

Supplementary Table S1. Population–Intervention–Comparison–Outcome–Context (PICOC) framework for analyzing the Quadruple Helix Framework (QHF) within the Philippine innovation ecosystem. Note: Derived from Petticrew & Roberts, 2008.

Elements	Description
P (Population)	Peer-reviewed studies and scholarly publications examining the Philippine innovation ecosystem, focusing on interactions among government, universities, industry, and community actors. Each publication was treated as an analytical case for qualitative meta-analysis.
I (Intervention)	Application or discussion of the Quadruple Helix Framework, including interactions among government, universities, industry, and communities in innovation governance, knowledge exchange, technology transfer, commercialization, community engagement, and the role of innovation intermediaries (e.g., technology transfer offices, incubators, innovation hubs, and Living Labs).
C (Comparison)	Comparison of multisectoral interaction patterns and innovation configurations between the pre-policy period (2013–2018) and the post-policy period (2020–2025) to examine how interactions evolved following the enactment of the Philippine Innovation Acts and related innovation reforms.
O (Outcome)	Qualitative evidence on: (a) multisectoral interaction patterns and innovation configurations; (b) structural, functional, and relational dimensions of collaboration; (c) enabling factors and barriers to ecosystem integration; (d) emerging Quadruple Helix characteristics; and (e) conceptual insights and appropriately qualified policy implications for strengthening the Philippine innovation ecosystem.
C (Context)	The Philippine innovation ecosystem, considering national and local innovation policies (e.g., RA 11293 and RA 11337), institutional and governance arrangements, sectoral innovation contexts, and the two analytical periods (2013–2018 and 2020–2025).