimization problems. We implement a variational quantum eigensolver (VQE) approach on a 127-qubit quantum processor to address multi-objective supply chain network design problems involving facility location, inventory management, and transportation routing. Our quantum-classical hybrid algorithm demonstrates a 5x speedup over classical solvers for problem instances with over 10,000 variables, while achieving near-optimal solutions within 2% of the theoretical bound.