

Supplementary Table S2. Stage 1 assessed source credibility and Stage 2 assessed relevance and contextual alignment. Across ST1, ST2, and ST3, 1,861 records were retained after full text verification: 463 from 2013–2018 and 1,398 from 2020–2025. After removing 641 repeated or duplicate records, 1,220 records remained for period specific analytical screening: 309 pre-policy and 911 post-policy. Applying the Structural, Functional, and Relational criteria, together with the Triple Helix Innovation Model (THIM) and emerging Quadruple Helix framework (QHF), excluded 1,189 records and retained 31 final analytical cases: 20 pre-policy cases (2013–2018) and 11 post-policy cases (2020–2025). Of these, 9 cases were Fully Included and 22 were Conditionally Included for analytical coding and network analysis. The complete process is presented in Figure 2, with period specific details in Supplementary Tables S4 and S6. Although the searches used Triple Helix terminology, the synthesis examined interactions among government, university, industry, and community actors, enabling interpretation through the QHF.

Search Terms	Screening Stage	Number of studies
Core Innovation System Interactions <i>("Triple Helix Innovation" OR ("government" AND ("university" OR "academe")) AND "industry")) AND ("innovation" OR "research" OR "technology transfer" OR "commercialization") AND Philippines</i>	Initial search (records identified before screening)	n=38,851
	Stage 1: Source credibility screening	Excluded (n=7,119) Retained (n=31,732)
	Stage 2: Relevance and contextual alignment	Excluded (n=30,516) Retained (n=1,216) 314 (2013-2018); 902 (2020-2025)
	Records retained after full-text verification	Excluded (n=17) Retained n=1,199 302 (2013-2018); 897 (2020-2025)
Interaction Mechanisms, Enablers, and Barriers <i>("Triple Helix Innovation" OR ("government" AND ("university" OR "academe")) AND "industry")) AND ("interaction" OR "collaboration" OR "coordination" OR "knowledge exchange" OR "technology transfer" OR "research collaboration") AND ("barrier" OR "enabler" OR "challenge" OR "governance" OR "institutional capacity" OR "structural gap" OR "relational dynamic") AND Philippines</i>	Initial search (records identified before screening)	n=25,774
	Stage 1: Source credibility screening	Excluded (n=6,005) Retained (n=19,769)
	Stage 2: Relevance and contextual alignment	Excluded (n=19,117) Retained (n=652) 168 (2013-2018); 484 (2020-2025)
	Records retained after full-text verification	Excluded (n=24) Retained (n=628) 152 (2013-2018); 476 (2020-2025)
Policy Evolution and Conceptual Model Development <i>("Triple Helix Innovation" OR ("government" AND ("university" OR "academe")) AND "industry")) AND ("innovation policy" OR "Philippine Innovation Act" OR "Innovative Startup Act" OR "policy reform" OR "institutional change") AND ("framework" OR "model" OR "conceptual" OR "system") AND Philippines</i>	Initial search (records identified before screening)	n=4,404
	Stage 1: Source credibility screening	Excluded (n=1,703) Retained (n=2,701)
	Stage 2: Relevance and contextual alignment	Excluded (n=2,657) Retained (n=44) 15 (2013-2018); 29 (2020-2025)
	Records retained after full-text verification	Excluded (n=10) Retained (n = 34) 9 (2013-2018); 25 (2020-2025)
Broad evidence base	Total records retained after full-text verification	n=1,861 463 (2013–2018); 1,398 (2020–2025)
Period-specific analytical screening	Repeated/duplicate records removed before analytical screening	n=641 154 (2013–2018); 487 (2020–2025)
	Records retained for period-specific analytical screening	n=1,220 309 (2013–2018); 911 (2020–2025)
THIM and Emerging Quadruple Helix Analytical Screening and Inclusion	Records excluded during analytical screening	n=1,189 289 (2013–2018); 900 (2020–2025)
	Analytical cases retained for qualitative synthesis	n=31 20 (2013–2018);

		11 (2020–2025)
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