

From Partnership to Performance: A Serial Mediation Model Linking Inter-organizational Collaboration Strategy to the Effectiveness of High-Level Vocational Education in Thailand

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Abstract.

Thailand's efforts to widen access to high-level vocational education for disadvantaged youth increasingly depend on partnerships among colleges, industry, and intermediary funders such as the Equitable Education Fund (EEF). Yet little is known about how such partnerships are converted into institutional outcomes. This paper develops and operationalizes a serial mediation model in which inter-organizational collaboration strategy (IOCS) influences the effectiveness of vocational education management (EVEM) through two sequential mechanisms: vocational education management (VEM) and competency-based work-integrated learning (WIL). Drawing on the resource-based view, resource dependence theory, collaborative governance and collaborative advantage theories, and experiential learning theory, five hypotheses are specified. The paper then describes an explanatory sequential mixed-methods design for testing the model in the EEF High-Level Vocational Innovation Scholarship Project, which involves 121 vocational institutions under the Office of the Vocational Education Commission. The quantitative phase targets 330 administrators, department heads, and teachers using a 55-item, five-point questionnaire covering four latent constructs and ten subscales, to be analyzed through a two-step structural equation modeling approach; the qualitative phase involves 20 key informants. Content validity was examined by five experts using the index of item-objective congruence, and a try-out with 30 respondents yielded Cronbach's alpha coefficients of 0.953–0.978 for subscales and 0.994 for the full instrument. The framework clarifies why memoranda of understanding alone are unlikely to raise effectiveness unless they are translated into management systems and co-designed workplace learning, and it offers funders and colleges a diagnostic tool for partnership-based vocational reform.

Keywords: inter-organizational collaboration, vocational education management, work-integrated learning, educational effectiveness, serial mediation

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1. Introduction

Human capital has become a decisive source of national competitiveness in economies reshaped by digital technology and automation. Technical and vocational education and training (TVET) is the part of the education system that connects that investment most directly to the world of work. International organizations now frame TVET reform as a lever for just transitions to green and digital economies (UNESCO, 2022). At the same time, the

World Bank (2018) warns of a learning crisis in which schooling does not reliably translate into learning, employability, and income, particularly for low-income learners.

Thailand faces these pressures in a distinctive form. The country is attempting to escape the middle-income trap while its working-age population shrinks, and national strategies place the development of a high-competency workforce and the reduction of educational inequality at the center of policy. Participation in vocational programs, however, remains below national targets, and graduates frequently report a mismatch between the skills they acquire and those employers demand. The Equitable Education Fund (EEF), established under the Equitable Education Fund Act of 2018, responds to this challenge through the High-Level Vocational Innovation Scholarship Project, which supports financially disadvantaged but capable young people to study for higher vocational diplomas in target industries. A defining condition of the project is that participating colleges must co-develop curricula with enterprises, deliver work-integrated learning, and secure partnerships that offer graduates employment pathways (Equitable Education Fund, 2024).

The project therefore treats collaboration among the EEF, colleges, and enterprises as the engine of quality. Yet the organizational literature cautions that collaboration does not automatically produce value. Huxham and Vangen (2005) describe the persistent risk of collaborative inertia, in which partners invest effort without achieving collaborative advantage, and Ansell and Gash (2008) show that trust building, shared understanding, and facilitative leadership condition whether collaborative governance succeeds. In vocational education, Patrick et al. (2008) similarly found that the benefits of work-integrated learning depend on how stakeholder relationships and resources are managed. A signed memorandum of understanding (MOU) is, in this sense, a starting point rather than an outcome.

Previous studies have typically examined partnership, institutional management, work-integrated learning, and effectiveness separately or in pairs, and seldom in the equity-oriented, network-based setting of a national scholarship program. The mechanism through which collaboration strategy becomes institutional effectiveness therefore remains a black box. This paper addresses that gap with three aims: (1) to develop a theoretically grounded serial mediation model linking inter-organizational collaboration strategy (IOCS), vocational education management (VEM), work-integrated learning (WIL), and the effectiveness of vocational education management (EVEM); (2) to specify the hypotheses and a mixed-methods design capable of testing the model in the EEF project; and (3) to report the development and preliminary validation of the measurement instrument. The paper contributes a transferable framework for analyzing partnership-based vocational reform and a validated instrument that can be used by researchers and program managers.

2. Theoretical Background and Hypothesis Development

2.1 Theoretical foundations

The model integrates several complementary perspectives. The resource-based view explains performance through valuable, rare, and hard-to-imitate resources (Barney, 1991), and its extension to strategic alliances argues that organizations collaborate to obtain resources they cannot efficiently build alone (Das & Teng, 2000). Resource dependence theory adds that organizations facing environmental uncertainty seek relationships that secure critical inputs, while accepting some loss of autonomy (Pfeffer & Salancik, 1978). Public vocational colleges operating under tight budgets and rapidly changing technology fit this description well: equipment, industrial expertise, and training placements are controlled largely by enterprises.

A scholarship college must also balance the interests of students and families, the funder, industry, and the regulator. Collaborative governance theory specifies how such multi-party arrangements function, emphasizing starting conditions, institutional design, facilitative leadership, and cycles of dialogue, trust, and commitment (Ansell & Gash, 2008). Network governance research shows that a lead or network administrative organization can coordinate dispersed members effectively (Provan & Kenis, 2008), which describes the EEF's role as a backbone organization in the project. Finally, experiential learning theory holds that knowledge is created through the transformation of concrete experience (Kolb, 1984), providing the pedagogical logic for learning in authentic workplaces.

2.2 Inter-organizational collaboration strategy

In this study, IOCS is defined as the deliberate approach through which a vocational college builds and manages relationships with external organizations, especially the EEF and enterprises, as strategic partners sharing responsibility for common goals. Two observable dimensions are specified. Forms of collaboration capture the structures and mechanisms of joint work, including MOUs that define roles, deep strategic partnerships, resource sharing, coordination through a backbone organization, and networks with regular communication and joint planning. Benefits of collaboration capture the value that the college derives, such as relief from budget constraints, upgraded teacher skills, higher educational standards, improved institutional reputation, and a reduced skills mismatch. This two-dimensional view is consistent with the argument that collaboration should be judged both by its design and by the collaborative advantage it produces (Huxham & Vangen, 2005).

2.3 Vocational education management

VEM refers to the planning, organizing, directing, and evaluating processes through which a college translates national vocational policy into institutional practice. Three dimensions are specified: policy, strategy, and legal frameworks, reflecting how national strategies and vocational legislation are converted into flexible institutional plans and budgets; institutional management, including innovative and participative leadership, digital management systems, the development of dual-qualified teachers, flexible timetabling aligned with enterprise schedules, and career guidance; and quality assessment, covering outcome-focused quality assurance, enterprise participation, graduate employment tracking, and the use of evaluation results to strengthen partnerships. The emphasis on leadership and organizational systems follows established educational administration scholarship (Hoy & Miskel, 2013) and evidence that school leaders influence outcomes mainly by shaping conditions for teaching and learning (Leithwood et al., 2008).

2.4 Competency-based work-integrated learning

WIL is defined as a competency-based instructional process in which scholarship students practise in real industrial settings (school in factory) or in realistic production environments within the college (factory in school). Its dimensions are curriculum, meaning joint design with enterprises aligned to occupational standards and a shared training plan that allocates skills between college and workplace; instruction and assessment, meaning learning by doing, enterprise mentors, project-based learning with real industrial problems, structured reflection, supervision visits, authentic assessment with rubrics accepted by both parties, and remedial practice before reassessment; and workplace partnership, meaning enterprise participation in co-design, co-teaching, and co-assessment. Billett (2009) argues that workplace experiences have educational worth only when they are deliberately integrated into the curriculum, and Smith (2012) identifies alignment, supervision, and assessment as core

quality conditions. Jackson (2015) further shows that the development of employability skills through WIL is constrained when coordination between institutions and host organizations is weak.

Organizational effectiveness is widely regarded as a multidimensional construct, particularly in educational institutions with complex goals and multiple constituencies (Cameron, 1978). Educational effectiveness research likewise shows that leadership, a focus on learning, and systematic monitoring are recurring characteristics of effective institutions (Scheerens, 2016). EVEM is therefore operationalized through three dimensions aligned with the EEF project's aims: vision and mission attainment, including reducing inequality, producing a high-competency workforce, reducing dropout, and serving as a model for other colleges; teacher satisfaction, including professional pride, satisfaction with resources and working climate, professional growth, and morale; and educational achievement, including graduates' job-ready technical skills, soft skills, professional ethics, relevant employment, and external occupational certification.

The theories above suggest a causal chain. Collaboration strategy brings external resources, knowledge, and commitments into the college (Das & Teng, 2000; Pfeffer & Salancik, 1978). Institutional management is the first transmission mechanism, converting these inputs into policies, systems, and cultures that support quality (Hoy & Miskel, 2013). Partnerships create pressure and capacity for colleges to redesign plans, budgets, teacher development, and quality assurance around industry needs; hence H1: IOCS has a positive direct effect on VEM. Because enterprises supply placements, mentors, equipment, and occupational standards, collaboration also shapes learning design directly; hence H2: IOCS has a positive direct effect on WIL. WIL requires flexible timetables, dual-qualified teachers, budgets, and supervision systems that only institutional management can provide (Patrick et al., 2008); hence H3: VEM has a positive direct effect on WIL.

Figure 1: Conceptual serial mediation model of the study
Source: Authors' synthesis of the literature

EVEM indirectly through VEM, through WIL, and through the serial path IOCS → VEM → WIL → EVEM. Figure 1 presents the conceptual model, and Table 1 summarizes each construct, its dimensions, and its principal theoretical anchors.

Table 1: Constructs, dimensions, and theoretical anchors of the proposed model

Construct	Role	Dimensions	Key anchors
IOCS	Independent	Forms of collaboration; benefits of collaboration	Das & Teng (2000); Huxham & Vangen (2005); Ansell & Gash (2008)
VEM	Mediator 1	Policy, strategy and law; institutional management; quality assessment	Hoy & Miskel (2013); Leithwood et al. (2008)
WIL	Mediator 2	Curriculum; instruction and assessment; workplace partnership	Kolb (1984); Billett (2009); Smith (2012)
EVEM	Dependent	Vision and mission attainment; teacher satisfaction; educational achievement	Cameron (1978); Scheerens (2016)

Source: Authors' synthesis

3. Research Design

3.1 Paradigm and design

The study adopts a pragmatist paradigm, which lets the research questions determine the methods and values knowledge that can solve practical problems (Creswell & Creswell, 2023). An explanatory sequential mixed-methods design (QUAN → qual) is used. The dominant quantitative phase estimates the levels of the four constructs and tests the hypothesized causal structure with structural equation modeling (SEM). The supportive qualitative phase then explains how and why the observed paths operate in real colleges.

3.2 Population, sample, and sampling

The population comprises administrators, department heads, teachers, and staff directly involved in the High-Level Vocational Innovation Scholarship Project at 121 vocational institutions under the Office of the Vocational Education Commission that have supported scholarship cohorts one to eight, amounting to approximately 12,611 persons. The sample size was determined with the ratio of 30 respondents per observed variable recommended for stable covariance-based SEM estimation (Hair et al., 2019). With 11 observed variables in the model, the target sample is 330 respondents, which also exceeds the frequently cited minimum of 200 cases for SEM (Kline, 2023). Multi-stage sampling is applied: institutions are first stratified by region and type (public or private), representative colleges are then drawn within each stratum, and respondents are finally selected proportionally and purposively according to their roles in partnership management and competency-based instruction.

3.3 Instrument

The quantitative instrument is a three-part questionnaire. Part 1 records respondent characteristics such as position, length of service, teaching field, and institution type. Part 2 contains 55 items rated on a five-point Likert-type scale from 1 (least) to 5 (most), interpreted with a class interval of 0.80, so that means of 4.21–5.00 indicate the highest level and 1.00–1.80 the lowest. Part 3 invites open-ended comments. Table 2 shows the structure of Part 2. Although the conceptual model contains 11 dimensions, the workplace partnership dimension of WIL is embedded in the curriculum and instruction items, because enterprise co-design, co-teaching, and co-assessment permeate every stage of WIL; Part 2 is therefore organized into ten subscales.

Table 2: Structure of the questionnaire (Part 2)

Latent construct	Subscale	Items	No. of items
IOCS	Forms of collaboration	1–5	5
	Benefits of collaboration	6–10	5
VEM	Policy, strategy and law	11–14	4
	Institutional management	15–20	6
	Quality assessment	21–25	5
WIL	Curriculum	26–29	4
	Instruction and assessment	30–40	11
EVEM	Vision and mission attainment	41–45	5
	Teacher satisfaction	46–50	5
	Educational achievement	51–55	5
Total	10 subscales	1–55	55

Source: Research instrument developed by the authors (2026)

Representative items illustrate the operational definitions: for IOCS, whether enterprises participate fully in WIL as strategic partners; for VEM, whether departments are empowered to work flexibly with enterprises and teachers are developed as dual-qualified professionals; for WIL, whether joint training plans allocate skills between college and workplace; and for EVEM, whether dropout among disadvantaged students has declined and graduates are employed in their field.

4. Instrument Validation Results

Content validity was examined by five experts in vocational education management, enterprise practice, and research and measurement, using the index of item-objective congruence (IOC), in which each expert rates an item +1, 0, or –1 for its congruence with the intended objective. Items with IOC values of 0.50–1.00 were retained, and wording was refined according to the experts' comments. The revised questionnaire was then tried out with 30 respondents who resembled, but were not part of, the target sample. Item discrimination was examined through corrected item-total correlations, and internal consistency was estimated with Cronbach's alpha against a minimum criterion of 0.70.

Table 3 reports the try-out reliability. The full 55-item instrument achieved an alpha of 0.994. Coefficients for the four latent constructs ranged from 0.976 to 0.990, and those for the ten subscales ranged from 0.953 to 0.978, all well above the 0.70 threshold. These results indicate strong internal consistency. At the same time, coefficients above 0.95 may partly reflect item redundancy or a small, homogeneous try-out group, so the main study will also examine composite reliability, average variance extracted, and discriminant validity to confirm that the constructs are empirically distinct (Fornell & Larcker, 1981).

Table 3: Try-out reliability of the questionnaire (n = 30)

Construct / subscale	No. of items	Cronbach's α
IOCS	10	0.976
Forms of collaboration	5	0.953
Benefits of collaboration	5	0.963
VEM	15	0.989
Policy, strategy and law	4	0.961
Institutional management	6	0.974
Quality assessment	5	0.977

Construct / subscale	No. of items	Cronbach's α
WIL	15	0.990
Curriculum	4	0.969
Instruction and assessment	11	0.987
EVEM	15	0.989
Vision and mission attainment	5	0.973
Teacher satisfaction	5	0.972
Educational achievement	5	0.978
Whole instrument	55	0.994

Source: Try-out data (2026)

5. Analytical Strategy and Qualitative Phase

5.1 Quantitative analysis

Quantitative data will be collected in dual mode, with printed and online questionnaires, after formal letters from the Graduate School of Suan Sunandha Rajabhat University are sent to participating colleges. Descriptive statistics (frequency, percentage, mean, and standard deviation) will address objective 1. Data will first be screened for missing values, normality, linearity, and multicollinearity. SEM will follow the two-step approach of Anderson and Gerbing (1988): confirmatory factor analysis will first establish an acceptable measurement model on the basis of factor loadings and their significance, and the structural model will then be estimated by maximum likelihood to obtain direct, indirect, and total effects. Hypotheses H1–H5 will be supported when the corresponding standardized path coefficients are positive and statistically significant. Because the model contains a serial indirect path, indirect effects will be tested with bootstrapped confidence intervals rather than normal-theory tests (Preacher & Hayes, 2008). Model fit will be judged against the criteria in Table 4.

Table 4: Goodness-of-fit criteria for the structural equation model

Fit index	Acceptance criterion
Relative chi-square (CMIN/df)	≤ 2.00 (acceptable ≤ 3.00)
p-value of χ^2	> 0.05
GFI	≥ 0.90
AGFI	≥ 0.90
CFI	≥ 0.90 (good ≥ 0.95)
TLI/NNFI	≥ 0.90
RMSEA	≤ 0.05 (acceptable ≤ 0.08)
SRMR	≤ 0.05 (acceptable ≤ 0.08)

Source: Adapted from Hu and Bentler (1999), Hair et al. (2019), and Kline (2023)

5.2 Qualitative phase and integration

The qualitative phase involves 20 key informants, namely directors, deputy directors, and department heads from public and private colleges participating in the project, selected purposively for their direct experience in managing partnerships with the EEF and enterprises or in delivering WIL. Data will be collected after the preliminary SEM results are available, using an open-ended qualitative questionnaire whose eight issues are mapped onto the model's paths (Table 5). The guide was reviewed by the advisor and experts for content coverage and clarity. Responses will be analyzed through content analysis through data reduction, data display, and conclusion drawing and verification. Trustworthiness will be strengthened

through source triangulation across roles and institution types, thick description of the project context, an audit trail, and linkage of the qualitative themes to the quantitative results.

Table 5: Mapping of open-ended issues to model paths

Issue	Guiding question	Model path
1	Does IOCS affect vocational education management, and how?	IOCS → VEM (H1)
2	Does IOCS affect work-integrated learning, and how?	IOCS → WIL (H2)
3	Which forms of collaboration suit the college context?	IOCS dimensions
4	Does VEM affect work-integrated learning, and how?	VEM → WIL (H3)
5	Does VEM affect effectiveness, and how?	VEM → EVEM (H4)
6	Does WIL affect effectiveness, and how?	WIL → EVEM (H5)
7	Does IOCS affect effectiveness directly, and how?	IOCS → EVEM (exploratory)
8	What other factors influence effectiveness?	Model refinement

Source: Research instrument developed by the authors (2026)

Integration will take place at the interpretation stage by connecting the two strands: qualitative themes will be used to explain the strength, direction, and practical meaning of each significant path and to identify conditions that the survey cannot capture. The strategic model required by objective 3 will be drafted from this integrated evidence. The study follows human research ethics principles, including informed consent, voluntary participation, the right to withdraw, confidentiality, and anonymized data storage.

6. Discussion

The proposed model advances the literature in three ways. First, it moves beyond the common assumption that partnership quality directly determines educational outcomes. By placing institutional management and WIL between collaboration strategy and effectiveness, the model specifies the organizational work needed to turn relational resources into results, consistent with the resource-based argument that alliance resources create value only when they are deployed through internal capabilities (Das & Teng, 2000). If the serial path is supported, it would indicate that an MOU produces little unless college leaders rebuild plans, budgets, staffing, and quality systems, and unless those systems in turn enable co-designed curricula, mentoring, and authentic assessment.

Second, the model brings collaborative governance and network governance concepts into institution-level vocational research. The EEF acts as a lead organization that coordinates colleges and enterprises while also supplying finance and system knowledge (Provan & Kenis, 2008). Examining how colleges perceive the forms and benefits of this arrangement can show whether backbone-supported networks create the trust, shared commitment, and joint action that collaborative governance theory predicts (Ansell & Gash, 2008). Third, the multidimensional outcome construct links organizational effectiveness theory (Cameron, 1978) with the equity mission of the scholarship program, recognizing that teacher satisfaction and mission attainment matter alongside graduate achievement.

The framework also has practical value. For college administrators, the questionnaire can serve as a self-assessment tool that reveals whether weaknesses lie in partnership design, internal management, or learning delivery. For the EEF and the Office of the Vocational Education Commission, the model suggests that grant criteria should reward evidence of institutional follow-through, such as flexible timetabling, dual-qualified teacher development, joint training plans, and graduate tracking, rather than the number of signed agreements alone. This is consistent with evidence that employer engagement and workplace learning characterize strong vocational systems (OECD, 2014).

7. Conclusion

This paper has proposed and operationalized a serial mediation model explaining how inter-organizational collaboration strategy can raise the effectiveness of high-level vocational education through vocational education management and competency-based work-integrated learning in Thailand's EEF scholarship project. Five hypotheses were derived from resource-based, resource dependence, collaborative governance, and experiential learning theories, and an explanatory sequential mixed-methods design was specified for testing them with 330 survey respondents and 20 key informants. The 55-item instrument demonstrated content validity through expert review and high internal consistency in the try-out.

Several limitations should be acknowledged. The try-out sample was small, and the very high alpha coefficients call for confirmatory evidence of convergent and discriminant validity in the main study. All survey data come from college personnel, so common method variance and self-report bias must be addressed through procedural remedies and statistical checks, and the perspectives of enterprises and students are represented only indirectly. The cross-sectional design will also limit strong causal inference. Future research could incorporate enterprise and graduate data, track scholarship cohorts longitudinally, and compare the model across industries and regions to establish how far the partnership-to-performance pathway generalizes beyond the Thai context.

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