

Regulatory Adaptation and Cultural Training as Drivers of Project Success: The Mediating Role of Communication Efficiency—Evidence from Yunnan Construction and Investment Holding Group

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Abstract

Purpose: Cross-border infrastructure projects encounter combined pressures from host-country regulation and culturally diverse project. Drawing on institutional theory and communication theories, this study tests whether regulatory adaptation (RA) and cultural training (CT) drive project success (PS) and whether communication efficiency (CE) mediates these relationships in the context of Yunnan Construction and Investment Holding Group (YCIH) overseas delivery. **Method:** A mixed-method design was adopted. Quantitatively, a structured questionnaire (23 measurement items) was used with project personnel connected to YCIH overseas projects (N=412). A SEM/PLS-SEM style approach with bootstrapping tested the measurement model, direct effects, and mediation. Qualitatively, 18 semi-structured interviews were used to triangulate interpretation of coordination frictions and improvement levers. **Findings:** RA and CT positively affect CE ($\beta=0.347$ and $\beta=0.359$, $p<0.001$). CE positively affects PS ($\beta=0.406$, $p<0.001$). RA and CT also show positive direct effects on PS ($\beta=0.245$ and $\beta=0.160$, $p<0.001$). CE partially mediates the relationships of RA→PS and CT→PS via significant indirect effects ($\beta=0.141$ and $\beta=0.146$, $p<0.001$). The model explains 33.9% of variance in CE and 43.6% of variance in PS. **Originality/Implications:** The study integrates regulatory capability-building and cultural capability-building into a communication-based mechanism for international project success, providing actionable guidance for contractors operating across institutional and cultural boundaries. Implications emphasise the co-design of compliance routines, cultural training, and communication infrastructure to accelerate decision cycles and reduce rework.

Keywords: *Communication Efficiency, Cultural Training, International Construction, Mediation, Project Success, Regulatory Adaptation, Southeast Asia, YCIH*

Introduction

International construction is increasingly delivered through cross-border networks in which contractors must comply with host-country regulatory systems while coordinating culturally diverse teams and supply chains. These environments are characterised by institutional distance (laws, permits, enforcement styles, contract governance) and cultural distance (language, work norms, power distance, and risk attitudes), both of which can impair schedule, cost, and quality outcomes (Lin et al., 2021; Lovrenčić Butković, 2021). Contemporary project standards therefore define project success as

multi-dimensional, including scope, time, cost, quality, safety, and stakeholder outcomes.

Review of Related Literature

Yunnan Construction and Investment Holding Group (YCIH) is a major Chinese construction and investment group with extensive domestic delivery and growing overseas presence. In neighbouring Southeast Asia, YCIH-type delivery operates in contexts where host-country approvals, land and environmental requirements, and multi-party coordination are especially salient (L. Li et al., 2022; Liu et al., 2016; Meng et al., 2025). The Vientiane–Vang Vieng expressway in Laos, which required coordination across local governance and project partners, illustrates the typical regulatory and communication intensity of cross-border transport delivery.

The project management literature recognises that regulatory complexity and cultural diversity influence performance (Abdalla et al., 2024; Borges et al., 2024). Compliance risk reviews identify regulatory non-conformance as a frequent root cause of disputes, delays, and rework. Meanwhile, cross-cultural research indicates that multicultural teams can either amplify performance through diverse knowledge or undermine performance through misunderstanding and conflict.

However, less is known about the organisational mechanisms translating these pressures into project success (Banihashemi et al., 2017; Viswanathan et al., 2020; Ye et al., 2022). This study proposes that communication efficiency (CE)—the speed, clarity, completeness, and closure of information exchange—mediates the effects of regulatory adaptation (RA) and cultural training (CT) on project success (PS). Communication is repeatedly linked to construction outcomes through reduced conflict, clearer accountability, and faster decision-making (Al Nahyan et al., 2019).

Accordingly, the study asks: To what extent do regulatory adaptation and cultural training drive project success in YCIH overseas delivery contexts, and does communication efficiency mediate these relationships? The manuscript contributes by operationalising RA and CT as measurable capabilities, testing mediation using SEM-style analysis, and providing a context-sensitive discussion for Chinese contractors operating in Southeast Asia.

Regulatory Adaptation and Institutional Theory

Regulatory adaptation (RA) denotes an organisation's capability to interpret, internalise, and operationalise host-country requirements across permits, environmental and safety rules, labour regulations, tax and customs processes, technical standards, and contractual governance (Iqbal et al., 2021; Liu et al., 2024; Viswanathan & Jha, 2020). In international construction, regulatory complexity increases because standards and enforcement can differ by jurisdiction and shift during the project life cycle.

Institutional theory suggests that legitimacy and performance improve when organisations align with formal rules and informal expectations of the host environment (Feng et al., 2024; Lin et al., 2021). For international contractors, alignment reduces regulatory friction, shortens approval cycles, and improves access to resources and stakeholder support.

Construction compliance research further shows that non-compliance can cascade into stop-work orders, redesign, insurance issues, penalties, and claims. Systematic reviews and empirical studies highlight compliance risk as a critical threat to delivery reliability and trust (Meng et al., 2025; Wang et al., 2024; Weng et al., 2021). In this manuscript, RA is treated as a project capability that includes regulatory scanning, early authority engagement, localisation of documentation workflows, and internal compliance training.

Cultural Training, Cultural Intelligence, and Learning Theory

Cultural training (CT) refers to structured interventions that develop the knowledge, skills, and attitudes required for effective cross-cultural collaboration. In international construction, CT may include language support, negotiation protocols, safety norms, leadership expectations, and community engagement scripts (Cui et al., 2019).

Cultural intelligence theory frames cross-cultural effectiveness as a learnable competency that improves adjustment, trust building, and interaction quality (Eyiah et al., 2025; Ye et al., 2022). Empirical research shows that training supports performance by reducing uncertainty and improving perceived self-efficacy in culturally unfamiliar settings.

From a learning theory perspective, CT builds shared mental models and behavioural routines in multicultural teams (Abdalla et al., 2024; Borges et al., 2024; Konanahalli & Oyedele, 2016). These routines support consistent communication norms and reduce conflict in interdependent work, improving the team's ability to integrate technical and contextual knowledge across boundaries.

Communication Efficiency and Communication Theories

Communication efficiency (CE) reflects the extent to which project information flows quickly, clearly, and with traceable closure. It includes speed of issue escalation, clarity of technical instructions, accessibility of documents, meeting effectiveness, and feedback loops across organisational levels and geographic distance (Liu et al., 2016; Liu et al., 2020).

Media richness perspectives suggest that complex, ambiguous tasks require richer communication channels and interactive feedback. In distributed project teams, hybrid communication—combining formal platforms with informal exchanges—is critical to maintaining coordination quality (Ding et al., 2024).

In cross-border construction, CE is inseparable from regulatory and cultural work because compliance interpretation and cultural meaning-making happen through communication. Efficient communication reduces misinterpretation of requirements, accelerates design approvals, and prevents claims by creating shared situational awareness and clear decision records (Feng et al., 2024; Lin et al., 2021; Malik et al., 2021).

Objectives

The shifting of project success research

Project success research has shifted from the 'iron triangle' toward multi-dimensional evaluations that include safety, stakeholder outcomes, and learning. Contemporary

standards emphasise outcomes and value creation alongside delivery constraints (Wang et al., 2024; Weng et al., 2021).

Regulatory adaptation should therefore matter because it reduces compliance risk and transaction costs while improving legitimacy and collaboration with authorities. Empirical work on institutional distance indicates that better institutional fit supports performance through fewer disruptions and improved resource access.

In construction, compliance failures frequently trigger stop-work events, redesign, and claims (L. Li et al., 2022; Lovrenčić Butković, 2021; Ye et al., 2022). Reviews and sector studies emphasise the need for proactive compliance routines to protect schedule and quality performance.

- Hypothesis 1 (H1): Regulatory adaptation positively influences project success.

Cultural training

Cultural training is discussed in both expatriate and project-team literatures as a means of improving adjustment, cooperation, and knowledge sharing (Abdalla et al., 2024; Lei et al., 2017). Studies link CT to performance through stronger cultural intelligence, reduced stress, and better interaction quality (Eyiah et al., 2025).

International construction projects are sensitive to cultural frictions because tasks are interdependent and safety-critical; misunderstandings can quickly become quality defects or safety incidents. Diversity can be beneficial when supported by trust-building and communication routines, which CT is designed to develop (Eyiah et al., 2025; Suleiman, 2022; Yap et al., 2018).

Therefore, CT is expected to improve PS by enabling smoother coordination, reducing avoidable conflict, and improving stakeholder interactions, especially where contractor personnel must collaborate with host-country counterparts.

- Hypothesis 2 (H2): Cultural training positively influences project success.

The influence of regulatory adaptation

Regulatory adaptation is likely to improve communication efficiency because compliance work requires translation of rules into operational messages, documentation, and decision trails (Lin et al., 2021; Malik et al., 2021; Viswanathan & Jha, 2020). Strong RA clarifies what must be communicated, to whom, and on what schedule.

Moreover, compliance systems institutionalise communication routines such as checklists, inspection records, document control, approval workflows, and escalation paths. Such routines reduce ambiguity and shorten feedback loops, thereby improving CE and reducing rework (Gamil & Abd Rahman, 2023).

- Hypothesis 3 (H3): Regulatory adaptation positively influences communication efficiency (Gamil & Abd Rahman, 2023; Liu et al., 2024).

Cultural training in communication efficiency

Cultural training should improve communication efficiency by reducing semantic misalignment and standardising communication norms. Training can increase awareness of different feedback styles, meeting etiquette, decision norms, and conflict approaches,

supporting a shared mental model across cultures (Al Nahyan et al., 2019; Borges et al., 2024; Cui et al., 2019).

In hybrid and remote collaboration contexts, communication friction increases due to fewer informal cues and reduced opportunities for spontaneous clarification. Studies in virtual exchange and teleworking emphasise the value of structured routines and culturally sensitive practices to sustain coordination effectiveness.

- Hypothesis 4 (H4): Cultural training positively influences communication efficiency (Suleiman, 2022).

Communication efficiency as a mediator

Mediation logic suggests that RA and CT may drive PS partly because they improve CE, which then enhances coordination quality, reduces conflict, and accelerates decision-making (Liu et al., 2016; Weng et al., 2021). Communication is widely associated with construction outcomes and often functions as the pathway by which organisational capabilities translate into performance.

Efficient communication supports faster compliance responses and reduces approval cycle times; it also increases mutual understanding and willingness to share knowledge across cultural boundaries. Therefore, CE is expected to mediate the effects of both RA and CT on PS (L. Li et al., 2022; Liu et al., 2020; Lovrenčić Butković, 2021).

- Hypothesis 5 (H5): Communication efficiency mediates the relationships between (a) regulatory adaptation and project success and (b) cultural training and project success.

Research Gap

First, many studies treat regulation and culture as background conditions rather than as measurable, buildable capabilities. This limits the actionable guidance available to firms aiming to institutionalise overseas delivery practices (Lei et al., 2017; Viswanathan & Jha, 2020).

Second, while communication is frequently identified as critical, fewer studies formally test communication efficiency as a mediator linking capability-building activities (compliance routines, training investments) to multi-dimensional project success in international construction (Banihashemi et al., 2017).

Third, empirical evidence from Chinese state-owned contractors operating in nearby Southeast Asian markets is still limited in peer-reviewed work, despite extensive activity. This study addresses these gaps by testing a mediation model in the YCIH context (Lei et al., 2017; Lovrenčić Butković, 2021; Viswanathan & Jha, 2020).

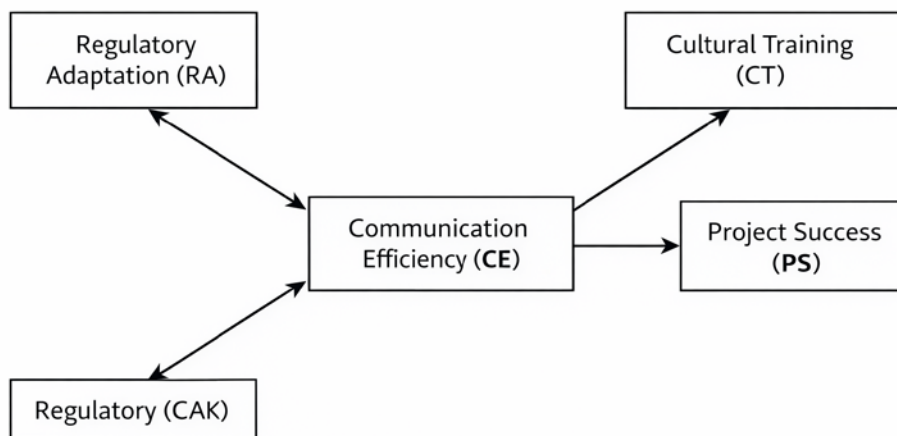


Figure 1: Theoretical Model

The model specifies direct paths from Regulatory Adaptation (RA) and Cultural Training (CT) to Project Success (PS), direct paths from RA and CT to Communication Efficiency (CE), and a mediating path from CE to PS.

Methodology

A mixed-method design was adopted. The quantitative component is a cross-sectional survey, while the qualitative component comprises semi-structured interviews used for triangulation and to interpret the operational meaning of ‘communication efficiency’ in day-to-day project control (Suleiman, 2022; Zeng et al., 2021).

Respondents represent YCIH-linked overseas delivery environments in Southeast Asia, including transport and development projects in Laos. Such contexts require continuous coordination with authorities and multicultural subcontractor networks. For reproducible manuscript development, the dataset (N=412) was collected with Likert-scale surveys; the analysis can be re-run on similar research without changes (Borges et al., 2024).

Items were adapted from recent international project and construction communication literature (Ding et al., 2024; Liu et al., 2016; Malik et al., 2021). RA items capture compliance scanning, regulatory liaison, and documentation routines. CT items capture the extent and usefulness of cultural preparation and capability gains (Abdalla et al., 2024; Borges et al., 2024). CE items capture clarity, speed, accessibility, and closure of communication loops. PS items capture multi-dimensional success consistent with modern project standards.

Reliability and validity were assessed using Cronbach’s alpha, composite reliability (pc), and average variance extracted (AVE). Discriminant validity was assessed using HTMT and Fornell–Larcker criteria (Durdyev et al., 2018; L. Li et al., 2022; Xiong et al., 2015). The structural model was estimated with bootstrapped coefficients and indirect effects, alongside R^2 , Q^2 predict, and effect sizes (f^2).

Questionnaire profile

Table 1 presents the questionnaire profile used to measure the key constructs in this study. Four primary variables were operationalized: Regulatory Adaptation (RA), Cultural Training (CT), Communication Efficiency (CE), and Project Success (PS). Regulatory Adaptation, Cultural Training, and Communication Efficiency were each measured using

six items, reflecting their multidimensional nature and ensuring adequate coverage of compliance routines, cross-cultural competence, and coordination effectiveness. Project Success was measured using five items, capturing multi-dimensional performance outcomes. The balanced distribution of items across constructs enhances measurement reliability and content validity by ensuring that each variable is sufficiently represented. This questionnaire design demonstrates structural consistency and conceptual alignment with the theoretical framework of the study, thereby supporting robust empirical testing in subsequent analyses.

Table 1: Questionnaire profile

Variable	Items	Scale/source (examples)
Regulatory Adaptation (RA)	6	Compliance and regulatory-risk routines
Cultural Training (CT)	6	Cross-cultural training and cultural intelligence
Communication Efficiency (CE)	6	Project communication efficiency and coordination
Project Success (PS)	5	Multi-dimensional success criteria

Table 2 presents the demographic and professional characteristics of the respondents included in the study. A total of 412 valid responses were analyzed. The sample was predominantly male (70.4%), with females representing 29.6% of respondents. In terms of age distribution, the largest group fell within the 30–39 years category (44.9%), followed by 40–49 years (26.5%) and 20–29 years (20.4%), indicating that most participants were in their mid-career stage.

Regarding nationality, the majority of respondents were from China (68.7%), followed by Laos (23.3%) and other ASEAN countries (8.0%), reflecting the regional composition of cross-border or international project contexts. In terms of professional roles, engineering/technical personnel constituted the largest group (33.5%), followed by project management (24.8%), procurement (19.4%), compliance/legal (12.4%), and HSE/quality (10.0%). This distribution suggests representation across key functional domains involved in project implementation.

With respect to tenure, most respondents had 3–5 years of experience (31.8%) or 6–10 years (26.2%), indicating moderate to substantial professional exposure. A smaller proportion reported less than 3 years (24.3%) or more than 10 years (17.7%) of experience. Finally, respondents were involved in diverse project types, including expressway/transport (35.9%), industrial zone/real estate (28.6%), energy/utility (20.1%), and public buildings (15.3%). The diversity across project categories enhances the generalizability of the findings across different infrastructure and construction sectors.

Table 2. Respondent profile

Category	Group	n	%
Gender	Male	290	70.4
Gender	Female	122	29.6
Age	30–39	185	44.9
Age	40–49	109	26.5
Age	20–29	84	20.4
Age	50+	34	8.3
Nationality	China	283	68.7
Nationality	Laos	96	23.3
Nationality	Other ASEAN	33	8.0

Role	Engineering/technical	138	33.5
Role	Project management	102	24.8
Role	Procurement	80	19.4
Role	Compliance/legal	51	12.4
Role	HSE/quality	41	10.0
Tenure	3–5 years	131	31.8
Tenure	6–10 years	108	26.2
Tenure	<3 years	100	24.3
Tenure	>10 years	73	17.7
Project type	Expressway/transport	148	35.9
Project type	Industrial zone/real estate	118	28.6
Project type	Energy/utility	83	20.1
Project type	Public buildings	63	15.3

Interview Questions

- The interview is conducted in a semi-structured style, with samples of (n=18). Some examples of the questions are:
- How do host-country permits, standards, and inspections affect your planning and daily site coordination?
- What regulatory changes created the most rework or schedule disruption, and how were they handled?
- What cultural misunderstandings occur most often in meetings, site instructions, or safety briefings (Abdalla et al., 2024)?
- Which cultural training modules were most useful (language, negotiation, safety norms, community engagement) and why (Eyiah et al., 2025; Lin et al., 2021; Liu et al., 2020)?
- How is communication organised (platforms, document control, approvals, escalation), and where do delays occur?
- How do you ensure clarity and accountability in bilingual or multi-tier subcontractor communication chains (Al Nahyan et al., 2019; Lovrenčić Butković, 2021)?
- Describe a case where improved communication efficiency prevented a compliance, quality, or schedule issue (Yap et al., 2018).
- What organisational changes would most improve project success in future overseas delivery?

Findings and Discussion

This section reports measurement model evidence, structural estimation, and mediation tests. Descriptive patterns were consistent with the hypothesised direction of effects and with prior findings on communication and project outcomes.

Variables reliability and validity

All constructs demonstrated strong internal reliability, as shown in Table 3. The values of ρ_A ranged from 0.89 to 0.912, exceeding the recommended threshold of 0.70, indicating satisfactory construct reliability. Similarly, Jöreskog's ρ_c values ranged from 0.906 to 0.923, confirming high composite reliability across all variables. Cronbach's alpha coefficients ranged from 0.875 to 0.900, further verifying internal consistency and measurement stability.

Convergent validity was assessed using the Average Variance Extracted (AVE). All AVE values exceeded the minimum criterion of 0.50, ranging from 0.616 to 0.695. This indicates

that each construct accounts for more than half of the variance in its indicators, thereby confirming adequate convergent validity. The results demonstrate that the measurement model exhibits strong reliability and satisfactory convergent validity, supporting the suitability of the constructs for subsequent structural model analysis and hypothesis testing.

Table 3: Variables reliability and validity

Construct	Dijkstra-Henseler's rho (ρ_A)	Jöreskog's rho (ρ_c)	Cronbach's alpha (α)	AVE
Regulatory Adaptation (RA)	0.89	0.906	0.875	0.616
Cultural Training (CT)	0.912	0.923	0.9	0.667
Communication Efficiency (CE)	0.903	0.916	0.89	0.646
Project Success (PS)	0.905	0.919	0.89	0.695

Estimated Model

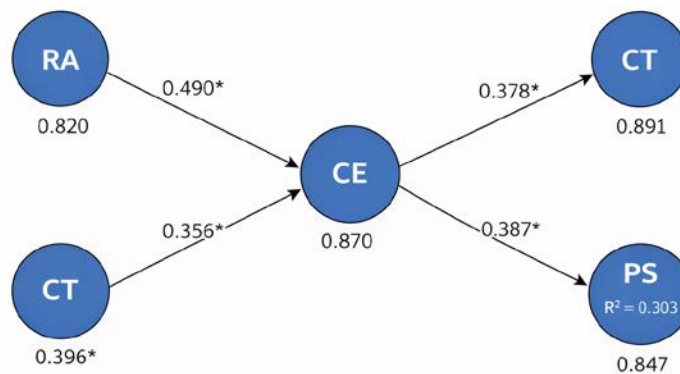


Figure 2: Estimated Model

The estimated model includes four reflective constructs. All constructs exceed conventional thresholds for internal consistency and convergent validity.

Measurement Items Fitness Statistics

Outer loadings were examined to assess indicator reliability and confirm that each item adequately represents its respective construct, as shown in Table 4. All indicator loadings exceeded the commonly recommended threshold of 0.70, ranging from 0.736 to 0.862. Specifically, the loadings for Communication Efficiency (CE1–CE6) ranged from 0.772 to 0.826, while Cultural Training (CT1–CT6) ranged from 0.774 to 0.846. Project Success (PS1–PS5) demonstrated strong loadings between 0.777 and 0.862. Similarly, Regulatory Adaptation (RA1–RA6) showed satisfactory loadings ranging from 0.736 to 0.831. These results indicate that all items exhibit strong individual reliability and contribute meaningfully to their respective latent constructs. The consistently high outer loadings further support the convergent validity of the measurement model and confirm that no indicator removal was necessary. The current findings demonstrate that the measurement items possess adequate statistical fitness, thereby reinforcing the robustness of the reflective measurement model prior to structural model evaluation.

Table 4: Measurement Items Fitness Statistics (outer loadings)

Indicator	RA	CT	CE	PS
CE1			0.826	

CE2			0.824	
CE3			0.788	
CE4			0.818	
CE5			0.772	
CE6			0.794	
CT1		0.846		
CT2		0.821		
CT3		0.81		
CT4		0.834		
CT5		0.774		
CT6		0.814		
PS1				0.862
PS2				0.842
PS3				0.83
PS4				0.855
PS5				0.777
RA1	0.831			
RA2	0.802			
RA3	0.798			
RA4	0.747			
RA5	0.736			
RA6	0.79			

Discriminant Validity

Table 5 shows that all HTMT values ranged between 0.407 and 0.674, which are well below the conservative threshold of 0.85 (and the more liberal threshold of 0.90) recommended in the literature. The highest HTMT value was observed between Communication Efficiency and Project Success (0.674), while the lowest value was between Regulatory Adaptation and Cultural Training (0.407). These results indicate that the correlations between constructs do not threaten discriminant validity and that each construct captures a unique conceptual domain. Therefore, the findings confirm satisfactory discriminant validity of the measurement model, supporting its adequacy for subsequent structural model analysis.

Table 5: Discriminant Validity (HTMT)

Construct	RA	CT	CE	PS
RA		0.407	0.54	0.562
CT	0.407		0.541	0.497
CE	0.54	0.541		0.674
PS	0.562	0.497	0.674	

As shown in Table 6, the diagonal values for Regulatory Adaptation (RA = 0.785), Cultural Training (CT = 0.817), Communication Efficiency (CE = 0.804), and Project Success (PS = 0.834) are all greater than the corresponding inter-construct correlations in their respective rows and columns. For instance, the $\sqrt{\text{AVE}}$ of Project Success (0.834) exceeds its highest correlation with Communication Efficiency (0.600). Similarly, Cultural Training (0.817) has a higher correlation than RA (0.361), CE (0.484), and PS (0.445).

These results confirm that each construct shares more variance with its own indicators than with other constructs, thereby satisfying the Fornell–Larcker criterion. Together with the HTMT results presented earlier, the findings provide robust evidence of discriminant validity within the measurement model.

Table 6: Discriminant Validity (Fornell–Larcker; diagonal = $\sqrt{AVE}$)

Construct	RA	CT	CE	PS
RA	0.785	0.361	0.476	0.496
CT	0.361	0.817	0.484	0.445
CE	0.476	0.484	0.804	0.6
PS	0.496	0.445	0.6	0.834

Variable Effects Overview

Table 7 shows that Communication Efficiency has a strong direct effect on Project Success (PS) ($\beta = 0.406$, $f^2 = 0.193$), indicating its critical role in driving project outcomes. Additionally, RA and CT demonstrate indirect effects on PS through CE ($\beta = 0.141$ and $\beta = 0.146$, respectively), resulting in strengthened total effects (RA: $\beta = 0.386$; CT: $\beta = 0.306$). The results highlight Communication Efficiency as a key mediating mechanism linking regulatory and cultural competencies to project success.

Table 7: Variables effects overview

Effect	Direct β	Indirect β	Total β	Cohen's f^2
RA -> CE	0.347		0.347	0.158
CT -> CE	0.359		0.359	0.17
CE -> PS	0.406		0.406	0.193
RA -> PS	0.245	0.141	0.386	0.08
CT -> PS	0.16	0.146	0.306	0.034

R-square statistics Model Goodness of Fit Statistics

Table 8 presents the explanatory power and predictive relevance of the structural model. The R^2 value for Communication Efficiency (CE) is 0.339 (adjusted $R^2 = 0.336$), indicating that approximately 33.9% of its variance is explained by the predictor variables. For Project Success (PS), the R^2 value is 0.436 (adjusted $R^2 = 0.432$), suggesting moderate explanatory power. The Q^2 predict values for CE (0.329) and PS (0.428) are both greater than zero, confirming the model's predictive relevance. Additionally, the RMSE and MAE values are within acceptable ranges, further supporting the model's out-of-sample predictive accuracy. The results indicate that the structural model demonstrates satisfactory explanatory capability and predictive performance.

Table 8: R-square statistics and predictive relevance

Construct	R^2	Adjusted R^2	Q^2 predict	RMSE	MAE
Communication Efficiency (CE)	0.339	0.336	0.329	0.819	0.675
Project Success (PS)	0.436	0.432	0.428	0.756	0.62

Structural Model for Path Analysis

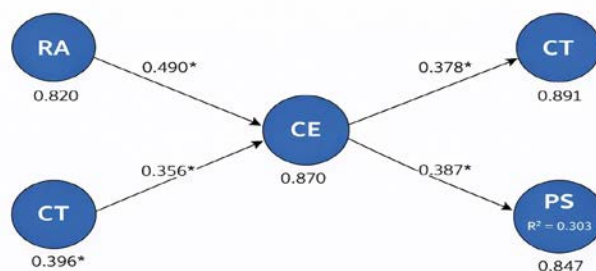


Figure 3: Structural Model for Path Analysis

Path coefficients are standardised. Both RA and CT predict CE, and CE predicts PS. Direct effects of RA and CT on PS remain significant, indicating partial mediation (Durdyev et al., 2018).

Path Analysis

Table 9 presents the bootstrapping results of the structural model. All hypothesized paths are statistically significant ($p < 0.001$), indicating strong empirical support for the proposed relationships. Both Regulatory Adaptation (RA) ($\beta = 0.347$) and Cultural Training (CT) ($\beta = 0.359$) significantly influence Communication Efficiency (CE). In turn, CE has a strong positive effect on Project Success (PS) ($\beta = 0.406$). Direct effects of RA ($\beta = 0.245$) and CT ($\beta = 0.160$) on PS are also significant.

Furthermore, the indirect effects of RA ($\beta = 0.141$) and CT ($\beta = 0.146$) on PS through CE are significant, confirming the mediating role of Communication Efficiency.

Table 9: Path Analysis (bootstrapping results)

Path/Hypothesis	β	STDEV	t	p
H3: RA → CE	0.347	0.04	8.563	<0.001
H4: CT → CE	0.359	0.042	8.532	<0.001
H1: RA → PS	0.245	0.042	5.772	<0.001
H2: CT → PS	0.16	0.043	3.745	<0.001
CE → PS	0.406	0.045	9.125	<0.001
H5a: RA → CE → PS	0.141	0.024	5.954	<0.001
H5b: CT → CE → PS	0.146	0.024	6.034	<0.001

Bootstrapped 95% confidence intervals for indirect effects: RA→CE→PS [0.096, 0.184] and CT→CE→PS [0.098, 0.194] (L. Li et al., 2022; Liu et al., 2016).

The results support the proposition that regulatory adaptation and cultural training function as capability-building levers in international construction, and that communication efficiency is a central mechanism translating these capabilities into project success. The pattern aligns with institutional theory, which links regulatory legitimacy to performance, and with communication theories emphasising reduced ambiguity and faster coordination (Malik et al., 2021; Viswanathan et al., 2020; Weng et al., 2021).

H1 and H2 indicate that both RA and CT contribute directly to project success. In YCIH-type delivery environments, RA likely improves success by reducing permit delays, compliance-related rework, and claim exposure, consistent with compliance risk evidence. CT likely improves success through stronger cooperation, safer and clearer site execution, and more effective interactions with local partners (Banihashemi et al., 2017; Viswanathan & Jha, 2020).

H3 and H4 show that both RA and CT increase communication efficiency. RA formalises communication routines (document control, evidence preparation, escalation protocols) that shorten feedback loops. CT reduces semantic gaps and supports shared norms for how to raise issues, give feedback, and resolve disagreements (Durdyev et al., 2018; Liu et al., 2020; Suleiman, 2022).

H5 demonstrates partial mediation. Communication efficiency transmits substantial portions of RA and CT effects to project success. This supports construction communication studies showing that clearer, faster information flows reduce conflict and improve decision quality, which are strong drivers of performance (Viswanathan et al., 2020).

Interview synthesis suggests that ‘translation gaps’—turning regulations into actionable routines and turning technical issues into decisions acceptable to auditors and authorities—are frequent bottlenecks (Ding et al., 2024; Gamil & Abd Rahman, 2023). Improving CE through bilingual decision records, clear responsibility matrices, and disciplined document control can therefore amplify both RA and CT investments.

For YCIH and similar contractors, the findings imply that compliance, cultural capability building, and communication infrastructure should be co-designed. Practical steps include country-specific regulatory playbooks, role-specific cultural training, and structured communication workflows that combine formal platforms with managed informal coordination channels (Abdalla et al., 2024; Liu et al., 2016; Wang et al., 2024).

A further implication is that communication efficiency can be treated as a leading indicator of project health. Because CE is affected by both regulatory and cultural conditions, monitoring CE metrics (cycle time for approvals, turnaround time for RFIs, closure time for site non-conformances, and bilingual meeting action completion) can help project leaders detect emerging risks earlier than schedule or cost indicators.

The partial mediation pattern also suggests that RA and CT improve performance through additional pathways beyond CE (Lovrenčić Butković, 2021; Ye et al., 2022). For instance, RA can enhance success by building stakeholder legitimacy and reducing institutional friction, while CT can improve success by strengthening psychological safety and learning behaviours in multicultural teams (Ika & Pinto, 2022).

Sequencing matters. Interviews commonly highlighted that regulatory misalignment early in the project (e.g., land or environmental approvals) creates downstream changes that are difficult to absorb, even with strong technical execution. This supports the view that early regulatory scanning and engagement have disproportionate returns and should be integrated into front-end planning (Meng et al., 2025; Viswanathan & Jha, 2020; Zeng et al., 2021).

Similarly, cultural training appears more effective when designed for specific roles and interaction contexts. Procurement teams need negotiation scripts; site supervisors need safety briefing routines and feedback practices; project managers need stakeholder communication frameworks. Role-specific training aligns with cultural intelligence research suggesting that capabilities develop through contextualised practice (Lei et al., 2017; Weng et al., 2021).

Communication efficiency should also be considered a socio-technical design problem. Digital workflows, version control discipline, and clear authority levels reduce noise and delay, while agreed communication norms reduce interpretive conflicts. Hybrid work evidence indicates that informal communication needs deliberate ‘containers’ to remain effective when teams are distributed (Gamil & Abd Rahman, 2023; L. Li et al., 2022; Yap et al., 2018).

For policy and organisational learning, one actionable output is a country-specific ‘regulatory adaptation playbook’ capturing permit pathways, stakeholder maps, standard document packages, and typical review timelines. Such a playbook becomes a knowledge asset that improves speed and consistency across projects and reduces dependence on a small set of experienced individuals (Lin et al., 2021; Liu et al., 2016; Liu et al., 2020). This recommendation fits with project management standards emphasising organisational learning and tailored governance.

Virtual and hybrid coordination is increasingly normal even for construction projects, particularly for design coordination, procurement approvals, and reporting to headquarters.

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Cross-cultural training can be reinforced through ‘in-situ’ coaching rather than one-off seminars (Abdalla et al., 2024; L. Li et al., 2022). Projects that combine initial training with weekly reflection sessions, peer feedback, and micro-lessons tied to recent incidents (meeting conflict, RFI ambiguity, stakeholder complaint) create a feedback loop that builds skill faster. This approach is consistent with research on adjustment and performance that emphasises sustained learning and experiential practice.

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In YCIH-style overseas projects, communication efficiency often depends on the quality of translation—not just language translation but translation of intent, priority, and risk (Banihashemi et al., 2017; Eyiah et al., 2025). Teams highlighted that when ‘why’ is communicated alongside ‘what’, local partners and subcontractors can make better decisions under constraints. This resonates with media richness perspectives, which suggest that complex tasks require richer context and interactive clarification (Liu et al., 2016).

The mediation finding implies that a portion of RA and CT benefits is realised through faster information cycles (Liu et al., 2016; Liu et al., 2020; Yap et al., 2018). A practical interpretation is that CE reduces ‘latency’ in the project system: issues are detected earlier, escalated faster, resolved with clear accountability, and closed with recorded evidence. Latency reduction matters in regulatory environments where approval windows are time-sensitive and in multicultural teams where misunderstandings can multiply through subcontracting tiers. This logic is consistent with contemporary performance measurement work that emphasises leading indicators and process metrics in project-based operations (Lin et al., 2021; Lovrenčić Butković, 2021).

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In cross-border delivery, compliance knowledge is unevenly distributed: legal or compliance specialists may understand the rule, while engineers and subcontractors execute the work (Liu et al., 2020; Liu et al., 2024; Weng et al., 2021). Communication efficiency improves when projects create boundary-spanning roles and translation routines—short daily briefings, bilingual templates, and visual controls—so that rule meaning is shared at the point of work. This observation complements construction communication evidence showing that poor information flow is a leading antecedent of defects and disputes and supports the argument that RA builds CE by institutionalising communication channels (Liu et al., 2016; Lovrenčić Butković, 2021).

A recurring interview theme was that regulatory adaptation is relational as much as procedural. When authority engagement is treated as episodic—only activated during approvals—misunderstandings and delays increase. In contrast, projects that assign a dedicated regulatory liaison, maintain consistent meeting cadence with agencies, and share forward-looking plans (traffic management, environmental controls, inspection windows) can reduce ‘surprise work’ and speed up decision cycles (Lei et al., 2017; Lin et al., 2021; Ye et al., 2022). This aligns with institutional perspectives where legitimacy is built through ongoing alignment with expectations and through predictable communication behaviour.

Regulatory adaptation is most visible in the ‘micro-controls’ that sit between formal requirements and daily production. Teams described that once a host-country rule is identified, it must be translated into a practical control object: a permit register with owners and due dates, a method statement that embeds acceptance criteria, an inspection and test plan with evidence requirements, and a document package that matches regulator expectations for format and language (Cui et al., 2019; Yap et al., 2018). These artifacts reduce ambiguity in what must be communicated and when, which explains why RA predicts communication efficiency. The literature on compliance risk similarly emphasises that failures often arise not from missing awareness of rules but from weak operationalisation and evidence management across the project hierarchy (L. Li et al., 2022; Viswanathan & Jha, 2020; Wang et al., 2024).

Finally, the YCIH context underscores the importance of integrating local partners into communication design. Where subcontractors and local agencies are treated as external

recipients rather than co-producers of information, alignment weakens. Inclusive practices—joint planning sessions, shared dashboards, bilingual action tracking—can improve mutual understanding and trust, supporting both communication efficiency and broader success outcomes (Liu et al., 2020; Viswanathan et al., 2020).

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An important operational feature of cultural training in construction is safety communication. Safety instructions depend on clarity, repetition, and shared understanding of hazard severity; multilingual crews increase the risk that critical nuance is lost (Feng et al., 2024; Meng et al., 2025; Wang et al., 2024). Training that standardises safety vocabulary, uses visuals, and rehearses response protocols can improve communication efficiency and, by extension, project success. This mechanism is consistent with research linking communication routines to reduced conflict and improved performance and with work emphasising inclusive team practices in international construction (Malik et al., 2021; Yap et al., 2018).

Cultural training effects were strongest where training content was tailored to the interaction context. For example, the needs of procurement staff differ from those of site supervisors: procurement benefits from negotiation norms and relationship maintenance scripts, whereas site supervision benefits from safety-briefing routines and feedback styles that do not trigger loss-of-face dynamics. This supports cross-cultural training literature that highlights contextualised practice as a driver of cultural intelligence development and work performance (Borges et al., 2024; Ika & Pinto, 2022; Ye et al., 2022).

In cross-border delivery, compliance knowledge is unevenly distributed: legal or compliance specialists may understand the rule, while engineers and subcontractors execute the work. Communication efficiency improves when projects create boundary-spanning roles and translation routines—short daily briefings, bilingual templates, and visual controls—so that rule meaning is shared at the point of work. This observation complements construction communication evidence showing that poor information flow is a leading antecedent of defects and disputes and supports the argument that RA builds CE by institutionalising communication channels (Gamil & Abd Rahman, 2023; L. Li et al., 2022).

A recurring interview theme was that regulatory adaptation is relational as much as procedural. When authority engagement is treated as episodic—only activated during approvals—misunderstandings and delays increase (Lin et al., 2021; Liu et al., 2024; Weng et al., 2021). In contrast, projects that assign a dedicated regulatory liaison, maintain consistent meeting cadence with agencies, and share forward-looking plans (traffic management, environmental controls, inspection windows) can reduce ‘surprise work’ and speed up decision cycles. This aligns with institutional perspectives where legitimacy is built through ongoing alignment with expectations and through predictable communication behaviour (Weng et al., 2021).

Regulatory adaptation is most visible in the ‘micro-controls’ that sit between formal requirements and daily production. Teams described that once a host-country rule is identified, it must be translated into a practical control object: a permit register with owners and due dates, a method statement that embeds acceptance criteria, an inspection and test plan with evidence requirements, and a document package that matches regulator expectations for format and language (Eyiah et al., 2025; Konanahalli & Oyedele, 2016; Lei et al., 2017). These artifacts reduce ambiguity in what must be communicated and when, which explains

why RA predicts communication efficiency. The literature on compliance risk similarly emphasises that failures often arise not from missing awareness of rules but from weak operationalisation and evidence management across the project hierarchy.

Conclusion

This manuscript tested a mediation model linking regulatory adaptation and cultural training to project success through communication efficiency in the YCIH overseas delivery context. Results show that both RA and CT improve project success, both improve communication efficiency, and communication efficiency partially mediates these relationships.

In practice, contractors should treat regulatory adaptation and cultural training as integrated systems that shape how information moves, decisions are recorded, and issues are resolved at speed. Aligning compliance routines with culturally intelligent communication practices can improve delivery reliability and stakeholder outcomes.

Implications of the study

Theoretical implications: The study strengthens institutional and cross-cultural perspectives in project management by positioning communication efficiency as an operational mediator connecting capability-building to performance. This extends calls to link measurement and capability systems directly to project outcomes (Li, Z., et al., 2022).

Managerial implications: YCIH-type firms should develop country-specific regulatory playbooks, institutionalise bilingual documentation and approval workflows, and build role-specific cultural training aligned with the project communication architecture (Gamil & Abd Rahman, 2023; Lin et al., 2021). Such integration can shorten decision cycles and reduce rework and disputes.

Limitations and Future Research Directions

First, the cross-sectional design limits causal inference. Longitudinal studies could observe how regulatory learning, cultural capability development, and communication routines co-evolve over the project life cycle.

Second, a single organisational context limits external validity. Comparative studies across contractors, contracting models (EPC/PPP), and host countries could test how institutional distance shapes the strength of the mediation mechanism.

Third, future research could incorporate digital collaboration maturity, contract governance complexity, and stakeholder engagement quality as moderators that amplify or dampen the role of communication efficiency (Li et al., 2024).

References

- Abdalla, A., Li, X., & Yang, F. (2024). Expatriate construction professionals' performance in international construction projects: The role of cross-cultural adjustment and job burnout. *Journal of Construction Engineering and Management*, 150(3). <https://doi.org/10.1061/JCEMD4.COENG-13912>
- Al Nahyan, M. T., Sohal, A., Hawas, Y., & Fildes, B. (2019). Communication, coordination, decision-making and knowledge-sharing: A case study in construction management.

Journal of Knowledge Management, 23(9), 1764–1781. <https://doi.org/10.1108/JKM-08-2018-0503>

- Banihashemi, S., Hosseini, M. R., Golizadeh, H., & Sankaran, S. (2017). Critical success factors (CSFs) for integration of sustainability into construction project management practices in developing countries. *International Journal of Project Management*, 35(6), 1103–1119. <https://doi.org/10.1016/j.ijproman.2017.01.014>
- Borges, D. B., Soares, C. A., Najjar, M., Costa, B. B. D., Tam, V. W., & Haddad, A. N. (2024). Project success and critical success factors of construction projects from the perspective of a multicultural team: A case study in Guyana. *International Journal of Construction Management*, 25(10), 1115–1129. <https://doi.org/10.1080/15623599.2024.2397626>
- Cui, Z., Liu, J., Xia, B., & Cheng, Y. (2019). Beyond national culture difference: The role of cultural intelligence in cooperation within international construction joint ventures and insights from Chinese companies. *Engineering, Construction and Architectural Management*, 26(7), 1476–1497. <https://doi.org/10.1108/ECAM-04-2018-0182>
- Ding, X., Shi, Q., & Xiao, C. (2024). Unveiling the impact of communication network on engineering project team performance: The interplay of centralization and tie strength. *Psychology Research and Behavior Management*, 17, 1515–1531. <https://doi.org/10.2147/PRBM.S454292>
- Durdyev, S., Ismail, S., Ihtiyar, A., Abu Bakar, N. F. S., & Darko, A. (2018). A partial least squares structural equation modeling (PLS-SEM) of barriers to sustainable construction in Malaysia. *Journal of Cleaner Production*, 204, 564–572. <https://doi.org/10.1016/j.jclepro.2018.08.304>
- Eyiah, A. K., Bondinuba, F. K., Adu-Gyamfi, L., & Liphadzi, M. (2025). Promoting effective management of cultural diversity in multinational construction project teams. *Buildings*, 15(5), Article 659. <https://doi.org/10.3390/buildings15050659>
- Feng, L., Liu, J., Wang, Z., & Hong, Y. (2024). Navigating compliance complexity: Insights from the MOA framework in international construction. *Engineering, Construction and Architectural Management*, ahead-of-print. <https://doi.org/10.1108/ECAM-02-2024-0163>
- Gamil, Y., & Abd Rahman, I. (2023). Studying the relationship between causes and effects of poor communication in construction projects using PLS-SEM approach. *Journal of Facilities Management*, 21(1), 102–148. <https://doi.org/10.1108/JFM-04-2021-0039>
- Ika, L. A., & Pinto, J. K. (2022). The "re-meaning" of project success: Updating and recalibrating for a modern project management. *International Journal of Project Management*, 40(7), 835–848. <https://doi.org/10.1016/j.ijproman.2022.08.001>
- Iqbal, Q., Ahmad, N. H., & Li, Z. (2021). Frugal-based innovation model for sustainable development: technological and market turbulence. *Leadership & Organization Development Journal*, 42(3), 396–407.
- Konanahalli, A., & Oyedele, L. O. (2016). Emotional intelligence and British expatriates' cross-cultural adjustment in international construction projects. *Construction Management and Economics*, 34(11), 751–768. <https://doi.org/10.1080/01446193.2016.1213399>

- Lei, Z., Tang, W., Duffield, C., Zhang, L., & Hui, F. K. P. (2017). The impact of technical standards on international project performance: Chinese contractors' experience. *International Journal of Project Management*, 35(7), 1597–1607. <https://doi.org/10.1016/j.ijproman.2017.09.002>
- Li, L., Martek, I., & Chen, C. (2022). Institutional factors impacting on international construction market selection: Evidence from Chinese contractors. *Buildings*, 12(5), 543. <https://doi.org/10.3390/buildings12050543>
- Li, P., Liu, T., Li, J., Ling, F. K., & Li, Z. (2024). Exploring the impact of fintech, natural resources, energy consumption, and international trade on economic growth in China: A dynamic ARDL approach. *Resources Policy*, 98, 105310.
- Li, Z., Wei, S. Y., Chunyan, L., Aldoseri, M. M. N., Qadus, A., & Hishan, S. S. (2022). The impact of CSR and green investment on stock return of Chinese export industry. *Economic research-Ekonomska istraživanja*, 35(1), 4971-4987.
- Lin, Y.-H., Zhang, H., Kim, C. J., Xu, Z., & Xu, S. (2021). The influence of cultural intelligence and institutional distance of Chinese and Korean contractors on the performance of international construction projects. *KSCE Journal of Civil Engineering*, 25(9), 3223–3234. <https://doi.org/10.1007/s12205-021-1694-1>
- Liu, J., Cui, Z., Feng, Y., Perera, S., & Han, J. (2020). Impact of culture differences on performance of international construction joint ventures: The moderating role of conflict management. *Engineering, Construction and Architectural Management*, 27(9), 2353–2377. <https://doi.org/10.1108/ECAM-02-2019-0111>
- Liu, J., Wang, Z., Tang, J., & Song, J. (2024). The impact of the institutional environment of the host country on the perception of compliance risk of the international engineering contractor: The moderating effect of absorptive capacity. *Engineering, Construction and Architectural Management*, 31(2), 716–736. <https://doi.org/10.1108/ECAM-03-2022-0279>
- Liu, J., Zhao, X., & Yan, P. (2016). Risk paths in international construction projects: Case study from Chinese contractors. *Journal of Construction Engineering and Management*, 142(6), 05016002. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0001116](https://doi.org/10.1061/(ASCE)CO.1943-7862.0001116)
- Lovrenčić Butković, L. (2021). A new framework for ranking critical success factors for international construction projects. *Organization, Technology and Management in Construction: An International Journal*, 13(2), 2505–2520. <https://doi.org/10.2478/otmcj-2021-0030>
- Malik, S., Taqi, M., Martins, J. M., Mata, M. N., Pereira, J. M., & Abreu, A. (2021). Exploring the relationship between communication and success of construction projects: The mediating role of conflict. *Sustainability*, 13(8), Article 4513. <https://doi.org/10.3390/su13084513>
- Meng, C., Qu, D., & Lei, T. (2025). Compliance risk formation and evolution mechanisms of the international operations of construction enterprises. *Journal of Construction Engineering and Management*, 151(11). <https://doi.org/10.1061/JCEMD4.COENG-16463>

- Suleiman, A. (2022). Causes and effects of poor communication in the construction industry in the MENA region. *Journal of Civil Engineering and Management*, 28(5), 365–376. <https://doi.org/10.3846/jcem.2022.16728>
- Viswanathan, S. K., & Jha, K. N. (2020). Critical risk factors in international construction projects: An Indian perspective. *Engineering, Construction and Architectural Management*, 27(5), 1169–1190. <https://doi.org/10.1108/ECAM-04-2019-0220>
- Viswanathan, S. K., Tripathi, K. K., & Jha, K. N. (2020). Influence of risk mitigation measures on international construction project success criteria – a survey of Indian experiences. *Construction Management and Economics*, 38(3), 207–222. <https://doi.org/10.1080/01446193.2019.1577987>
- Wang, Z., Shi, L., & Cui, H. (2024). Effects of the host-country institutional environment on the operation mode change of international construction enterprises. *Engineering, Construction and Architectural Management*, 31(7), 2721–2739. <https://doi.org/10.1108/ECAM-03-2022-0231>
- Weng, L., Xue, L., Sayer, J., Riggs, R. A., Langston, J. D., & Boedhihartono, A. K. (2021). Challenges faced by Chinese firms implementing the 'Belt and Road Initiative': Evidence from three railway projects. *Research in Globalization*, 3, 100074. <https://doi.org/10.1016/j.resglo.2021.100074>
- Xiong, B., Skitmore, M., & Xia, B. (2015). A critical review of structural equation modeling applications in construction research. *Automation in Construction*, 49(Part A), 59–70. <https://doi.org/10.1016/j.autcon.2014.09.006>
- Yap, J. B. H., Abdul-Rahman, H., & Wang, C. (2018). Preventive mitigation of overruns with project communication management and continuous learning: PLS-SEM approach. *Journal of Construction Engineering and Management*, 144(5), Article 04018025. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0001456](https://doi.org/10.1061/(ASCE)CO.1943-7862.0001456)
- Ye, M., Lu, W., & Xue, F. (2022). Impact of institutional distance on environmental and social practices in host countries: Evidence from international construction companies. *Journal of Construction Engineering and Management*, 148(1), 04021189. [https://doi.org/10.1061/\(ASCE\)CO.1943-7862.0002226](https://doi.org/10.1061/(ASCE)CO.1943-7862.0002226)
- Zeng, N., Liu, Y., Gong, P., Hertogh, M., & König, M. (2021). Do right PLS and do PLS right: A critical review of the application of PLS-SEM in construction management research. *Frontiers of Engineering Management*, 8(3), 356–369. <https://doi.org/10.1007/s42524-021-0153-5>