scch { software competence center hagenberg }


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Getting **QuantumReady**

A Framework for Exploiting Quantum Computing in SMEs

Software Competence Center Hagenberg

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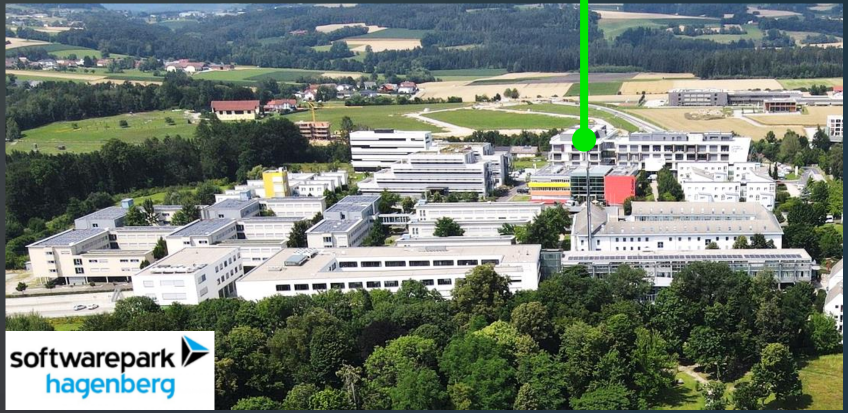
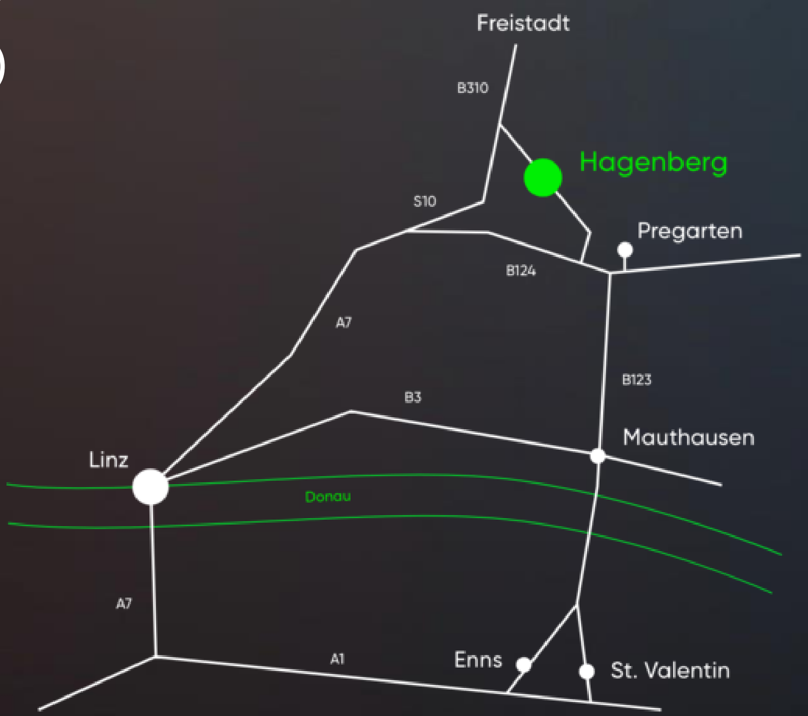
- Non-profit Ltd. research organization for Data Science & Software Science
- Founded by Johannes Kepler University Linz in 1999
- Owner: State of Upper Austria, Johannes Kepler University, association of company partners
- ~130 employees (>160 including partners)
- COMET competence center (FFG funded)





The QuantumReady Project

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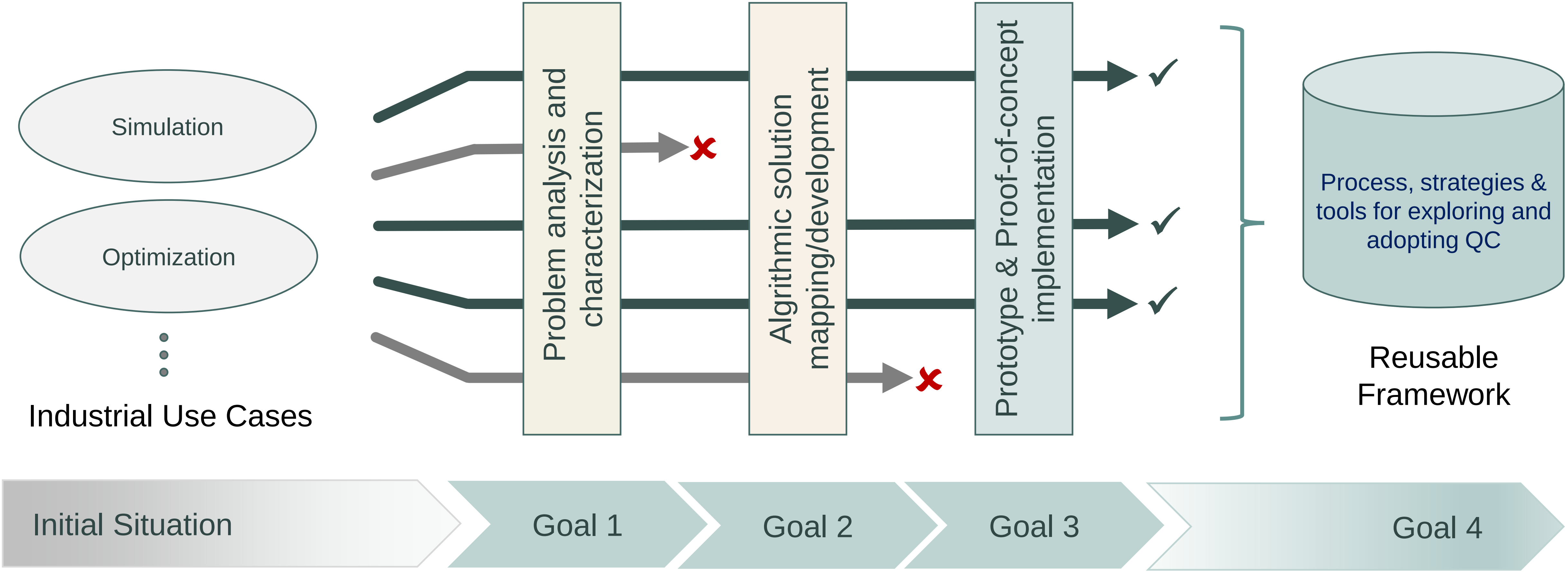
- Exploring and Realizing the Advantages of Quantum Computing for Early Adopters
- Quantum Computing for the Austrian Industry
- Funded through Quantum Austria managed by FFG
- R&D Project
- Prototyping for Industrial Solutions

Getting QuantumReady



Example Use Cases

HAKOM TIME SERIES

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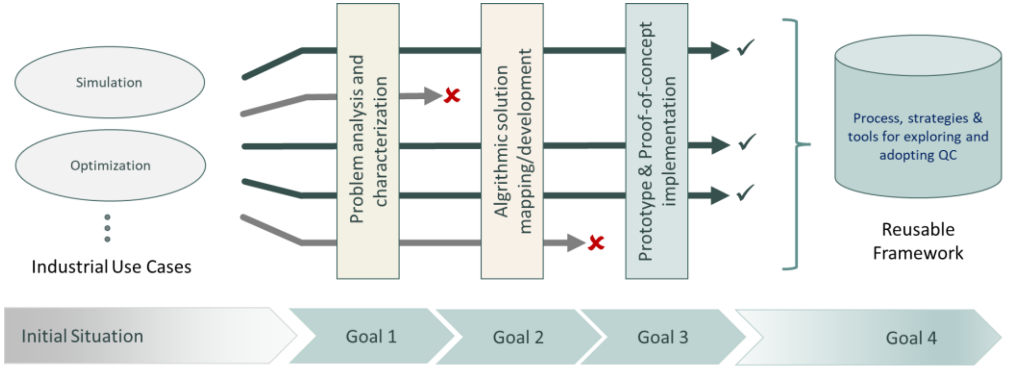
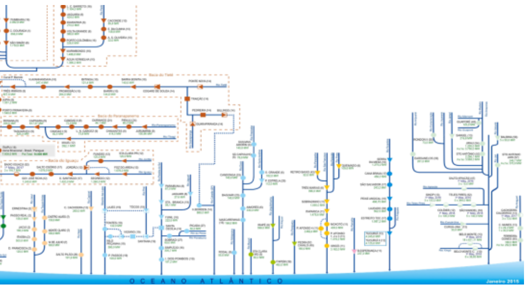
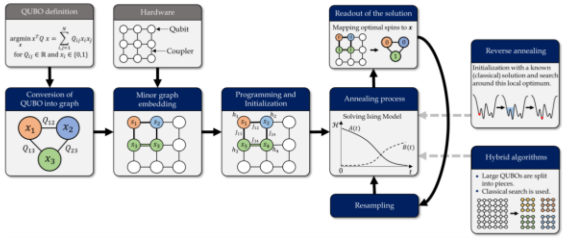
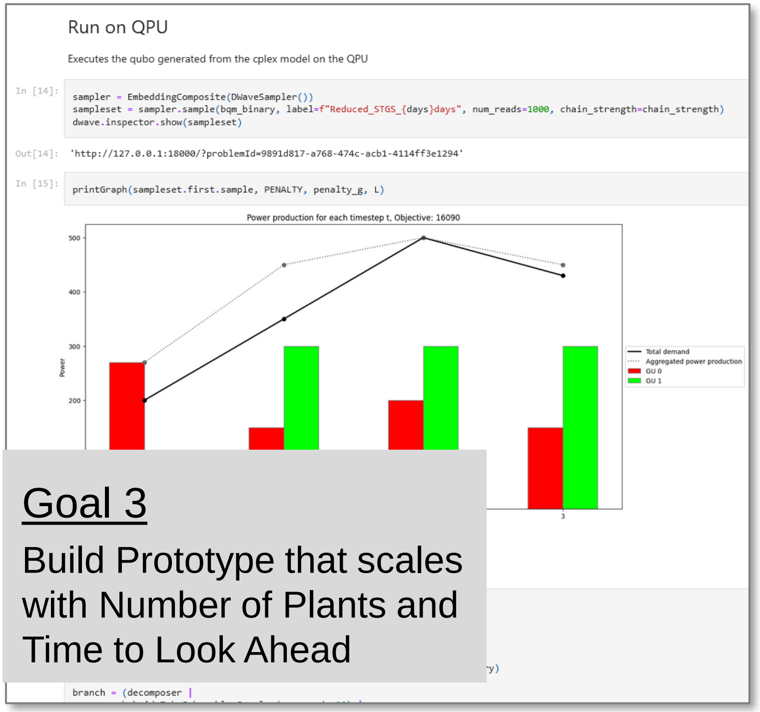








Initial Situation

Network of Hydropower Plants in Brazil

Goal 1

Model Energy Production with Forecasts and Revenue

Goal 2

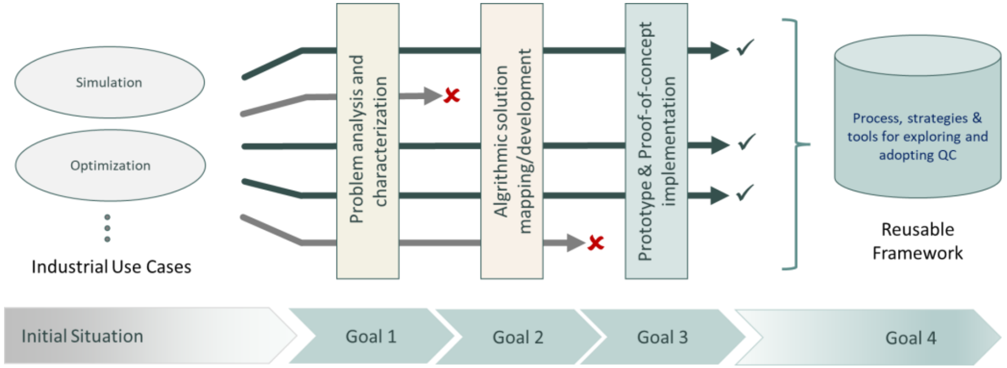
Map to QUBO for Evaluation on Quantum Annealer

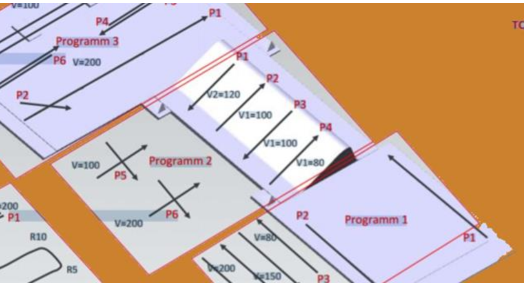
Goal 3

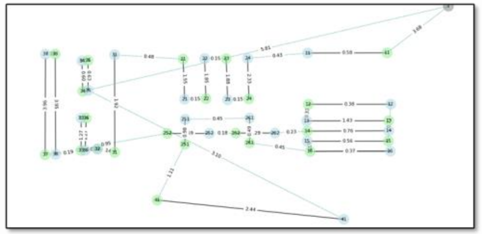
Build Prototype that scales with Number of Plants and Time to Look Ahead

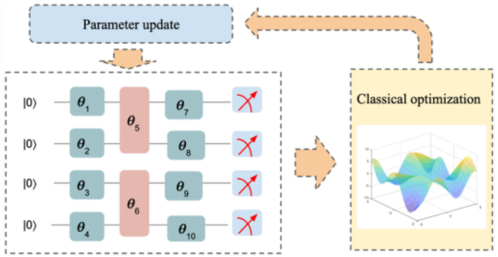
S. Yarkoni, E. Raponi, T. Bäck, and S. Schmitt, Quantum Annealing for Industry Applications: Introduction and Review, Rep. Prog. Phys. 85, 104001 (2022).

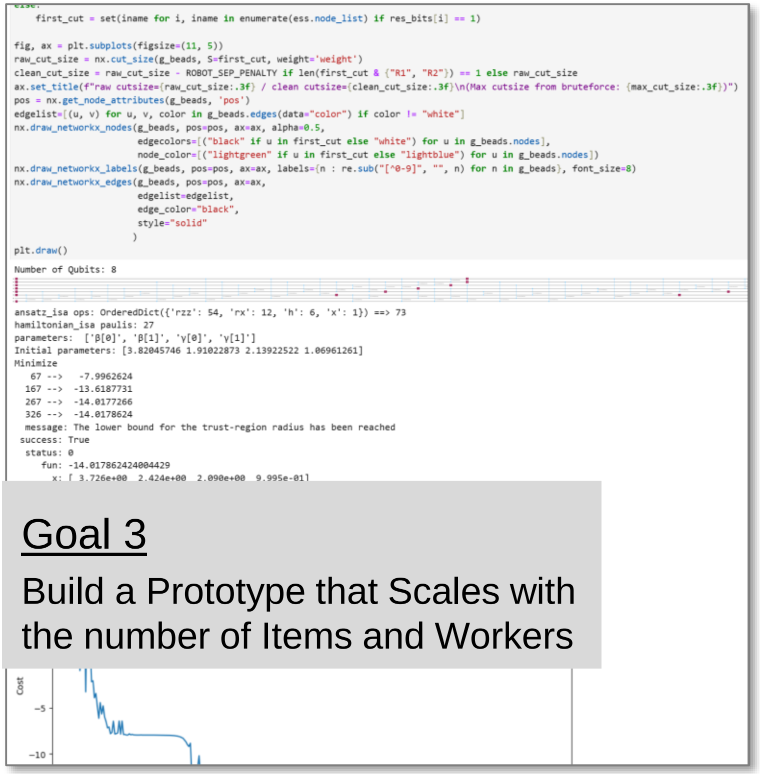
Example Use Cases











<u>Initial Situation</u>

Process a Number of Given Items as Fast as Possible

<u>Goal 1</u>

Abstract the Problem to a Graph, Retaining the Important Information

<u>Goal 2</u>

Construct Target Function and Apply QAOA

<u>Goal 3</u>

Build a Prototype that Scales with the number of Items and Workers

Najafi, K., Yelin, S. F., & Gao, X. (2022). The Development of Quantum Machine Learning. Harvard Data Science Review, 4(1). https://doi.org/10.1162/99608f92.5a9fd72c

Conclusion – Reusable Framework

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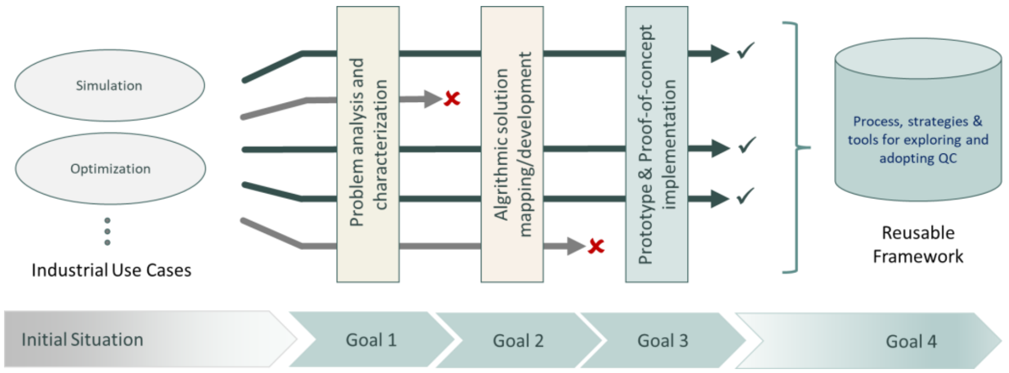
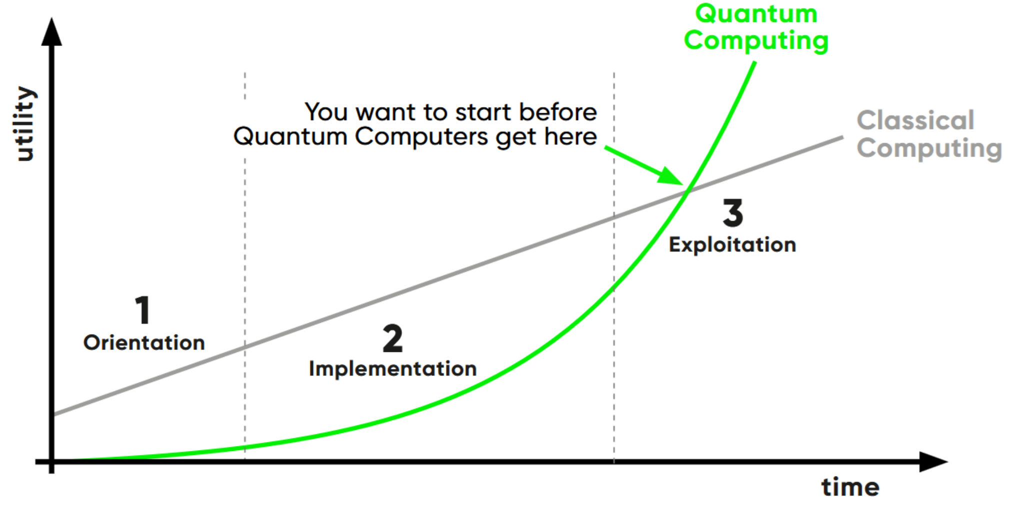
- Goal of evaluating 10+ use cases
  - Logistic, Energy, Finance, …
- Evidence enables a more efficient approach
  - Streamlined Process
  - Tested Strategies
  - Continuously improved Tools
- Results drive the decision on the next steps
  - Identifying suitable problems
  - Estimating a timeline to quantum utility
  - Getting an idea what quantum is about





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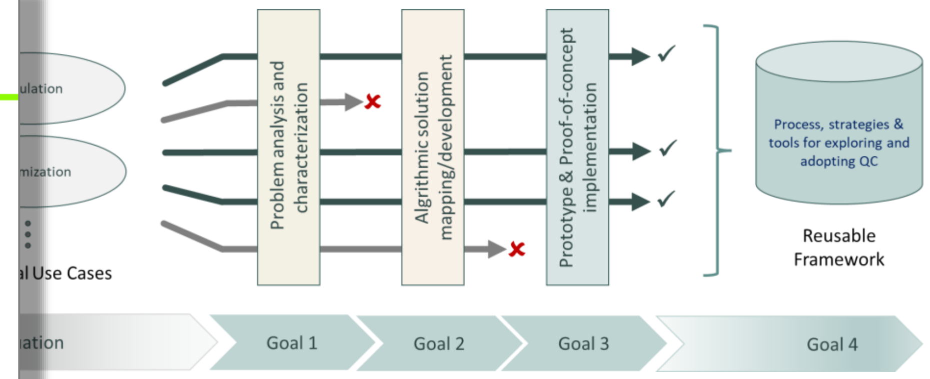
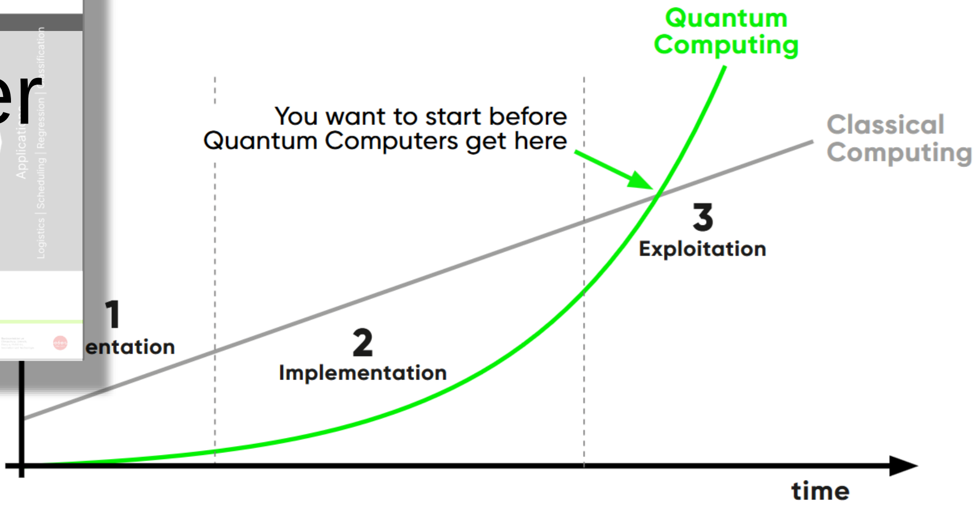
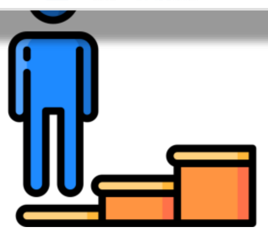
See our poster for a new project.







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SCCH ist eine Initiative der

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softwarepark hagenberg

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