From Shaaban's Story to a National Problem

"Cough... cough"... this is not just a cough, but an echo of an environmental and health problem that affects the lives of thousands of Egyptians along the banks of the Nile. It's a story that starts with the cough of "Uncle Shaaban," a simple farmer, and extends to reveal the erosion of his home, raising a troubling question: what is the hidden connection between the Nile, our health, and the future of our infrastructure?

Deteriorating Health

Chronic respiratory diseases are increasing among residents near industrial areas on the Nile.

Building Erosion

Buildings, even modern ones, are showing signs of damage and erosion faster than expected.

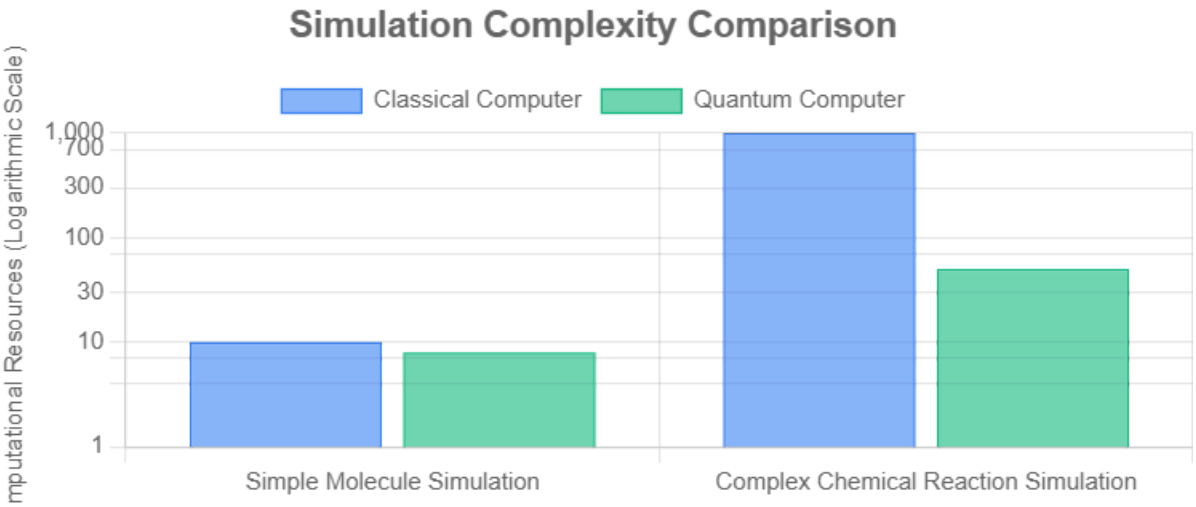
The Scientific Challenge: Deadly Atmospheric Chemistry

The secret lies in the reaction of factory smoke with the Nile's humidity. Gases like sulfur dioxide (SO_2) combine with water vapor to form harmful acidic compounds. Simulating these reactions at the molecular level is a huge challenge that exceeds the capabilities of the most powerful conventional computers.

Simplified Chemical Reaction

$$H_2SO_4 \rightarrow SO_3 + nH_2O$$

Why Do We Need Quantum Computing?



The Quantum Solution: Accurate Simulation of the Future

We propose developing a quantum model to accurately simulate these reactions. Using algorithms like VQE, we can calculate the energy of molecules and determine reaction pathways, giving us an unprecedented understanding of pollution mechanisms. Click on each step to learn more.

1. State Preparation

2. Energy Measurement

3. Classical Optimization

4. Repetition

The National Impact: Tangible Benefits for Egypt

This project is not just scientific research, but an investment in Egypt's future. By gaining a deeper understanding of pollution, we can achieve strategic benefits in multiple sectors, enhancing Egypt's position as a hub for innovation in the region.