Amaravati Quantum Valley Hackathon 2025

An Innovation Research Outcome Paper

(Use Case Template)

Title of the Use Case
A concise and descriptive title of your innovation or solution.

Author(s) and Affiliation
- Name(s) of Team Members
- Institution / Organization
- Contact Email(s)

Abstract
Brief overview of the problem addressed, proposed solution, methodology, and key outcomes.
Summarize novelty, prototype details (if any), and potential impact.

1. Introduction
Background and context of the challenge problem statement.
Relevance to quantum technologies.
Objectives and scope of the project.

2. Problem Statement
Clearly define the real-world challenge targeted.
Explain why this problem is significant and the potential beneficiaries.

3. Literature Review
Brief review of existing approaches or technologies.
Gaps or limitations identified.

4. Methodology and Approach
Proposed solution concept.
Technology stack used (Quantum SDKs, frameworks, simulators, hardware access, classical tools).
Design architecture / workflow diagram.
Development process during the hackathon (sprints, team roles).

5. Prototype Development
Description of the prototype created (hardware/software).
Components, configurations, and design schematics.

Screenshots, UI mock-ups, or hardware diagrams.
How the prototype demonstrates core functionality of the solution.

6. Implementation
Details of algorithms, models, or circuits implemented.
Tools, platforms, and resources used.
Challenges faced and how they were addressed.

7. Results and Outcomes
Experimental results, metrics, and benchmarks.
Demonstration outputs from the prototype.
Comparative analysis with existing solutions (if any).

8. Innovation and Novelty
Unique aspects of your solution and prototype.
Why it qualifies as an innovation.
Potential IP / patent possibilities (if any).

9. Use Case Applications
Real-world applicability and stakeholders who can adopt it.
Market / societal / industrial impact.
Scalability and integration possibilities.

10. Limitations and Future Work
Current limitations of your solution.
Suggested improvements, prototype refinement, and roadmap for future development.

11. Conclusion
Summary of key findings and takeaways.
Vision for further research or productization.

12. Acknowledgements
Hackathon organizers, mentors, sponsors, or institutions who supported the work.

13. References
Cite all references used in IEEE/APA style.

14. Appendix (Optional)
Prototype source code / repository links.
Additional diagrams, charts, or datasets.
User manuals or installation guides.