Educational Research Advances Vol.1, No.1, p. 23-37, 2026

Original article

Patterns of teacher collaboration in East and Southeast Asia: Insights from TALIS 2018

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Received: November 13, 2025
Revised: December 20, 2025
Accepted: January 11, 2026
Published: January 14, 2026

Cited as:
Xu, X., Ma, N., Xiong, Z., Zhang, H., Liu, X. (2026). Patterns of teacher collaboration in East and Southeast Asia: Insights from TALIS 2018. *Educational Research Advances*, *1*(1), 23-37.
https://doi.org/10.46690/era.2026.01.03

Abstract: Using the teaching and learning international survey (TALIS) 2018 data from six East and Southeast Asian systems (Shanghai in China, Chinese Taipei, Japan, South Korea, Singapore, Vietnam), this study distinguishes two forms of teacher collaboration –exchange/coordination and curriculum-focused professional work – and examines individual and organizational correlates. A structural equation modelling (SEM)-based measurement model showed good fit in the pooled data. In South Korea, the three self-efficacy facets converged into a single factor, so self-efficacy was modelled at the first order. Across the other five systems, metric invariance was supported, allowing cross-group comparison of relations. Two results are consistent. Teacher self-efficacy and a positive team-innovation climate are the most stable positive correlates of both forms of collaboration. Professional development needs also tend to promote collaboration. Personal-utility motivation is negative where significant. Perceived policy influence is more closely related to curriculum-focused collaboration, whereas the social value of teaching shows more reliable links to exchange/coordination and only occasional links to curriculum-focused work. Job satisfaction shows mixed signs across models. These patterns suggest a dual strategy: strengthen teachers' capability and shape school conditions that normalise joint work, while tailoring policies to local motivational and policy settings.

Keywords: East and Southeast Asia; teacher cooperation; TALIS; structural equation modelling; measurement invariance

1. Introduction

Teacher Collaboration refers to the behaviour in which teachers work or learn collectively to achieve instructional goals. Research has demonstrated that teacher collaboration plays a positive role in enhancing teaching competence, improving instructional practices, and boosting student achievement (Reeves et al., 2017; Ronfeldt et al., 2015; Voogt et al., 2018). Consequently, many countries have prioritized fostering teacher collaboration in their educational policies and reforms as a key strategy for improving teacher quality. Since 2008, the Organisation for Economic Cooperation and Development (OECD) has been conducting the teaching and learning international survey (TALIS), which identifies teacher collaboration as a crucial measurement metric.

In recent years, the quality of basic education in many East and Southeast Asian countries and regions has been leading globally. According to the results of the Programme for International Student Assessment (PISA) in 2013 and 2018, 15-year-old students from countries and regions such as China, Singapore, Japan, Korea, Chinese Taipei and Vietnam[1] performed exceptionally well in reading, science, and mathematics. The outstanding academic performance of students in East and Southeast Asian regions has sparked discussions and interest within academic and educational circles regarding the teaching behaviours in this region. Specifically, the TALIS 2018 survey investigated teacher collaborative practices across these East and Southeast Asian countries and regions, revealed significant variations among lower secondary teachers in the six participating entities. For instance, while Korean teachers reported lower than average participation rates in all eight types of collaborative activities surveyed by TALIS 2018, their Singaporean counterparts reported higher participation in seven out of the eight activities, with the exception of cross-class and age group cooperation (Ho et al., 2020). Furthermore, distinct patterns of variation were observed in the other participating entities like

[1] Vietnam did not participate in the PISA 2018 ranking

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ISSN: 3106-3632

Yandy Scientific Press

Shanghai (China), Vietnam, Japan, and Chinese Taipei. Therefore, investigating the factors that influence teacher collaboration in these East and Southeast Asian contexts holds significant practical importance for understanding regional teaching practices and professional development, as well as for enhancing teachers' collaborative capabilities.

2. Literature review

Research on the factors influencing teacher collaborative practices, both domestically and internationally, often focuses on discrete collaborative activities or scenarios, such as team teaching, professional dialogue, peer coaching, and collaborative learning (Carroll et al., 2021; De Jong et al., 2022a, 2022b; Khasawneh et al., 2023; Saks et al., 2025). Based on the existing literature, factors associated with teacher collaboration can be broadly categorised into the following: job satisfaction, professional development needs, self-efficacy, professional motivation, and team innovation.

First, a mutually beneficial relationship between teachers' job satisfaction and collaborative practices has been well-documented in numerous studies(Liu & Huang, 2025; Reeves et al., 2017) . Research indicates that high levels of job satisfaction can effectively foster greater work engagement among teachers (Wartenberg et al., 2023). When satisfied with their work, teachers tend to demonstrate positive work attitudes and a strong sense of organisational identification, which in turn encourages more active and meaningful participation in collaborative activities (Reeves et al., 2017). Under such circumstances, they actively seek to enhance their pedagogical knowledge and instructional skills, thereby increasing the likelihood of engaging in collaborative activities.

Second, teacher professional development refers to the sustained and deliberate efforts made by educators to improve their instructional practices, teaching attitudes and beliefs, as well as student learning outcomes (Reeves et al., 2017). Whether teachers participate in professional development is typically directly influenced by their professional development needs (Ronfeldt et al., 2015). When investigating teacher professional development activities, McElearney et al. (2019) found that collaboration had emerged as the most preferred learning method for the majority of teachers. Therefore, teachers with stronger professional development needs demonstrate a higher propensity for engaging in collaborative practices.

Third, the relationship between teacher self-efficacy and collaboration has long been discussed in educational research. Studies indicate that teachers with lower perceived self-efficacy tend to exhibit reduced social engagement with colleagues, which in turn leads to poorer performance in collaborative activities (Chong & Kong, 2012; Reeves et al., 2017; Wang et al., 2025). Conversely, teachers with higher self-efficacy generally possess greater confidence to engage in collaborative teaching and learning with colleagues.

Fourth, although scant research has directly focused on the relationship between teachers' professional motivation and their collaboration, it is theoretically and practically plausible that professional motivation influences collaborative practices (Çoban et al., 2023). Professional motivation provides a rationale for why individuals choose teaching as a career and subsequently sustains their teaching attitudes and behaviours. Research further indicates that stronger professional motivation is positively associated with higher levels of organisational identification, greater awareness of professional development needs, and increased job satisfaction (Richter et al., 2025; Wegge et al., 2006). Consequently, this leads to a greater willingness and higher likelihood of teacher participation in collaborative activities.

Fifth, a positive organisational climate for innovation exerts a significant influence on individual innovative behaviours (Lee & Jung, 2025; Reeves et al., 2017; Ren & Zhang, 2015; Su et al., 2022). Simultaneously, collaboration among individuals serves as a vital source of innovation. For instance, Ronfeldt et al. (2015) demonstrated that teacher innovation primarily stems from collaborative interactions with Thus, a higher teacher assessment of team innovation reflects a stronger innovative mindset, which in turn increases the likelihood of engagement in collaborative activities (Kouhsari et al., 2024).

In summary, considerable progress has been made in both domestic and international research on the factors influencing teacher collaborative practices. However, several limitations persist in the current research landscape. First, existing studies are often confined to specific collaborative activities, lacking a comprehensive perspective on teacher collaboration as an integrated construct. Furthermore, Second, existing research has predominantly focused on identifying the constituent factors affecting collaborative behaviour, while largely overlooking the underlying mediating pathways through which these factors operate. Finally, the majority of relevant studies have been conducted within single-nation or provincial contexts, revealing a conspicuous scarcity of cross-national regional research. Therefore, this study focuses specifically on East and Southeast Asia, aiming to investigate the influencing factors and pathways of teacher collaborative practices in the region, while comparing potential variations across different countries and regions.

Thus, the following four research questions will direct our study:

RQ1: Within each educational system, does the hypothesised measurement model fit adequately, and are the core constructs sufficiently comparable across systems to permit meaningful cross-system analyses?

RQ2: Which individual and organisational factors are associated with the teachers' collaboration?

RQ3: To what extent do these associations differ across systems, and which predictors emerge as stable versus context-specific drivers of collaboration?

3. Research methods

3.1 Sample and variables

This study utilises data from the teaching and learning international survey (TALIS) 2018. The TALIS survey employs separate questionnaires for teachers and their school principals to gather comprehensive data on teaching

environments and working conditions. It systematically explores factors relevant to teacher professional development – including personal background, self-efficacy, collaborative practices, and job satisfaction – while also collecting information on how school leadership facilitates and supports teacher growth. The TALIS survey primarily targets lower secondary education teachers and their school principals. The first cycle of TALIS was conducted in 2008, with subsequent surveys administered every five years, making TALIS 2018 the third cycle in this series.

This study utilises the probability samples from six Asian education systems that participated in the TALIS 2018 lower secondary survey: Shanghai (China), Chinese Taipei, Japan, Korea, Singapore, and Vietnam. The final analytic sample comprises 21,402 teachers from 1,122 schools. The sample sizes of teachers and schools for each participating country and region are presented in Table 1. Based on the research questions, this study selected 46 items from the TALIS 2018 Teacher Questionnaire. These items cover teachers' professional motivation, perceptions of professional value and policy influence, professional development needs, team innovation, teacher collaboration, self-efficacy, and job satisfaction. The descriptive statistics for the 46 items are presented in Table 2.

Table 1. Sample size of teachers and schools from six East and Southeast Asian countries and regions participating in the TALIS 2018 lower secondary education survey.

	Shanghai (China)	Chinese Taipei	Japan	South Korea	Singapore	Vietnam	Total
Teacher	3976	3835	3555	2931	3280	3825	21402
School	198	200	196	163	169	196	1122

Table 2. Descriptive statistics for the pooled sample of Six East and Southeast Asian countries and regions.

Variable Name	Item	N	Minimum	Maximum	M	SD
TT3G07A	Reasons for becoming a teacher: A stable job	21232	1	4	3.24	0.811
TT3G07B	Reasons for becoming a teacher: A reliable income	21238	1	4	3.28	0.720
TT3G07C	Reasons for becoming a teacher: A safe job	21206	1	4	3.33	0.708
TT3G07D	Reasons for becoming a teacher: A job that fit in with faily responsibilities	21216	1	4	3.21	0.801
TT3G07E	Reasons for becoming a teacher: To influence the development of children and young adults	21237	1	4	3.52	0.640
TT3G07F	Reasons for becoming a teacher: To work with children and young people from disadvantaged backgrounds	21226	1	4	3.19	0.776
TT3G07G	Reasons for becoming a teacher: To contribute to society	21234	1	4	3.43	0.694
TT3G27A	Current needs for professional development: Knowledge and understanding of my subject field(s)	21184	1	4	3.01	0.921
TT3G27B	Current needs for professional development: Pedagogical competencies in teaching my subject field(s)	21158	1	4	3.12	0.873
TT3G27C	Current needs for professional development: Curriculum knowledge	21129	1	4	2.90	0.893
TT3G27D	Current needs for professional development: Student assessment practices	21125	1	4	3.04	0.836
TT3G27F	Current needs for professional development: Student behavior and classroom management	21133	1	4	2.99	0.906
TT3G32A	Most teachers in this school: Try to develop new ideas for teaching and learning	21213	1	4	3.05	0.678
TT3G32B	Most teachers in this school: Are willing to change	21201	1	4	2.92	0.695
TT3G32C	Most teachers in this school: Search for new ways to solve problems	21196	1	4	3.01	0.672
TT3G32D	Most teachers in this school: Provide mutual support for putting new ideas into practice	21182	1	4	2.99	0.686
TT3G33B	Frequency of activity: Observe other teachers' classes and provide feedback	21161	1	6	3.45	1.379
TT3G33C	Frequency of activity: Engage in joint activities across different classes and age groups	21109	1	6	2.59	1.393
TT3G33D	Frequency of activity: Exchange teaching materials with colleagues	21163	1	6	4.07	1.531
TT3G33E	Frequency of activity: Discuss the learning development of specific students	21128	1	6	3.73	1.636
TT3G33F	Frequency of activity: Collaborate with other teachers to	21119	1	6	3.69	1.488

	ensure common standards in assessing student achievement					
TT3G33G	Frequency of activity: Attend team conferences	21137	1	6	3.90	1.513
TT3G33H	Frequency of activity: Engage in collaborative professional learning	21149	1	6	3.53	1.490
TT3G34A	In your teaching: Make students believe they can do well in school work	21218	1	4	3.10	0.756
TT3G34B	In your teaching: Help students value learning	21206	1	4	3.14	0.750
TT3G34C	In your teaching: Pose questions for students to brainstorm	21191	1	4	3.12	0.708
TT3G34D	In your teaching: Control disruptive behavior in the classroom	21197	1	4	3.18	0.721
TT3G34E	In your teaching: Motivate students who show low interest in learning	21196	1	4	2.98	0.774
TT3G34F	In your teaching: Make clear to students what is expected of them	21193	1	4	3.22	0.694
TT3G34G	In your teaching: Help students think critically	21188	1	4	2.92	0.787
TT3G34H	In your teaching: Get students to follow classroom rules	21205	1	4	3.28	0.699
TT3G34I	In your teaching: Calm a student who is disruptive or noisy	21198	1	4	3.17	0.729
TT3G34J	In your teaching: Use a variety of assessment strategies	21183	1	4	2.93	0.760
TT3G34K	In your teaching: Provide alternative explanations, for example when students are confused	21189	1	4	3.21	0.671
TT3G34L	In your teaching: Implement a variety of teaching strategies in my classroom	21184	1	4	3.04	0.728
TT3G53A	Overall feelings about profession: The advantages of being a teacher clearly outweigh the disadvantages	21188	1	4	2.95	0.654
TT3G53B	Overall feelings about profession: If I could decide again, I would still choose to be a teacher	21161	1	4	2.89	0.768
TT3G53C*	Overall feelings about profession: I would like to change to another school (*if possible*)	21162	1	4	2.80	0.801
TT3G53D*	Overall feelings about profession: I regret that I decided to become a teacher	21171	1	4	3.24	0.689
TT3G53E	Overall feelings about profession: I enjoy working at this school	21166	1	4	2.97	0.675
TT3G53F*	Overall feelings about profession: I wonder whether it would have been better to choose another profession	21169	1	4	2.71	0.830
TT3G53G	Overall feelings about profession: I would recommend this school as a good place to work	21156	1	4	2.83	0.745
TT3G53J	Overall feelings about profession: All in all, I am satisfied with my job	21168	1	4	3.07	0.586
TT3G54C	In this country/region: Teachers' views are valued by policy makers	21171	1	4	2.24	0.795
TT3G54D	In this country/region: Teachers can influence education policy	21182	1	4	2.20	0.826
TT3G54E	In this country/region: Teachers are valued by the media	21181	1	4	2.27	0.848
Valid N		19859				

Note. * Items are reverse-coded.

3.2 Analytical methods

This study utilised IBM SPSS 25.0 and Mplus 8.4 (Muthén & Muthén, 1998–2017) for data processing and analysis, employing Full Information Maximum Likelihood (FIML) estimation to handle missing data. Structural equation modelling (SEM) was employed to explore and validate the factor structure and establish the measurement model for the latent variables. Path Analysis was employed to test the hypothesised direct and indirect relationships between the independent and dependent variables. When evaluating the model fit of both the measurement and structural models, model fit was assessed using the following established cut-off criteria: Comparative Fit Index (CFI) ≥ 0.95, Root Mean Square Error of Approximation (RMSEA) ≤ 0.05, and Standardized Root Mean Square Residual (SRMR) ≤ 0.05 (Hu & Bentler, 1999).

3.3 Data analysis

First, a SEM analysis was conducted on the 46 items using the pooled data from the six East and Southeast Asian countries/regions to establish the measurement model. The model fit of this proposed measurement structure was then separately examined within the individual country/region datasets. Provided that the measurement model demonstrated

adequate fit for both the overall sample and each individual education system, it was subsequently used to test for Measurement Invariance (MI) across the six groups. MI test was essential to determine whether the conceptual model existed in a comparable manner across all participating countries and regions, thereby ensuring that subsequent cross-group comparisons were valid and meaningful (Brown, 2015).

The three commonly applied standards for assessing measurement invariance, including configural invariance, metric invariance, and scalar invariance (Rutkowski & Svetina, 2014). Configural invariance requires that the same items are used to measure the latent variables across groups, meaning that the basic configuration of the latent variable structure is identical for all groups under investigation. If only configural invariance is established for the latent variables, any comparability remains merely conceptual and does not allow for rigorous equivalence testing. Metric invariance is established when the latent variable structure is identical across groups and the strength of the relationships between the latent variables and their indicators (i.e., the factor loadings) are also equivalent. This indicates that the latent constructs have the same meaning and unit of measurement across groups, thereby allowing one to assume that comparisons of relational analyses (such as correlations or regressions) are free from cross-group measurement bias. Scalar invariance is achieved when the latent variable structure is identical across groups, the relationships between latent variables and indicators (factor loadings) are equivalent, and the intercepts of the indicators are also equal. This implies that the latent variable scores are unbiased, thereby making cross-group comparisons more justified. In the context of this cross-national/regional comparative study, the metric level determines the permissible statistical comparisons, allowing for correlation and linear regression analyses (Brown, 2015). For the measurement invariance testing in this study, the following criteria for changes in model fit indices were adopted (Chen, 2007):

- Configural Invariance (No constraints on factor loadings or means): CFI ≥0.95 and RMSEA ≤ 0.05 or SRMR ≤ 0.05,
- Metric Invariance (Factor loadings constrained to be equal across groups): ΔCFI ≤ -0.010 and ΔRMSEA ≥ 0.015 or ΔSRMR ≥ 0.030,
- Scalar Invariance (Factor loadings and intercepts constrained to be equal across groups): ΔCFI ≤ -0.010 and ΔRMSEA ≥ 0.015 or ΔSRMR ≥ 0.01.

Following the measurement invariance assessment, structural models were established separately for the overall dataset and for each country/region dataset, followed by path analysis. This approach was employed to explore the relationships between the independent and dependent variables and to examine potential interactive effects among the independent variables.

4. Results

4.1 Measurement validity within systems and cross-system comparability (RQ1)

Following a SEM analysis of the 46 items from the pooled data of the six East and Southeast Asian countries and regions, 12 first-order latent variables were identified (see Table 4)：Personal Utility Motivation for Teaching (PERUMT), Social Utility Motivation for Teaching (SOCUMT), Perceptions of the Value and Policy Influence of the Teaching Profession (PVLPIN), Need for Professional Development (NPDPED), Team Innovation (TEMINV), Exchange and Coordination among Teachers (EXCRDN), Professional Collaboration on Curriculum among Teachers (PFCOLB), Self-Efficacy for Classroom Management (SLFCLS), Self-Efficacy for Instruction (SLFINS), Self-Efficacy for Student Engagement (SLFENG), Satisfaction with the Work Environment (JBSENV), and Satisfaction with the Profession (JBSPRO).Among these, SLFCLS, SLFINS, and SLFENG form the second-order latent variable Teacher Self-Efficacy (SLFEFF), while JBSENV and JBSPRO constitute the second-order latent variable Teacher Job Satisfaction (JBSATF).The SEM for the overall dataset demonstrated good model fit: $\chi^2(940) = 12659.16$, Degree of Freedom (DF) = 940, $P < .001$, CFI = 0.95, RMSEA = 0.02, SRMR = 0.05.

After applying the overall measurement model to each country and region, the latent variable structures were found to be invariant and compositionally equivalent across the five East and Southeast Asian systems (excluding South Korea), comprising 12 first-order and 2 second-order latent variables. In the South Korean sample, the three hypothesized first-order latent variables (SLFCLS, SLFINS, and SLFENG) constituting the second-order Teacher Self-Efficacy (SLFEFF) construct were not empirically validated. Thus, the latent variable SLFEFF was directly constituted by the 12 items originally designed to measure SLFCLS, SLFINS, and SLFENG. As a result, SLFEFF functioned as a first-order latent variable in South Korea, whereas it was modelled as a second-order latent variable in all other participating countries and regions. In the SEM analysis, the model demonstrated good fit for the data from each individual country and region. The specific values for all model fit indices are presented in Table 3, and the factor loadings of the latent variables can be found in Table 4.

Following tests for measurement invariance across the five education systems—Shanghai (China), Chinese Taipei, Japan, Singapore, and Vietnam—metric invariance was established. This indicates that the latent variables are present across all five countries/regions, are measured by the same items, and exhibit equivalent factor loadings with their respective indicators. In other words, the measurement model for these five countries and regions is aligned with the overall model, allowing for valid comparisons using correlational and linear regression analyses. The model fit indices for the measurement invariance tests are presented in Table 5.

Table 3. Model fit indices for the SEM across the six East and Southeast Asian Countries and Regions.

	χ^2	DF	Sig	CFI	RMSEA	SRMR

Overall	12659.16	940	***	0.95	0.02	0.05
Shanghai (China)	3348.76	940	***	0.97	0.02	0.02
Chinese Taipei	3710.22	940	***	0.96	0.03	0.03
Japan	2521.10	940	***	0.97	0.02	0.03
South Korea	3346.92	945	***	0.95	0.03	0.02
Singapore	2583.99	940	***	0.97	0.02	0.03
Vietnam	2961.12	940	***	0.96	0.02	0.03

*** P<0.000

Table 4. Factor loadings of latent variables in the data from six East and Southeast Asian countries and regions.

Latent Variable		Variable Name	Overall	Shanghai (China)	Chinese Taipei	Japan	South Korea[#]	Singapore	Vi-etnam
PERUMT		TT3G07A	0.78	0.86	0.89	0.58	0.85	0.88	0.68
		TT3G07B	0.60	0.86	0.89	0.63	0.87	0.87	0.73
		TT3G07C	0.55	0.86	0.86	0.56	0.79	0.86	0.68
		TT3G07D	0.75	0.81	0.68	0.62	0.79	0.69	0.68
SOCUMT		TT3G07E	0.76	0.86	0.83	0.65	0.85	0.82	0.73
		TT3G07F	0.84	0.87	0.87	0.78	0.87	0.81	0.77
		TT3G07G	0.85	0.89	0.85	0.80	0.89	0.85	0.79
NPDPED		TT3G27A	0.85	0.87	0.90	0.84	0.78	0.88	0.84
		TT3G27B	0.86	0.90	0.85	0.80	0.86	0.86	0.87
		TT3G27C	0.85	0.92	0.93	0.80	0.83	0.88	0.86
		TT3G27D	0.85	0.83	0.79	0.83	0.86	0.78	0.84
		TT3G27F	0.80	0.78	0.70	0.78	0.80	0.72	0.79
TEMINV		TT3G32A	0.88	0.91	0.90	0.88	0.86	0.87	0.86
		TT3G32B	0.89	0.94	0.88	0.90	0.90	0.81	0.85
		TT3G32C	0.92	0.96	0.92	0.92	0.86	0.92	0.93
		TT3G32D	0.89	0.92	0.87	0.89	0.86	0.85	0.90
SLFFF[#]	SLFENG[#]	TT3G34A	0.86	0.85	0.81	0.80	0.85[#]	0.81	0.68
		TT3G34B	0.88	0.87	0.83	0.82	0.87[#]	0.82	0.69
		TT3G34C	0.84	0.88	0.78	0.78	0.87[#]	0.81	0.71
		TT3G34E	0.86	0.86	0.79	0.77	0.87[#]	0.82	0.75
		TT3G34G	0.45	0.46	0.37	0.21	0.88[#]	0.63	0.43
			0.99	0.97	0.98	098	-	0.97	0.96
	SLFINS[#]	TT3G34F	0.40	0.46	0.49	0.45	0.87[#]	0.59	0.29
		TT3G34G	0.37	0.41	0.39	0.42	-	0.22	0.43
		TT3G34J	0.83	0.87	0.78	0.71	0.86[#]	0.80	0.76
		TT3G34K	0.82	0.87	0.80	0.80	0.85[#]	0.83	0.77
		TT3G34L	0.81	0.90	0.78	0.75	0.86[#]	0.85	0.71
			0.91	0.96	0.94	0.94	-	0.94	0.87
	SLFCLS[#]	TT3G34D	0.85	0.89	0.86	0.84	0.90[#]	0.86	0.75
		TT3G34F	0.45	0.43	0.37	0.35	-	0.59	0.47
		TT3G34H	0.89	0.94	0.90	0.85	0.88[#]	0.88	0.72
		TT3G34I	0.85	0.93	0.88	0.86	0.88[#]	0.86	0.69
			0.89	0.92	0.79	0.80	-	0.85	0.91
JBSATF	JBSPRO	TT3G53A	0.72	0.79	0.74	0.73	0.85	0.81	0.82
		TT3G53B	0.81	0.88	0.87	0.80	0.83	0.84	0.79
		TT3G53D*	0.66	0.76	0.78	0.72	0.74	0.77	0.55
		TT3G53F*	0.66	0.72	0.64	0.74	0.81	0.72	0.55
		TT3G53J	0.52	0.33	0.33	0.46	0.78	0.46	0.52
			0.87	0.95	0.87	0.87	0.89	0.88	0.99
	JBSENV	TT3G53C*	0.63	0.70	0.68	0.62	0.78	0.72	0.47
		TT3G53E	0.82	0.86	0.88	0.79	0.90	0.93	0.77
		TT3G53G	0.80	0.85	0.83	0.73	0.87	0.87	0.78
		TT3G53J	0.31	0.51	0.52	0.36	0.12	0.44	0.25
			0.92	0.98	0.88	0.87	0.92	0.87	0.75
PVLPIN		TT3G54C	0.87	0.91	0.84	0.87	0.92	0.90	0.67
		TT3G54D	0.91	0.88	0.92	0.93	0.91	0.86	0.65
		TT3G54E	0.89	0.93	0.80	0.80	0.88	0.80	0.77
PFCOLB		TT3G33B	0.61	0.67	0.69	0.72	0.74	0.54	0.38

EXCRDN	TT3G33C	0.55	0.64	0.64	0.65	0.74	0.55	0.49
	TT3G33H	0.70	0.71	0.61	0.75	0.77	0.57	0.72
	TT3G33D	0.66	0.71	0.69	0.68	0.64	0.71	0.55
	TT3G33E	0.54	0.77	0.68	0.72	0.61	0.77	0.54
	TT3G33F	0.71	0.83	0.78	0.76	0.76	0.77	0.58
	TT3G33G	0.62	0.68	0.64	0.55	0.82	0.51	0.69

* Items are reverse-coded.

[#] For South Korea, the three first-order latent variables (SLFCLS, SLFINS, SLFENG) were not empirically supported. Instead, the 12 constituent items load directly on the SLFEFF factor.

Table 5. Results of measurement invariance testing based on data from five East and Southeast Asian countries and regions (Excluding South Korea).

	χ2	DF	Sig	CFI	RMSEA	SRMR	ΔCFI	ΔRMSEA	ΔSRMR
Configural Invariance	14338.55	4575	0.000	0.969	0.024	0.023			
Metric Invariance	15821.10	4723	0.000	0.965	0.025	0.032	0.004	-0.001	-0.009
Scalar Invariance	34268.59	4859	0.000	0.906	0.040	0.080	0.019	-0.015	-0.048

4.2 Diverse patterns across the different countries and regions

In the path analysis, Exchange and Coordination among Teachers (EXCRDN) and Professional Collaboration on Curriculum among Teachers (PFCOLB) served as the dependent variables. The seven latent variables acting as independent variables were: Personal Utility Motivation for Teaching (PERUMT), Social Utility Motivation for Teaching (SOCUMT), Perceptions of the Value and Policy Influence of the Teaching Profession (PVLPIN), Need for Professional Development (NPDPED), Team Innovation (TEMINV), Teacher Self-Efficacy (SLFEFF), and Teacher Job Satisfaction (JBSATF).The results indicated that both the overall model and the country-/region-specific structural equation models demonstrated acceptable to good fit, as detailed by the fit indices in Table 6. However, the specific structural solutions—that is, the significant paths and strengths of relationships—were found to be divergent across the different education systems, as detailed in Table 7.

Table 6. Model fit results for the six East and Southeast Asian countries and regions

	χ2	DF	Sig	CFI	RMSEA	SRMR
Overall	12660.59	942	***	0.95	0.02	0.05
Shanghai (China)	3379.90	942	***	0.97	0.03	0.03
Chinese Taipei	3714.70	942	***	0.96	0.03	0.03
Japan	2524.589	942	***	0.97	0.02	0.03
South Korea	3350.73	947	***	0.95	0.03	0.02
Singapore	2581.51	942	***	0.97	0.02	0.03
Vietnam	2973.12	942	***	0.96	0.02	0.03

Table 7. Direct Effects of Independent Variables on Dependent Variables: Standardized Regression Coefficients (β) for the Six East and Southeast Asian Countries and Regions

Independent Variable	Dependent Variable	Overall	Shanghai (China)	Chinese Taipei	Japan	South Korea[#]	Singapore	Vietnam
PERUMT	EXCRDN	-0.146***	-	-0.060*	-	-	-0.058*	-
	PFCOLB	-0.060**	-	-0.126***	-	-	-0.080*	-
SOCUMT	EXCRDN	0.121***	0.071*	0.094***	-	0.094**	-	0.117**
	PFCOLB	0.083***	0.090*	0.136***	-	-	-	0.101**
PVLPIN	EXCRDN	-	-	-	-	0.129**	-	0.099**
	PFCOLB	0.221***	-	0.102**	0.151**	0.239**	0.170***	0.106**
NPDPED	EXCRDN	0.121***	0.091***	0.032*	0.053*	0.060*	-	0.069**
	PFCOLB	0.101***	0.134***	0.056**	-	0.098**	0.095*	0.080**
TEMINV	EXCRDN	0.252***	0.170***	0.188***	0.318***	0.319***	0.168***	0.118***
	PFCOLB	0.286***	0.183***	0.242***	0.423***	0.306***	0.217***	0.101**
SLFEFF	EXCRDN	0.064**	0.256***	0.192***	0.144***	0.162***	0.096*	0.221***

JBSATF	PFCOLB	0.217***	0.284***	0.152***	0.168***	0.149***	0.141**	0.241***
	EXCRDN	0.085***	0.082**	-	-	-	0.114**	-
	PFCOLB	-0.040*	0.075*	-	-	-	0.121**	-

*** P<0.000 **P<0.01 *P<0.05 - P>0.05

[#] For South Korea, the three first-order latent variables (SLFCLS, SLFINS, SLFENG) were not empirically supported. Instead, the 12 constituent items load directly on the SLFEFF factor.

In the overall dataset (see Table 7), six variables – Personal Utility Motivation for Teaching, Social Utility Motivation for Teaching, Need for Professional Development, Team Innovation, Teacher Self-Efficacy, and Teacher Job Satisfaction – exerted direct effects on both Exchange and Coordination among Teachers and Professional Collaboration on Curriculum. In contrast, Perceptions of the Value and Policy Influence of the Teaching Profession only demonstrated a direct effect on Professional Collaboration on Curriculum. Notably, Teacher Self-Efficacy exhibited negative effects on both dimensions of teacher collaboration, and Teacher Job Satisfaction also showed a negative effect on Professional Collaboration on Curriculum. All other independent variables maintained positive relationships with the collaboration measures. It is important to emphasize that these predictors are not mutually independent, they interact and influence one another. Consequently, several variables also function as mediators. For instance, Teacher Self-Efficacy not only directly influenced teacher collaboration but also indirectly affected it through its impact on teachers' Need for Professional Development (Ghamrawi et al., 2024). The specific pathways of influence among the variables are illustrated in Figure 1.

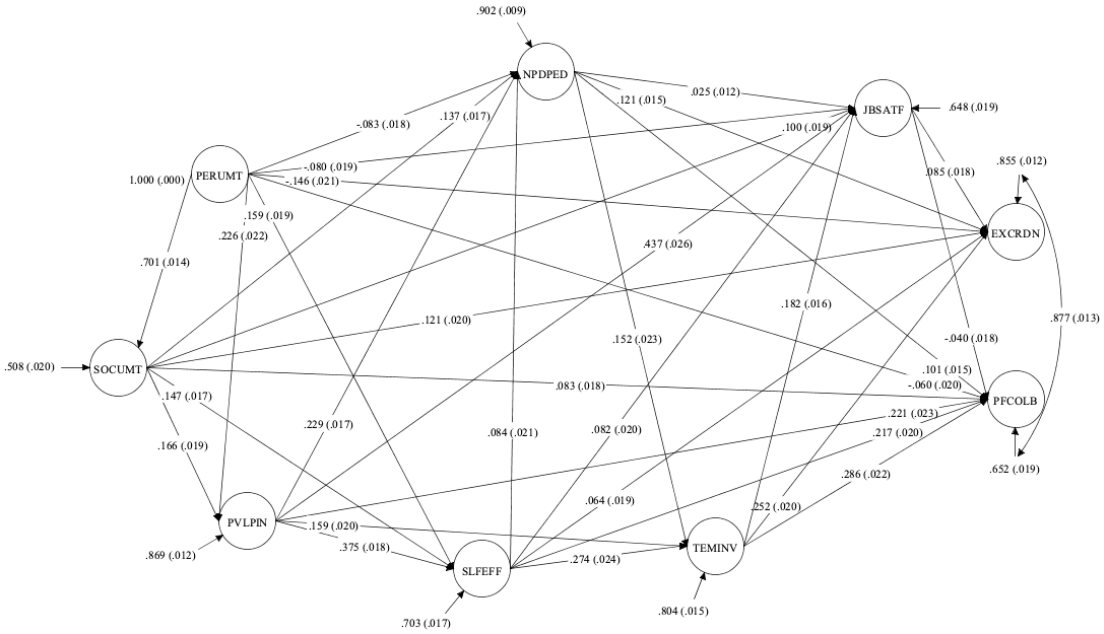

Figure 1 Path Analysis Model for the Pooled Data from the Six East and Southeast Asian Countries and Regions

In Shanghai, China (see Table 7), Social Utility Motivation for Teaching (SOCUMT), Need for Professional Development (NPDPED), Team Innovation (TEMINV), Teacher Self-Efficacy (SLFEFF), and Teacher Job Satisfaction (JBSATF) all demonstrated statistically significant positive direct effects on both dimensions of teacher collaboration: Exchange and Coordination (EXCRDN) and Professional Collaboration on Curriculum (PFCOLB).Although Personal Utility Motivation for Teaching (PERUMT) and Perceptions of the Value and Policy Influence of the Teaching Profession (PVLPIN) exerted no significant direct effects on either dimension of collaboration, both variables influenced other independent variables in the model. As illustrated in the upper section of Figure 2, PERUMT significantly influenced SOCUMT (ß=0.780，P<0.000) and NPDPED (ß=0.087，P<0.05). Similarly, PVLPIN had significant effects on SLFEFF (ß=0.095，P<0.01), NPDPED (ß=0.165，P<0.000), TEMINV (ß=0.189，P<0.000), and JBSATF (ß=0.413，P<0.000). Furthermore, SOCUMT positively influenced both PVLPIN (ß=0.231，P<0.000) and SLFEFF (ß=0.272，P<0.000). SLFEFF, in turn, demonstrated positive effects on NPDPED (ß=0.156，P<0.000), TEMINV (ß=0.207，P<0.000), and JBSATF (ß=0.118，P<0.000). Additionally, NPDPED positively influenced TEMINV (ß=0.132，P<0.000) and JBSATF (ß=0.074，P<0.01). Finally, TEMINV exerted a positive influence on JBSATF (ß=0.148，P<0.000).

In the case of Chinese Taipei, Teacher Job Satisfaction (JBSATF) showed no significant direct effects on either dimension of teacher collaboration, nor did Perceptions of the Value and Policy Influence of the Teaching Profession (PVLPIN) on Exchange and Coordination (EXCRDN). Apart from these non-significant paths, all other independent variables demonstrated statistically significant relationships with the collaboration measures (see Table 7). Notably, Personal Utility Motivation for Teaching (PERUMT) exhibited significant negative effects on both dimensions of teacher collaboration. In the path model for Chinese Taipei (lower section of Figure 2), Team Innovation (TEMINV) was positively influenced by Teacher Self-Efficacy (SLFEFF) (ß=0.299，P<0.000), PVLPIN (ß=0.182，P<0.000), and the Need

for Professional Development (NPDPED) (ß=0.066，P<0.05). SLFEFF itself was positively affected by Social Utility Motivation for Teaching (SOCUMT) (ß=0.281，P<0.000) and PVLPIN (ß=0.119，P<0.05). Furthermore, SOCUMT was positively influenced by PERUMT (ß=0.525，P<0.000). PVLPIN received a positive effect from SOCUMT (ß=0.135，P<0.000). Finally, NPDPED was positively predicted by SLFEFF (ß=0.102，P<0.05), PERUMT (ß=0.089，P<0.000), and PVLPIN (ß=0.142，P<0.000).

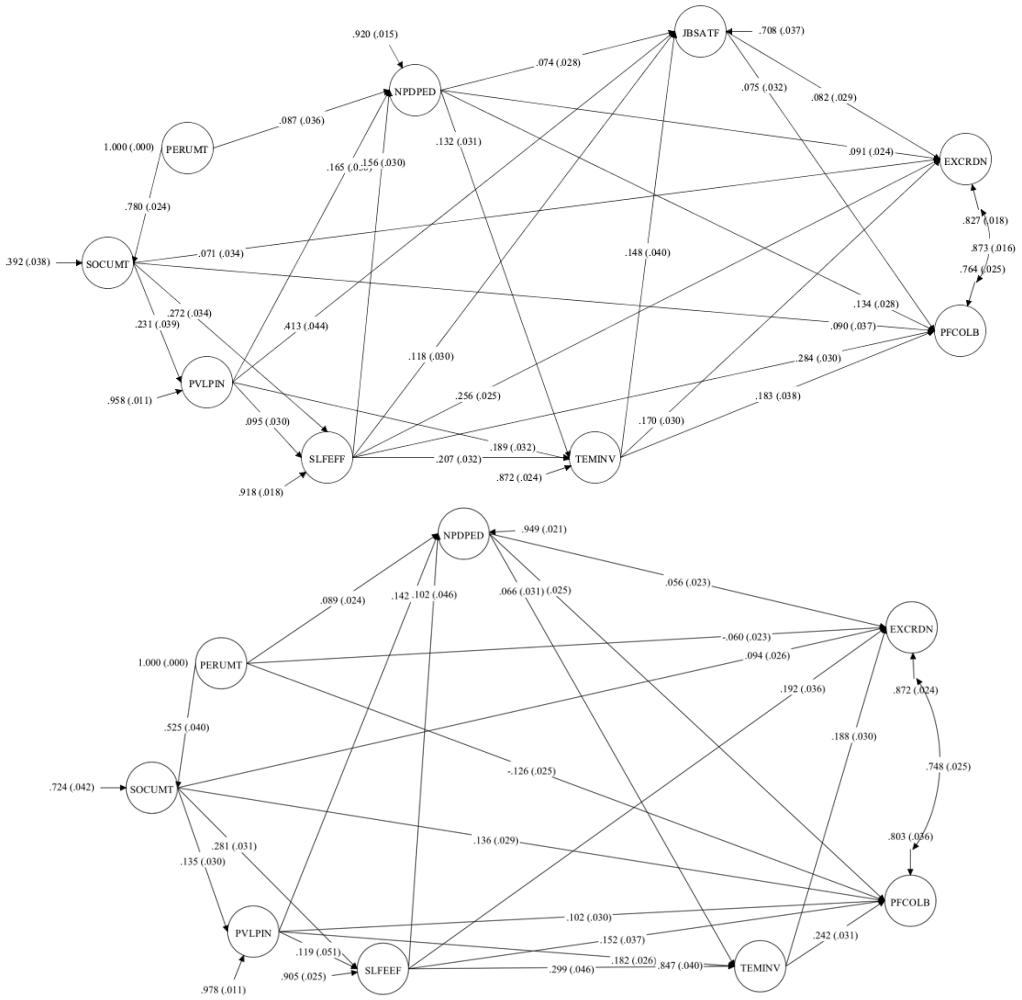

Figure 2 Path Analysis Models for Shanghai, China (Top) and Chinese Taipei (Bottom)

In Japan, Personal Utility Motivation for Teaching (PERUMT), Social Utility Motivation for Teaching (SOCUMT), and Teacher Job Satisfaction (JBSATF) showed no significant direct effects on either dimension of teacher collaboration. Similarly, Perceptions of the Value and Policy Influence of the Teaching Profession (PVLPIN) demonstrated no significant relationship with Exchange and Coordination (EXCRDN), and the Need for Professional Development (NPDPED) showed no significant link with Professional Collaboration on Curriculum (PFCOLB). Among all the independent variables, only Team Innovation (TEMINV) and Teacher Self-Efficacy (SLFEFF) exhibited significant direct effects on both collaboration dimensions (see Table 7).Furthermore, as shown in the upper section of Figure 3, Team Innovation (TEMINV) was positively influenced by Teacher Self-Efficacy (SLFEFF) (ß=0.345，P<0.000), PVLPIN (ß=0.149，P<0.000), and NPDPED (ß=0.151，P<0.000). SLFEFF, in turn, was positively affected by SOCUMT (ß=0.197，P<0.000) and PVLPIN (ß=0.203，P<0.000). Additionally, NPDPED was influenced by SLFEFF (ß=0.150，P<0.01), PERUMT (ß=0.060，P<0.05), SOCUMT (ß=0.090，P<0.01), and PVLPIN (ß=0.131，P<0.000). Finally, PERUMT exerted positive effects on both SOCUMT (ß=0.477，P<0.000) and PVLPIN (ß=0.143，P<0.000).

According to Table 7, for South Korean teachers, Personal Utility Motivation for Teaching (PERUMT) and Teacher Job Satisfaction (JBSATF) showed no significant effects on either dimension of teacher collaboration. While Social Utility Motivation for Teaching (SOCUMT) demonstrated no significant effect on Professional Collaboration on Curriculum (PFCOLB), it did exhibit a significant positive effect on Exchange and Coordination (EXCRDN). All other independent variables maintained significant positive relationships with both collaboration dimensions. Within the path model, Team Innovation (TEMINV) was positively influenced by Teacher Self-Efficacy (SLFEFF) (ß=0.268，P<0.000), Perceptions of the Value and Policy Influence of the Teaching Profession (PVLPIN) (ß=0.212，P<0.000), and the Need for Professional Development (NPDPED) (ß=0.144，P<0.000). NPDPED, in turn, was positively affected by SLFEFF (ß=0.203，P<0.000), PVLPIN (ß=0.197，P<0.000), and PERUMT (ß=0.096，P<0.01). Furthermore, SLFEFF was positively

influenced by PVLPIN (ß=0.296，P<0.000) and SOCUMT (ß=0.113，P<0.01). Additionally, PVLPIN received positive effects from both PERUMT (ß=0.106，P<0.05) and SOCUMT (ß=0.091，P<0.05). Finally, SOCUMT was strongly and positively influenced by PERUMT (ß=0.753，P<0.000).

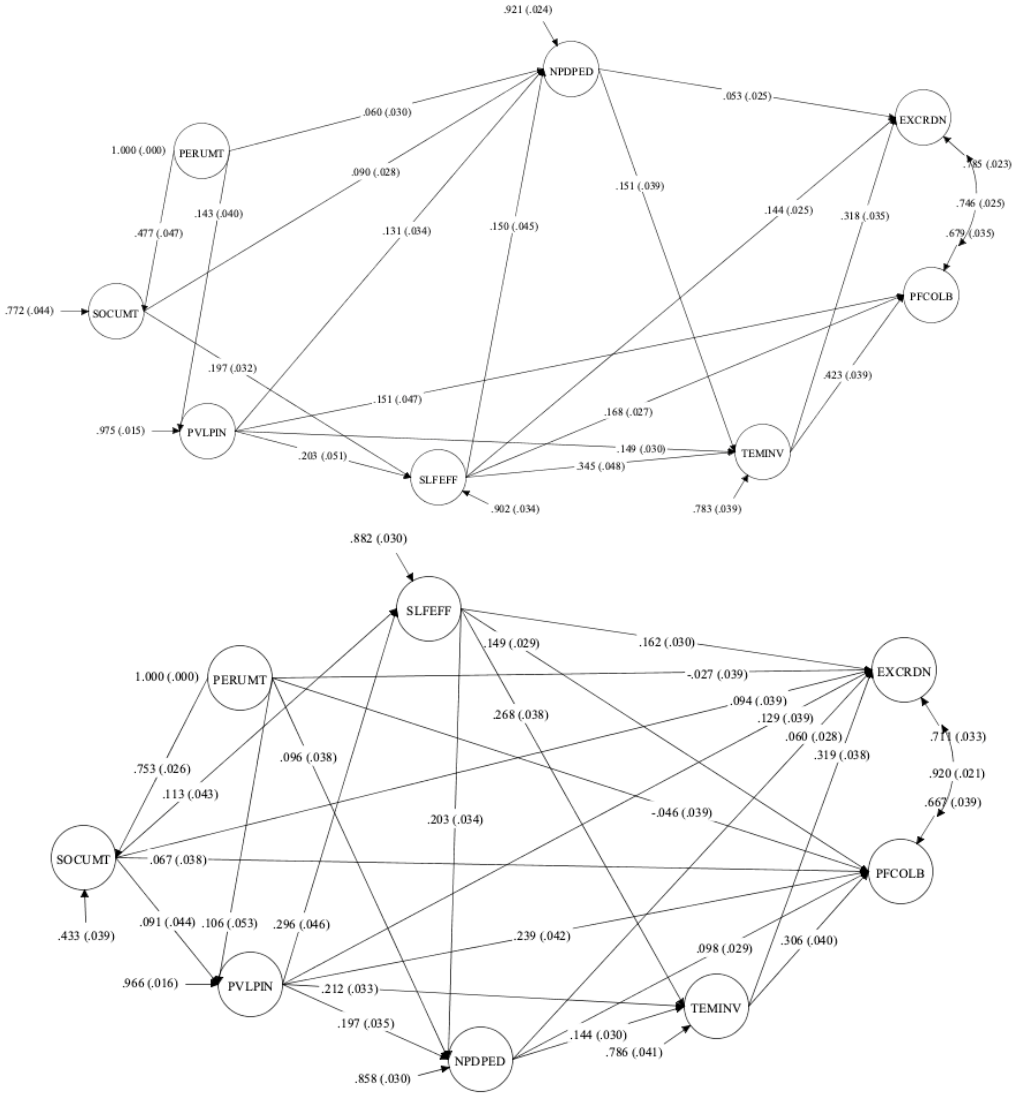

Figure 3 Path Analysis Models for Japan (Top) and South Korea (Bottom)

In Singapore (see Table 7), Social Utility Motivation for Teaching (SOCUMT) showed no significant direct effects on either dimension of teacher collaboration. Similarly, Perceptions of the Value and Policy Influence of the Teaching Profession (PVLPIN) and the Need for Professional Development (NPDPED) demonstrated no significant relationships with Exchange and Coordination (EXCRDN). Regarding other relationships, Personal Utility Motivation for Teaching (PERUMT) showed significant negative correlations with both EXCRDN and Professional Collaboration on Curriculum (PFCOLB). All other significant relationships with the collaboration dimensions were positive. As illustrated in the upper section of Figure 4, PERUMT positively influenced SOCUMT (ß=0.535，P<0.000) and PVLPIN (ß=0.074，P<0.01). SOCUMT, in turn, had positive effects on PVLPIN (ß=0.088，P<0.01) and Teacher Self-Efficacy (SLFEFF) (ß=0.231，P<0.000).Furthermore, PVLPIN demonstrated positive effects on SLFEFF (ß=0.212，P<0.000), NPDPED (ß=0.166，P<0.000), Team Innovation (TEMINV) (ß=0.270，P<0.000), and Teacher Job Satisfaction (JBSATF) (ß=0.333，P<0.000). Additionally, SLFEFF positively influenced TEMINV (ß=0.209，P<0.000) and JBSATF (ß=0.180，P<0.000). Finally, TEMINV had a positive effect on JBSATF (ß=0.239，P<0.000).

In Vietnam (see Table 7), Teacher Job Satisfaction (JBSATF) and Personal Utility Motivation for Teaching (PERUMT) demonstrated no significant direct effects on either dimension of teacher collaboration. In contrast, the other five variables—Social Utility Motivation for Teaching (SOCUMT), Perceptions of the Value and Policy Influence of the Teaching Profession (PVLPIN), Need for Professional Development (NPDPED), Team Innovation (TEMINV), and Teacher Self-Efficacy (SLFEFF)—all exhibited significant positive effects on both Exchange and Coordination (EXCRDN) and Professional Collaboration on Curriculum (PFCOLB).Within the path model (as shown in the lower section of Figure 4), Team Innovation (TEMINV) was positively influenced by Teacher Self-Efficacy (SLFEFF) (ß=0.191，P<0.000) and PVLPIN (ß=0.157，P<0.000). NPDPED was positively affected by SLFEFF (ß=0.175，P<0.000), PVLPIN (ß=0.081，

P<0.01), and PERUMT (ß=0.093，P<0.05). Furthermore, SLFEFF was positively influenced by PVLPIN (ß=0.129，P<0.01) and SOCUMT (ß=0.180，P<0.000). Finally, both PVLPIN (ß=0.133，P<0.01) and SOCUMT (ß=0.670，P<0.000) received significant positive effects from PERUMT.

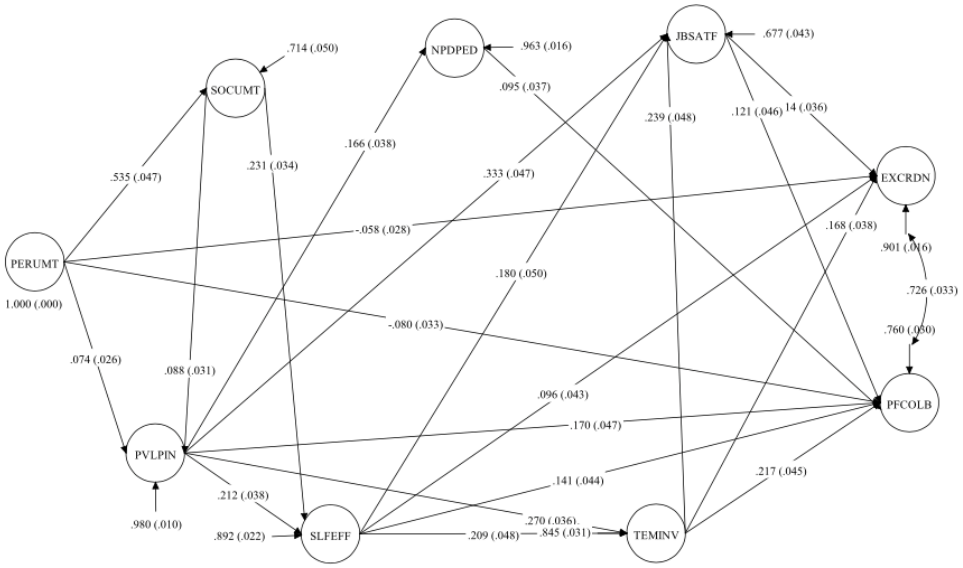

Figure 4 Path Analysis Models for Singapore (Top) and Vietnam (Bottom)

4.3 Cross-system contrasts in structural relations

Having reported the system-specific models, we now compare patterns across systems. Two broad regularities can be observed. First, team innovation and teacher self-efficacy emerge as the most consistent positive correlates of both forms of collaboration, namely exchange and coordination and curriculum-focused professional collaboration. These associations appear across systems and suggest that collaboration is more likely where teachers feel capable in their professional practice and work within a climate that supports experimentation, shared problem-solving and collective improvement.

Second, several other drivers display clear context-specific differences. Perceived policy influence and the perceived social value of the profession are more closely related to curriculum-focused professional collaboration than to simple exchange and coordination, indicating that teachers may be more willing to engage in joint curriculum work when they feel that their professional voice matters and that teaching is recognised as socially important. The reported need for professional development generally shows a positive association with collaboration, suggesting that collaboration may function as a response to identified developmental needs. Social-utility motivation is positively related to collaboration in several systems but is not significant in Japan and Singapore.

By contrast, personal-utility motivation is negatively related to collaboration where it is significant, most notably in Chinese Taipei and Singapore, implying that a focus on individual advancement rather than shared practice may act as a disincentive to collaborative work. Job satisfaction shows mixed patterns: in some systems, such as Shanghai and Singapore, higher satisfaction is associated with higher levels of collaboration, whereas in others the association is weaker or even negative.

At the same time, notable system-specific configurations appear. In Shanghai, teacher self-efficacy, team innovation, perceived professional development needs and job satisfaction are all positively associated with both forms of collaboration, while perceived policy influence is more closely linked to curriculum-focused collaboration. In Chinese Taipei, personal-utility motivation shows a negative association with collaboration, whereas self-efficacy, team innovation and perceived policy influence are positively associated. In Japan, the most consistent positive correlates are team innovation and teacher self-efficacy, and social-utility motivation is not a significant predictor. In South Korea, where self-efficacy was modelled at the first order, self-efficacy, team innovation, professional development needs and perceived policy influence are all positively related to collaboration. In Singapore, personal-utility motivation is negatively associated with collaboration, while perceived policy influence, teacher self-efficacy and job satisfaction are positively associated. In Vietnam, positive associations are observed for self-efficacy, team innovation, perceived policy influence, social-utility motivation and professional development needs.

Taken together, these findings indicate that two elements – teachers' sense of professional capability and an innovative team climate – operate as broadly stable levers across systems, whereas motivational and institutional signals are more localised. Perceived policy influence, perceptions of the social standing of the profession, different forms of professional motivation and job satisfaction do not exert uniform associations across systems. Rather, they appear to be contingent on context, including how work is organised, how teachers' voices are recognised, and how career incentives are structured.

5. Discussion

5.1 The influencing factors and pathways of teacher collaborative practices demonstrate significant cross-national/regional variations

Research on the factors influencing teacher collaborative practices in East and Southeast Asian countries and regions reveals that, overall, teachers' professional motivation, perceptions of the profession's value and policy influence, self-efficacy, job satisfaction, need for professional development, and team innovation collectively influence teacher collaboration. However, significant variations exist across individual countries and regions regarding the specific influencing factors, as well as their pathways and effect sizes. For instance, social utility motivation for teaching did not significantly affect collaborative practices in Japan and Singapore, whereas it exerted a positive influence in other systems. This indicates that the underlying mechanisms driving teacher collaboration differ across these East and Southeast Asian contexts, likely attributable to distinct educational cultures, policies, and systems that shape both the extent and the determinants of teachers' engagement in collaboration (Niu et al., 2023).

5.2 Teacher self-efficacy and team innovation exert a universal positive influence on teacher collaborative practices

Based on the research findings, both teacher self-efficacy and perceived team innovation positively influence teachers' collaborative practices, both in the overall sample of six East and Southeast Asian countries/regions and within each individual education system. Compared to other factors, the effects of teacher self-efficacy and team innovation on collaborative behaviour appear more robust and consistent. Specifically, the positive relationship between teacher self-efficacy and collaboration indicates that self-efficacy can be regarded as a key driver of teacher collaboration. Previous research has suggested that teacher self-efficacy influences their willingness to seek help from others by shaping their sense of self-esteem (Reeves et al., 2017), this may offer a plausible explanation for the findings of this study. Furthermore, the positive influence of team innovation on teacher collaborative practices highlights the crucial role of team climate in fostering teacher collaboration. This observation aligns well with the collectivist cultural values prevalent across East and Southeast Asia. In contrast to the individualism often emphasized in Western societies, the cultural context in these regions prioritises collectivist values, which emphasize interaction and mutual support between the group and the individual (Hofstede et al., 2010; Nguyen et al., 2021; Ouyang et al., 2025). The stronger the sense of team innovation, the higher the likelihood of teacher participation in collaborative activities.

5.3 The effects of teachers' personal and social utility motivations on their collaborative practices are inconsistent

The findings indicate that teachers' personal utility motivation demonstrated statistically significant negative direct effects on their collaborative practices, whereas their social utility motivation showed positive direct effects. In other words, the more value teachers place on the personal benefits of the profession, the less likely they are to engage in collaboration, conversely, the more they value the profession's social contribution, the more likely they are to collaborate (Bogunovich & Greene, 2023). Furthermore, the two motivation types appear to operate through distinct indirect pathways. In the cross-system synthesis, personal-utility motivation was also linked to collaboration indirectly via professional development needs, whereas all observed indirect paths for social-utility motivation were positive. Thus, although both represent components of professional motivation, they exert fundamentally different influences on teacher collaboration: personal utility motivation inhibits participation in collaborative activities, while social utility motivation promotes it.

5.4 In specific countries and regions, the composition of latent variables diverged from the established TALIS 2018 framework

The TALIS 2018 Technical Report provides well-established structures for numerous latent variables, complete with validated measurement models and measurement invariance testing, offering researchers a convenient foundation for subsequent analysis. However, as these constructs were developed based on the large aggregated dataset from all 48 participating countries and regions, they may not be fully applicable to the specific national or regional context of a given study. Consequently, this study re-specified the TALIS 2018 latent variables where required and estimated system-specific measurement models prior to the structural analyses. The results revealed that the composition of certain latent variables in the six East and Southeast Asian countries and regions was not entirely consistent with that presented in the TALIS 2018 framework. This demonstrates that when utilizing international large-scale survey data – whether for single-country analysis or cross-national/cross-regional comparative research – it is essential to preliminarily re-examine the factor structure and validate the measurement model within the specific context of the target population.

5.5 Theoretical implications

The patterns reported here connect social-cognitive views of teacher agency with organisational accounts of collaborative climate. Collaboration is more likely where teachers feel capable in their professional practice and where the team climate legitimises experimentation, shared problem-solving and iterative improvement. The observed distinction between exchange and coordination, on the one hand, and curriculum-focused professional collaboration, on the other, is also theoretically informative: the latter appears more sensitive to perceived professional voice and the social standing of teaching, which is consistent with the greater demands of co-designing lessons, assessing pupils and moderating standards.

5.6 Policy and practice implications

Taken together, the findings suggest a dual lever for improving collaborative practice in East and Southeast Asian schools. Strengthening teachers' sense of capability and cultivating an innovative team climate are broadly advisable

across systems. In practical terms, school leaders can prioritise collaborative lesson study, peer observation with feedback, and safe-to-try routines that normalise experimentation. At policy level, signalling that teachers' voices matter—especially in curriculum and assessment—aligns with the observed link between perceived policy influence and curriculum-centred collaboration. These moves fit the region's collegial norms while speaking to teachers' professional agency.

5.7 Future directions and system-sensitive design

The cross-system contrasts caution against one-size-fits-all interventions. Where personal-utility motives dampen collaboration, workload design and recognition systems should reduce zero-sum trade-offs, for example by tying advancement to team-based contributions rather than solely to individual outputs. In Japan, where social-utility motives did not translate into collaboration, efforts may focus on efficacy-building, shared problem-solving structures and protected time for joint work. The South Korea measurement result highlights another lesson: validate constructs locally before drawing comparisons or setting targets. Future studies could test longitudinal change and qualitative mechanisms behind the mixed satisfaction links and the distinct roles of policy perceptions for curriculum-focused work. For practice, using professional-development needs assessments as an entry point to seed joint planning and moderation may be a pragmatic path to sustained collaboration.

6. Conclusion and Limitations

This study identifies two robust associations across East and Southeast Asian systems in TALIS 2018: teachers' self-efficacy and an innovative team climate are positively related to both exchange/coordination and curriculum-focused collaboration. Other correlates are context-dependent. Perceived policy influence and the social value of teaching align more closely with curriculum-focused work; personal-utility motives, where salient, coincide with lower collaboration; and job satisfaction shows non-uniform links. For practice, the most defensible course is to pair capability-building with organisational conditions that protect time for joint work, recognise team outputs, and give teachers a clearer voice in curriculum and assessment, while tailoring specific levers to local settings.

Several limitations temper these conclusions. The data are cross-sectional and self-reported, precluding causal inference and raising the possibility of common-method bias. Measurement comparability is partial: not all constructs reach scalar invariance, and South Korea required a first-order specification of self-efficacy, which constrains level comparisons. The two collaboration indices may omit informal or subject-specific practices, and important contextual variables (e.g., timetabling, leadership stability, accountability pressures) are unavailable. Finally, models were estimated at the teacher level and not linked to student outcomes, so any claims about downstream impact rely on prior literature rather than direct evidence in this dataset.

Data Availability Statement

The dataset generated and analyzed during the current study is available from the corresponding author upon request.

Acknowledgments

This research was funded by the National Social Science Fund of China—Education Special Programme (General Programme), grant number BHA250113.

Conflicts of interest

The authors declare no conflict of interest.

Use of AI and AI-assisted Technologies

No AI tools were utilized for this paper.

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