

Supplementary Table S10. Edge Attributes Representing Multisectoral Interactions in the Network Analysis (2020–2025). Note: This table presents the complete list of network edges and their attributes for the 11 analytical cases (2020–2025). Directed edges represent explicitly documented interactions between actors. Attributes include Source and Target (direction of interaction), Relationship (e.g., funding, training, data provision, workflow validation), and Weight, standardized on a three-point scale (1 = limited interaction; 2 = moderate collaboration; 3 = strong or sustained collaboration). Edge direction follows the documented flow of influence, knowledge exchange, funding, mentorship, or policy coordination, with reciprocal interactions included only when explicitly reported. Corresponding network visualizations are provided in the figures for each analytical case.

Case	Source	Target	Relationship	Weight
1 (SID-b100)	ASTI	PREGINET	Provides ICT infrastructure support	2
	ADMU	SHINE_OS	Develops EMR system	3
	CICT	DOH	ICT governance coordination (historical role)	1
	DOH	NTSP	Implements national telemedicine program	3
	DOH	LGU_Quezon	Implements CHITS program	3
	DOH	LGU_Navotas	Implements CHITS program	3
	DOH	LGU_Pasay	Implements CHITS program	3
	DOST	RXBOX	Funds biomedical device development	3
	DOST	PHIE	Funds national health data exchange	3
	ITU	DOH	Provides ICT-health framework guidance	1
	JR_BORJA	SPMC	Telepsychiatry referral collaboration	2
	MDH	UP-PGH	Telemedicine consultation collaboration	2
	LGU_Navotas	CHITS	Deploys EMR system	2
	NTHC	CHITS	Develops EMR system	3
	NTHC	RXBOX	Develops telemedicine device	3
	NTHC	NTSP	Program design and technical support	3
	LGU_Pasay	CHITS	Deploys EMR system	2
	PHIE	DOH	Supports national data aggregation	3
	PHILHEALTH	DOH	Health financing integration for eHealth	2
	PREGINET	UP-PGH	Enables telemedicine connectivity	2
	PREGINET	MDH	Supports tele-education and consultation	2

	PREGINET	VMMC	Supports telemedicine training	2
	LGU_Quezon	CHITS	Deploys EMR system	2
	RXBOX	CHITS	Integrates patient monitoring data	3
	RXBOX	NTSP	Supports teleconsultation workflow	2
	SHINE_OS	PHILHEALTH	Enables eClaims integration	2
	SMART	SHINE_OS	Technology implementation partner	2
	UNICEF	DOH	Maternal and neonatal program support	2
	VMMC	UP-PGH	Telemedicine training collaboration	2
	WHO	DOH	Provides global eHealth framework guidance	1
	WHO	NTHC	Informs eHealth framework design	1
2 (SID-b171)	BFAR	NIFTDC	Institutional oversight for training and dissemination	3
	BFAR	HATCH_OPS	Establishment of central and satellite hatcheries	3
	BFAR	GROW_OUT	Dissemination of fry production technologies	2
	DOST-PCAARRD	BFAR	Funding and program support for fisheries development	3
	DOST-PCAARRD	HATCH_OPS	Technical and financial assistance for hatchery commercialization	2
	DOST-PCAARRD	UPV	Project coordination for GAINEX implementation	2
	DOST-PCAARRD	SEAFDEC_AQD	Collaboration on broodstock and hatchery research	2
	GROW_OUT	FISH_CONS	Production and supply of table-sized milkfish	2
	HATCH_OPS	GROW_OUT	Supply of hatchery-bred fry	2
	IMPORT_SUP	GROW_OUT	Supply of imported fry to grow-out operators	2
	NIFTDC	HATCH_OPS	Training on hatchery operations and larval rearing	2
	PSA	BFAR	Provision of fisheries production and price data	1
	PSA	DOST-PCAARRD	Provision of statistical data for R&D planning	1
	SEAFDEC_AQD	HATCH_OPS	Technology transfer on hatchery and broodstock systems	2
	SEAFDEC_AQD	BFAR	Technical support for national broodstock programs	2
	UNDP	DOST-PCAARRD	Funding support for GAINEX project	3
	UPV	HATCH_OPS	Research collaboration and pilot hatchery support	2
	WILD_GATHER	GROW_OUT	Supply of wild-caught fry	2
3	PENRO_NE	EMPLOYEES	Organizational affiliation	3
	PENRO_NE	BIODIV_COM	Organizational affiliation	3

(SID-b247)	IT_EXPERTS	PENRO_NE	Evaluated system quality characteristics	1
	EMPLOYEES	PENRO_NE	Evaluated system usability, functionality, reliability, and interface	1
	BIODIV_COM	PENRO_NE	Evaluated system usability, functionality, reliability, and interface	1
	COMMUNITY	PENRO_NE	Evaluated system usability, functionality, reliability, and interface	1
	TSU	PENRO_NE	Provided substantial support for the study	2
	CLSU	PENRO_NE	Provided substantial support for the study	2
	PENRO_NE	DENR	Recommended possible linkage of system	2
	DENR	LAWIN	LAWIN Forest and Biodiversity Protection System under DENR	3
4 (SID-b694)	External_Biz	CSU_BIZNEST	Collaborates in incubation ecosystem	1
	External_Biz	NVSU_Sabatan	Collaborates in incubation ecosystem	1
	ISU_CVCDC	External_Biz	Develops cacao products for industry use	2
	IPO_Taguig	ISU_CVCDC	Grants IP registration and certification	3
	CSU	CSU_BIZNEST	Hosts business incubator	3
	ISU	ISU_CVCDC	Hosts business incubator	3
	NVSU	NVSU_Sabatan	Hosts business incubator	3
	BI_CSU	CSU_BIZNEST	Implements mentoring, training, incubation support	2
	BI_ISU	ISU_CVCDC	Implements mentoring, training, incubation support	2
	BI_NVSU	NVSU_Sabatan	Implements mentoring, training, incubation support	2
	Kasama_Company	ISU_CVCDC	Promotes cacao products internationally	1
	CSU_BIZNEST	Biz_Grads	Provides exposure, training, employability support	2
	ISU_CVCDC	Biz_Grads	Provides exposure, training, employability support	2
	NVSU_Sabatan	Biz_Grads	Provides exposure, training, employability support	2
	Cooperative_Banks	NVSU_Sabatan	Provides financial support access	2
	Cooperative_Banks	CSU_BIZNEST	Provides financial support access	2
	LBP	NVSU_Sabatan	Provides funding access for ventures	3
	LBP	ISU_CVCDC	Provides funding access for ventures	3
	DOST	NVSU_Sabatan	Provides funding, technical validation, mentorship	3
	DOST	ISU_CVCDC	Provides funding, technical validation, mentorship	3
	DOST	CSU_BIZNEST	Provides funding, technical validation, mentorship	3
	PLTCI	NVSU_Sabatan	Provides incubatees and mentoring pipeline	1

	SMU	NVSU_Sabatan	Provides incubatees and mentoring pipeline	1
	CSU_BIZNEST	Incubatees	Provides incubation services and support	2
	ISU_CVCDC	Incubatees	Provides incubation services and support	2
	NVSU_Sabatan	Incubatees	Provides incubation services and support	2
	DTI	NVSU_Sabatan	Provides mentorship, technical support, partnerships	2
	DTI	ISU_CVCDC	Provides mentorship, technical support, partnerships	2
	DTI	CSU_BIZNEST	Provides mentorship, technical support, partnerships	2
	ISU_CVCDC	Cacao_Growers	Provides processing support and development outreach	2
	NGAs	NVSU_Sabatan	Provides support services and partnerships	2
	NGAs	ISU_CVCDC	Provides support services and partnerships	2
	NGAs	CSU_BIZNEST	Provides support services and partnerships	2
	CSU_BIZNEST	Biz_Students	Provides training, mentorship, incubation services	2
	ISU_CVCDC	Biz_Students	Provides training, mentorship, incubation services	2
	NVSU_Sabatan	Biz_Students	Provides training, mentorship, incubation services	2
	Biz_Students	BI_NVSU	Receive training and mentorship	2
	Biz_Students	BI_ISU	Receive training and mentorship	2
	Biz_Students	BI_CSU	Receive training and mentorship	2
	CHED	NVSU	Sets curriculum policies and standards	3
	CHED	ISU	Sets curriculum policies and standards	3
	CHED	CSU	Sets curriculum policies and standards	3
	ISU_CVCDC	IPO_Taguig	Submits products for utility model and patent registration	3
	CSU_BIZNEST	Technopreneurs	Supports development and incubation	2
	NVSU_Sabatan	Technopreneurs	Supports development and incubation	2
	CSU_BIZNEST	Biz_Assisted	Supports development and scaling	2
	NVSU_Sabatan	Biz_Assisted	Supports development and scaling	2
	LGUs	NVSU_Sabatan	Supports events and partnerships	2
	LGUs	ISU_CVCDC	Supports events and partnerships	2
	LGUs	CSU_BIZNEST	Supports events and partnerships	2
	CSU_BIZNEST	Startups	Supports incubation and business development	2
	NVSU_Sabatan	Startups	Supports incubation and business development	2

	ISU_CVDC	Biz_Assisted	Supports product development and processing	2
	Biz_Grads	Biz_Students	Transition and outcome linkage (skills development pathway)	1
5 SID-b695	BSU	SEs	Technical skills training support	2
	CBA	SEs	Formation and coordination of social enterprises	3
	CDA	LGU_Taal	Cooperative development support	2
	DOLE	SEs	Provision of utensils and raw materials	2
	DOST	SEs	Grants-in-aid funding and enterprise development support	3
	DOST_PCAARRD	SEs	Technology transfer support	2
	DSWD_SLP	SEs	Funding for production facility establishment	3
	EZFI	SEs	Funding and production facility establishment	3
	EZFI	SEs	Enterprise monitoring and marketing assistance	2
	FDA	SEs	Licensing and regulatory approval (LTO)	2
	FNRI	EZFI	Technology transfer support	2
	KabisigKALAH	EZFI	Marketing assistance	2
	LGU_Cuenca	SEs	Enterprise supervision and assistance coordination	2
	LGU_Ibaan	SEs	Funding and facility support	3
	LGU_Ibaan	SEs	Marketing and training assistance	2
	LGU_Rosario	SEs	Facility provision and supervision	3
	LGU_Rosario	SEs	Technical and marketing assistance	2
	LGU_Taal	SEs	Enterprise formation and operational support	3
	PHP_NGO	SEs	Formation of associations and funding support	3
	PHP_NGO	SEs	Management guidance and marketing assistance	2
	ProvVetOffice	LGU_Taal	Agricultural technical instruction	2
	PSTC_Batangas	SEs	Delivery of S&T enterprise support services	3
	PTRI	SEs	Technology transfer support	2
	SEARCA	LGU_Rosario	Technology transfer support	2
	SEC	SEs	Enterprise registration authority	3
	SEs	LGU_Cuenca	Feedback on enterprise needs and coordination	1
	SEs	LGU_Ibaan	Feedback on enterprise needs and coordination	1
	SEs	MSMEs	Operate within MSME sector context	1

	SIMabini	SEs	Skills training and production facility funding support	3
	UB	PHP_NGO	Equipment provision support	2
6 (SID-b110)	ADM	AMS	Uses system outputs for attendance monitoring and reporting	2
	CHED	SCH	Provides institutional oversight framework (general education governance context only)	3
	DepEd	SCH	Enforces attendance monitoring requirements	3
	PAR	SCH	Receives attendance-related student information indirectly	1
	RES	AMS	Designs and develops attendance monitoring system	2
	SCH	TCH	Assigns attendance monitoring responsibility	2
	SCH	ADM	Assigns administrative attendance oversight role	2
	AMS	TCH	Automates attendance recording and tracking	2
	AMS	ADM	Generates attendance reports for school administration	2
	AMS	STD	Tracks student attendance status	2
	TCH	AMS	Uses system to record student attendance	2
	TCH	STD	Records attendance presence/absence	2
7 (SID-b209)	AT	PA	Submits field surveillance data	2
	AT	SCI	Provides field observations for interpretation	2
	CIT_U	AT	Provides academic/research support context for system development	1
	DA_SAM	PA	Provides agricultural monitoring mandate and oversight	3
	DA_SAM	RCPC	Coordinates crop protection reporting system	3
	FARMERS	AT	Submits pest and disease surveillance reports	2
	FARMERS	PA	Provides surveillance form inputs indirectly via system reporting chain	2
	PA	RCPC	Submits consolidated pest and disease reports	3
	SCI	PA	Assists in interpretation of pest and disease data	2
8 (SID-b318)	AMReL	MakerLab	Integrates MakerLab within research laboratory	2
	BPSU	MakerLab	Establishes and operates academic makerspace	2
	DOST-PCIEERD	MakerLab	Jointly supports establishment	3
	MakerLab	BPSU_Students	Provides ideation, prototyping, and manufacturing space	2
	MakerLab	BPSU_Faculty	Provides research and project facilities	2
	Balanga_City	BPSU	Supports local makerspace initiative and technology ecosystem vision	3

	CHED	SLU_TechHub	Higher education support in technopreneurship context	3
	DOST	SLU_TechHub	Supports innovation ecosystem development	3
	DTI	SLU_TechHub	Partner agency support for innovation ecosystem	3
	SLU	SLU_TechHub	Establishes technopreneurship hub	2
	SLU_TechHub	SLU_SIRIB	Provides ideation and design thinking facility	2
	SLU_TechHub	SLU_FabLab	Provides fabrication and prototyping facility	2
	SLU_TechHub	SLU_TBI	Provides incubation and mentoring facility	2
	SLU_FabLab	MSMEs	Collaborates in prototyping and fabrication	2
	Miriam_College	Miriam_Innovation	Hosts innovation center	2
	SM_Group	Miriam_Innovation	Donates innovation center facility	3
9 (SID-b469)	CMU	FARMERS	Provides seminars and trainings on cacao production	2
	CMU	FARMERS	Provides agricultural inputs (planting materials and fertilizers)	2
	CMU	FARMERS	Provides technical assistance in cacao plantation establishment	2
	CMU	FARMERS	Conducts monitoring and evaluation of cacao plantations	2
	CMU	LGUs	Collaborates in project implementation (MOA-based coordination)	2
	LGUs	FARMERS	Selects project-cooperators for cacao project	2
	DOST-PCAARRD	CMU	Provides project grant funding	3
10 (SID-b582)	COMPETITORS	SUPPLIERS	Share supply networks and business linkages	2
	CUSTOMERS	HALAL_EXP	Provide certification demand and market requirements	1
	CUSTOMERS	HCB	Influence certification demand through market expectations	1
	GOV_PH	PAB	Mandates accreditation policies under RA 10817	3
	GOV_PH	HCB	Establishes regulatory framework for certification system	3
	GOV_PH	HALAL_EXP	Promotes halal export development through policy framework	3
	HALAL_EXP	EXPORT_MARKETS	Exports halal-certified products to international markets	2
	HALAL_EXP	TOURISM_SECTOR	Establish domestic market and distribution linkages	2
	HALAL_EXP	MNL_HALAL_SYSTEM	Operate within halal ecosystem structure	2
	HCB	HALAL_EXP	Certifies halal compliance; conducts audits	2
	HCB	HALAL_EXP	Provides certification guidelines and compliance instructions	2
	IDCP	HALAL_EXP	Issues halal certification after compliance audits	2
	MIDDLE_EAST_CERT	HALAL_EXP	Determines acceptance/rejection of exported certification	2

	PAB	HCB	Accredits halal certifying bodies	3
	PAB	HALAL_EXP	Regulates certification compliance affecting exporters	3
	SUPPLIERS	HALAL_EXP	Provide halal-certified raw materials and inputs	2
11 (SID- b590)	Biz	LGU_Valencia	Transaction use and service interaction	1
	CIT	LGU_Valencia	Citizen engagement, feedback, and service usage	1
	EMP	LGU_Valencia	Internal system use and administrative interaction	1
	GOVAG	LGU_Valencia	Supports intergovernmental coordination for digital governance	2
	ICT	LGU_Valencia	Provides ICT infrastructure and platforms for e-governance	3
	LGULEAD	LGU_Valencia	Leadership oversight and governance direction	3
	LGU_Valencia	CIT	Delivers e-government services (G2C)	3
	LGU_Valencia	Biz	Provides digital government-to-business services (G2B)	2
	LGU_Valencia	EMP	Provides internal e-government services (G2E)	2
	LGU_Valencia	GOVAG	Coordinates inter-agency e-government services (G2G)	2
	LGU_Valencia	ICT	Utilizes and implements ICT systems for service delivery	2
	LGU_Valencia	LGULEAD	Reporting and administrative feedback flow	1
	NATLEG	LGU_Valencia	Enacts e-government policies and legislation	3