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The Influence of Teamwork on the Agile Software Development Success: Evidence from Hanoi's Software Outsourcing Companies

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Abstract

The study examines the impact of teamwork factors on the success of Agile Software Development projects in Hanoi's software outsourcing sector, addressing the lack of empirical evidence from emerging economies. The study integrated the Input–Process–Output model, the Teamwork Quality model, and the Agile Teamwork Effectiveness Model to examine the influence of teamwork factors on project success. Survey data from 260 agile team members in Hanoi show five key teamwork factors that influence agile project success: communication, adaptability, coordination of expertise, mutual trust, and shared leadership. Among these, communication has the strongest effect, while shared leadership exhibits the weakest. In contrast, peer feedback and team cohesion do not have significant direct effects on project success, although organizational and cultural conditions may influence Agile practices effectiveness. These findings emphasize that effective agile teamwork relies on technical coordination, interpersonal dynamics, and adaptive collaboration. This study contributes to the Agile literature by providing empirical evidence from a non-Western, emerging economy context while challenging assumptions commonly reported in Western Agile studies regarding the roles of peer feedback and cohesion. The findings reveal that agile performance relies on the interaction between interpersonal and structural team dynamics, whereas peer feedback and cohesion do not exhibit significant direct effects, suggesting that Agile teamwork mechanisms may depend on organizational and cultural contexts. These insights suggest that although agile practices are globally recognized, their effectiveness depends on adaptation to local cultural and managerial contexts, offering theoretical and practical implications for agile management in emerging economies.

Keywords: ASD, ATEM, critical success factor, software outsourcing, TWQ.

1. Introduction

Recently, numerous studies have been conducted on teamwork in agile settings, particularly in Agile Software Development (ASD). Many researchers have addressed the advantages of ASD have been addressed from many research [1-4]. However, several gaps remain in the extensive research on teamwork in ASD. First, most studies on teamwork in ASD have been conducted in the USA [1] and Europe, particularly in countries such as Norway [2-4] and Germany [4-5]. At the same time, there is a lack of research in areas where agile methodologies are increasing considerably, such as the Middle East and Southeast Asia, particularly in Vietnam, where teamwork studies in agile teams are yet to be conducted. This shows a significant gap in the literature, emphasizing the need for further research in these emerging regions.

In addition, the Teamwork Quality (TWQ) model [6] has been employed in the majority of the studies conducted so far, which emphasizes the validity and dependability of this model. Most of these studies have demonstrated that communication and mutual support have positive and significant effects on agile teamwork [1, 6-8]. It has been repeatedly demonstrated that these are the most important factors for effective teamwork. In contrast, the Big Five theory has not been used as much in agile studies, especially the agile teamwork effectiveness model (ATEM) which is developed based on Big Five theory [3]. There is still no empirical study to evaluate the reliability of the model in agile contexts, and the authors have not argued for the potential relationships between components and coordinating mechanisms. Therefore, this gap opens up more opportunities for further studies on agile settings based on these models.

Furthermore, most previous studies on ASD have examined agile environments broadly, without focusing on specific domains. As each domain presents distinct challenges and teamwork requirements, there is a need for research that explores how teamwork factors shape agile practices across different domains. This study aimed to address this gap by examining the relationship between key teamwork factors and ASD project success in Hanoi - Vietnam's leading software development hub. According to the ICT "Make in Vietnam" Industrial Database managed by the Ministry of Information and Communications (MIC), Vietnam has more than 18,000 software companies, of which 6,432 (36.06%) are located in Hanoi. These include major corporations such as Viettel, FPT Software, and CMC, alongside numerous small and medium-sized outsourcing firms [9].

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Collectively, these enterprises handle thousands of software projects annually for both domestic and international clients, making Hanoi an ideal context for studying how teamwork contributes to agile project success.

Although prior studies consistently report positive relationships between teamwork factors and Agile project performance, most evidence originates from Western organizational contexts. Consequently, it remains unclear whether these teamwork mechanisms operate similarly in outsourcing organizations within emerging economies. Addressing this issue helps identify the contextual boundary conditions of Agile teamwork theories and assess their applicability beyond Western settings.

2. Theoretical Framework

2.1. Agile Methodology

The Software Development Life Cycle (SDLC) is a structured framework that guides the process of software development within organizations. It provides a systematic approach for planning, designing, implementing, testing, deploying, and maintaining software until retirement [10-11]. While the SDLC enables companies to manage large projects systematically, it has often been criticized for its lengthy timelines, with some projects extending over two to three years. To address these limitations, more adaptive models, such as Iterative and Spiral approaches, were introduced, promoting incremental progress and continuous feedback. Although these models have increased flexibility, the demand for faster and more collaborative methods has led to an increase in agile methodologies. Agile emphasizes iterative development, customer collaboration, and responsiveness to change, making it particularly effective in today's fast-paced software industry [12].

The Agile methodology, initially formalized in the Agile Manifesto, represents a paradigm shift from traditional software development approaches by emphasizing short development cycles, iterative delivery, and active customer involvement. It has emerged as a response to the inherent limitations of conventional Software Development Life Cycle (SDLC) models, offering a more adaptive, collaborative, and efficient framework for managing software projects [12].

A key characteristic of agile is its capacity to accommodate modifications during the development process, which makes it particularly effective in dynamic environments where requirements evolve over time [12, 20]. Agile employs iterative and incremental techniques that prioritize flexibility, collaboration, and continuous stakeholder engagement [20]. Unlike linear methodologies such as Waterfall, Agile divides projects into short, time-boxed iterations known as sprints, typically lasting between one and four weeks.

Customer collaboration plays a central role in agile practice. By engaging users throughout the process, Agile ensures that software products align closely with end-user requirements, thereby enhancing both user satisfaction and overall product quality [20]. Moreover, Agile's responsiveness to shifting priorities enables development teams to realign objectives effectively, making it particularly suitable for environments characterized by rapid technological and business changes.

Within the Agile framework, multiple approaches have gained prominence, including Extreme Programming (XP), Crystal methods, Scrum, and Feature-Driven Development [12]. Each emphasizes adaptability and incremental progress while collectively reinforcing Agile's overarching principles of iterative refinement and collaborative problem-solving.

The Agile methodology has demonstrated substantial benefits in addressing challenges such as schedule reliability, scope creep, and escalating development costs. Consequently, its adoption has proven valuable in meeting the continuously evolving demands of software development, positioning Agile as a dominant approach in contemporary software engineering [13-14].

2.2. Teamwork

The concept of teamwork has been the focus of extensive research in organizational and management studies. Salas *et al.* [15] defined teamwork as the collaborative effort of individuals possessing diverse skills, knowledge, and responsibilities, collectively working toward a common objective. These factors are effectively supported by three coordinating mechanisms: mutual trust, shared mental models, and closed-looped communication, which improve the overall dynamics of teamwork. This framework underscores the interdependence of members and the complementary nature of their contributions as the key drivers of effective team performance.

In the organizational context, [6] and [16] proposed the concept of TWQ, comprising six dimensions: communication, coordination, balance of contributions, mutual support, effort, and cohesion. Their framework demonstrated that high-quality teamwork directly influences team performance and member satisfaction. Since its introduction, the TWQ has been widely applied to assess team dynamics in both traditional and agile development settings.

Teamwork in a virtual environment introduces additional complexities. [17] highlighted the need for the effective management of shared goals, trust, and communication when team members are geographically dispersed. Technology plays a crucial

role in facilitating collaboration and decision-making, while trust is often grounded in reliable task performance rather than personal relationships.

Within ASD, teamwork takes a more adaptive and collaborative form. [18] emphasized that successful agile teamwork depends on cooperation, adaptive planning, shared responsibility, and frequent communication to accommodate evolving requirements. More recent perspectives have expanded this view. [19] determined teamwork as a dynamic process characterized by adaptive interactions, distributed leadership, and continuous knowledge sharing, which are particularly valuable in volatile environments. Similarly, [3] stressed the importance of diversity and inclusion, arguing that multiple perspectives enhance creativity, innovation, and problem-solving.

In the context of agile methodology, teamwork is expected to be democratic and flexible. Leadership roles may shift among members, enabling individuals to gain new knowledge and experiences while promoting equality and collaboration [11, 21–22]. This approach fosters adaptability and resilience for complex software projects.

3. Research Methodology

3.1. Research Model

This research seeks to examine how teamwork factors influence project outcomes and promote efficiency, innovation, and success in ASD. The inherited independent variables are communication, coordination of expertise, cohesion from the TWQ model [6, 16] and shared leadership, adaptability, and mutual trust from the ATEM [3]. The success of the ASD project was used as the dependent variable. Fig.1 illustrates our research model.



Fig. 1. Research model

(Source: Developed by the authors based on [3,6, 16])

The author has defined key teamwork factors based on the Input-Process-Output (IPO) model, which was proposed by [23] with three antecedent attributes: Inputs, Processes, and Outcomes [23], the definition of agile teamwork factors in Table 1, and the author's experience in ASD teams. The IPO model is essential in team and project management, highlighting that project success depends on the interaction among inputs, processes, and outputs. Several studies confirm that applying this model enhances team performance and project processes [11, 24-25], [24] showed that using the IPO model in agile settings enhances project success by promoting adaptability and iterative progress. Table 1 justifies the inclustion of each teamwork factor in the proposed research model, based on its alignment with the IPO model.

3.2. Hypothesis Development

Shared leadership significantly contributes to the success of ASD projects by improving teamwork, building trust, and allowing teams to adapt successfully to changing project needs. Flexibility and responsiveness are essential in an agile work environment. Shared leadership enables team members to make decisions, solve obstacles, and align themselves with changing goals. [29] found that shared leadership has a beneficial impact on project success through mediators such as team performance and autonomy, and effective communication improves this relationship. [18] also stated that shared leadership enhances decision-making and team cohesiveness, resulting in improved project outcomes. [3] also highlighted the importance of shared leadership, which is defined in their ATEM, in supporting collective decision-making and adaptation in agile teams. Thus, shared leadership is likely to improve TWQ and increase project success.

Hypothesis 1: Shared leadership has a positive impact on the ASD project success.

Coordination of expertise is a key contributor to the success of ASD projects. According to [26], enhancing team performance in software development teams requires coordination of expertise. By aligning the specialized expertise of team members, teams can better utilize their collective skills and achieve better project outcomes. Moreover, the TWQ model was expanded by [6], who demonstrated that coordination of expertise is essential for effective teamwork, particularly in agile settings, where several skills need to be integrated. [8] emphasized that coordination of expertise ensures that the right skills are used when needed, which directly improves team performance. Additionally, [1] found that better coordination of expertise improves team alignment and decision-making, further contributing to project success. Therefore, this study can hypothesize that coordination expertise positively impacts on ASD success.

Table 1. Research model variables

Variables	Definition	Scales	Sources
Shared Leadership	Ability of the team to direct and coordinate their activities, assess team performance, assign tasks, develop team knowledge, skills, and abilities, motivate one another, plan and organize, and establish a positive atmosphere	SL1: Problem-Solving Facilitation SL2: Clear Expectations and Interaction SL3: Integration of Contributions SL4: Information Seeking and Adaptability SL5: Role Definition through Agile Values SL6: Agile-Driven Meetings and Feedback SL7: Servant Leadership Support SL8: Agile-Based Planning and Strategy	[3, 6]
Coordination of Expertise	Location and need of expertise are known and coordinated	CE1: Understanding of Team Skills CE2: Task–Skill Alignment CE3: Awareness of Task-Related Skills CE4: Recognition of Specialized Expertise CE5: Knowledge Sharing CE6: Access to Hard-to-Find Expertise	[20, 26]
Communication	The adequate, frequent, spontaneous, timely, accurate, and meaningful exchange of information	CC1: Communication Frequency CC2: Spontaneous Communication CC3: Information Timeliness CC4: Information Accuracy CC5: Information Relevance	[24]
Peer Feedback	Ability to develop common understandings of the team environment and apply appropriate task strategies to accurately monitor teammate performance	PF1: Constructive Error Management PF2: Regular Constructive Feedback PF3: Feedback for Learning	[3]
Adaptability	Ability to adjust strategies based on information gathered from the environment through the use of backup behavior and reallocation of intra-team resources	AA1: Change Recognition AA2: Adaptive Planning AA3: Improvement Orientation AA4: Environmental Vigilance	[3, 24]
Cohesion	The degree to which team members are attracted to the team and motivated to remain part of it	CH1: Goal Unity CH2: Performance Development CH3: Social Bonding CH4: Support Beyond Work CH5: Group Belonging	[27]
Mutual Trust	The extent to which team members assist and support one another in accomplishing their tasks	MT1: Open Information Sharing MT2: Access to Information MT3: Openness to Mistakes MT4: Constructive Feedback MT5: Member Support MT6: Collaborative Climate	[3,6, 24]
Project Success	The degree to which a project achieves its intended objectives within the defined scope, time, and budget constraints, while meeting quality standards and satisfying stakeholder expectations	PS1: Timeliness PS2: Budget Adherence PS3: End-User Utilization PS4: Sustainability PS5: End-User Benefit PS6: Problem-Solving Effectiveness PS7: Process Satisfaction (Self) PS8: Process Satisfaction (Team) PS9: User Acceptance PS10: End-User Performance Improvement PS11: Visible Impact PS12: Specification Fulfillment PS13: Beneficiary Satisfaction PS14: Donor Satisfaction	[6, 24, 27]

(Source: Authors own works)

Hypothesis 2: Coordination of expertise has a positive impact on the ASD project success.

A key aspect of TWQ is the quality of communication and coordination among team members. Studies indicate that agile teams require high levels of synchronous communication to meet the rapidly changing project requirements [7-8, 28]. The relationship between communication and project success is emphasized in [2] on software engineering teams, where successful projects have well-established channels and clear task coordination among team members. Communication has become particularly important in software outsourcing companies, where geographically dispersed teams must bridge time zones and cultural differences to effectively collaborate. In this context, we propose that improved communication positively contributes to project success.

Hypothesis 3: Communication has a positive impact on the ASD project success.

Previous research indicates that constructive feedback fosters knowledge exchange and skill enhancement, which are essential elements of team effectiveness and project results [29]. [7] examined group development within agile teams and highlighted that peer feedback improves psychological safety and team maturity, both of which are crucial for the success of projects. [29] emphasized the importance of peer feedback as a crucial element in successful large-scale agile transformations, promoting a culture of continuous improvement and flexibility. When team members provide timely and constructive feedback, they result in improved alignment with project goals and increased responsiveness to changing requirements [30].

Hypothesis 4: Peer feedback has a positive impact on the ASD project success.

Agile teams operate in environments characterized by continuous changes and rapid decision-making requirements. Thus, adaptability is essential to overcome unforeseen challenges and maintain project momentum [31]. [7] highlighted that teams with adaptive capabilities are better equipped to respond to changes in requirements, client demands, and technical obstacles. [1] also found that agile teams that demonstrate adaptability are more likely to achieve successful outcomes because of their capacity to maintain productivity under adverse conditions. These findings suggest that a team's ability to adapt contributes positively to its overall success.

Hypothesis 5: Adaptability has a positive impact on the ASD project success

Mutual trust fosters transparent communication, psychological safety, and a cooperative mindset, enabling teams to effectively navigate complex and evolving project environments [3]. In Agile settings, where team members are empowered to self-organize and make group decisions, trust is crucial for open feedback and cooperative problem-solving. [13] discovered that mutual trust minimizes conflicts and speeds up the resolution processes, thereby enhancing project success. In addition, mutual trust enhances the exchange of information and adaptability in retrospectives and sprint planning, improves transparency, and reduces misunderstandings [32]. Thus, fostering mutual trust is essential for enhancing the quality of teamwork and ensuring the success of agility.

Hypothesis 6: Mutual trust has a positive impact on the ASD project success.

Team cohesion is a critical component of TWQ that is likely to affect the success of ASD teams. According to Batista *et al.* [2], team cohesion contributes to higher satisfaction and reduced turnover within the development teams. Cohesion reflects the interpersonal bonds that develop among team members and is essential for addressing challenges collectively [23]. In Agile settings, where team members are encouraged to self-organize and collaborate intensively, cohesion is particularly valuable for navigating complex and changing project demands [22]. The Agile framework encourages frequent retrospectives and collaborative problem-solving sessions, fostering cohesion that may reduce conflict and enhance productivity. Thus, cohesion is likely to improve TWQ and increase project success.

Hypothesis 7: Cohesion has a positive impact on the ASD project success.

3.3. Data Collection and Analysis

The authors collected primary data from online sources using the survey questionnaire. The expected number of responses was 300. From April 18, 2025 to July 18, 2025, they sent the survey for the first time, and 281 responses were collected. After processing and eliminating the unqualified responses using Microsoft Excel, 260 valid responses were obtained. Therefore, the final sample size used in this study included 260 observations. With this number, the author can choose methods for data analysis.

This study employed IBM SPSS Statistics 27 to analyze how teamwork factors influence the success of ASD projects in Hanoi's software outsourcing firms. Descriptive statistics summarized the respondents' demographic characteristics, providing contextual understanding of the sample. The reliability and validity of the measurement scales were assessed using Cronbach's Alpha (≥0.6) and item–total correlations (≥0.3) (Nunnally and Bernstein, 1994). Exploratory Factor Analysis (EFA) was then performed to validate the underlying teamwork constructs by applying standard criteria for KMO (>0.5), Eigenvalues (>1), and factor loadings (≥0.5) (Hair *et al.,* 1998).

To test the proposed relationships, this study applied Pearson's correlation analysis to identify significant linear associations ($p < 0.05$), followed by multiple linear regression using the Ordinary Least Squares (OLS) method. Model adequacy was assessed using the adjusted R^2 (>0.5), Durbin–Watson (1.5–2.5), and VIF (<2) statistics. Finally, standardized beta coefficients (β) were used to determine the relative influence of teamwork factors on project success.

4. Findings

The survey of 260 respondents showed several common traits: (1) There were more male than females employees (75.86%), andfemales made up 20.3%, while the other was 3.83%); (2) a significant number of employees were young, mainly under 30 years old (72.8%); (3) the workforce is well-educated, with most possessing a bachelor's degree or higher (77.39% having finished university programs, 15.71% holding a master's degree, 2.68% achieving a doctorate, and only 4.21% having just completed high school); (4) many employees are at the beginning of their careers, having 1-5 years of experience (accounting for 47.13%); and (5) most are employed in technical positions, especially as developers (43.68%) and testers (27.59%).

Based on the results of Cronbach's Alpha reliability analysis (as shown in Table 2), the scale consisting of 31 observed variables of seven independent factors belonging to teamwork factors and 11 observed variables of the dependent factor "ASD project success" satisfies the reliability condition of the scale, with Cronbach's Alpha coefficients greater than 0.6, and the item-total correlation coefficient greater than 0.3. Thus, these variables will continue to be used in the next step of the EFA.

Table 2. Summary of the results of Cronbach's Alpha coefficient test

No.	Scale	Cronbach's Alpha		Items Removed	Remaining Items
		Initial	After Removing Items		
1	Shared leadership	0.798	0.892	SL6, SL7	SL1, SL2, SL3, SL4, SL5, SL8
2	Coordination of expertise	0.821	0.903	CE3	CE1, CE2, CE4, CE5, CE6
3	Communication	0.781	0.879	CC1	CC2, CC3, CC4, CC5
4	Peer feedback	0.837	0.837		PF1, PF2, PF3
5	Adaptability	0.877	0.877		AA1, AA2, AA3, AA4
6	Cohesion	0.765	0.856	CH5	CH1, CH2, CH3, CH4
7	Mutual trust	0.797	0.874	MT5	MT1, MT2, MT3, MT4, MT6
8	Agile software development project success	0.872	0.927	PS2, PS7, PS8	PS1, PS3, PS4, PS5, PS6, PS9, PS10, PS11, PS12, PS13, PS14

(Source: Authors own works)

At the same time, through the analysis results, the authors eliminated 9 observed variables that did not meet the requirements: SL6, SL7, CE3, CC1, CH5, MT5, PS2, PS7, and PS8 because the item-total correlation coefficient was less than 0.3.

The KMO coefficients for the independent and dependent variables are 0.823 and 0.919, respectively (both within the acceptable range of 0.5 to 1). The results of Bartlett's test were 4435.320 and 1899.992 for Sig. value equal 0.000, *p* less than 0.05, respectively (see Table 3).

Table 3. The results of KMO and Bartlett's Test

Independent variables			**Dependent variables**		
KMO		0.823	KMO		0.919
Bartlett's test	Approx. Chi-square	4435.320	Bartlett's test	Approx. Chi-square	1899.992
	Df	465		Df	36
	Sig.	0.000		Sig.	0.000

(Source: Authors own works)

These results indicate that the data are suitable for factor analysis, showing sufficient correlations among the variables and satisfying the conditions for EFA.

Furthermore, Eigenvalues equal 1.649 greater than 1 at the 7th independent factors, showing that all 7 factors extracted from 31 observed variables met the requirements and were highly significant in the collected data. In addition, the EFA result showed that only one factor extracted from 9 observed dependent variables with Eigenvalue equal 6.286 greater than > 1 and 69.840% of the variation in the data is explained by this factor.

Exploratory Factor Analysis (EFA) was conducted using the principal components method with Varimax rotation. The Total Variance Explained results indicate that all seven factors had eigenvalues greater than 1 (minimum eigenvalue = 1.649), confirming that the extracted factors from the 31 observed variables satisfied the required criteria and were statistically significant. In addition, the extraction sums of the squared loadings accounted for 70.862% of the total variance, which exceeded the recommended 50% threshold, demonstrating that the seven factors captured a substantial proportion of the variance in the dataset.

After testing the reliability of the scales through Cronbach's Alpha test and EFA, the study tested the correlation between independent variables and dependent variables as well as examined whether multicollinearity between independent variables occurred through Pearson correlation analysis. The results are shown in Table 4.

From Table 4, we can see that sig. values between the five variables *SL, CE, CC, AA*, and *MT* are all less than 0.05, and the Pearson correlation coefficients are all less than 1, which proves that these variables have a linear correlation with the dependent variable (*PS*). The variables *CC* and *AA* had the strongest correlation, with Pearson correlation coefficients of 0.666 and 0.519, respectively. Simultaneously, the variables *CE*, *MT*, and *SL* have weak correlations but are statistically significant, with the lowest Pearson correlation coefficients of 0.183 and sig. value less than 0.05. They all meet the conditions to be included in the regression model to explain the influence of teamwork on ASD project success in Hanois software outsourcing companies in the next steps of the analysis. In contrast, the sig. values of two variables *PF* and *CH* were higher than 0.05, indicating that they did not show correlations with other variables.

Table 4. The results of Pearson correlation analysis

Correlations[c]

		PS	SL	CE	CC	PF	AA	CH	MT
PS	Pearson Correlation	1	.183**	.282**	.666**	-.020	.519**	.020	.265**
	Sig. (2-tailed)		.003	<.001	<.001	.753	<.001	.747	<.001
SL	Pearson Correlation	.183**	1	.163**	.069	-.055	.074	.104	.109
	Sig. (2-tailed)	.003		.008	.270	.380	.233	.095	.079
CE	Pearson Correlation	.282**	.163**	1	.143*	.112	.118	-.098	.242**
	Sig. (2-tailed)	<.001	.008		.021	.070	.057	.113	<.001
CC	Pearson Correlation	.666**	.069	.143*	1	-.052	.435**	.012	.149*
	Sig. (2-tailed)	<.001	.270	.021		.405	<.001	.841	.016
PF	Pearson Correlation	-.020	-.055	.112	-.052	1	.011	-.026	-.050
	Sig. (2-tailed)	.753	.380	.070	.405		.866	.682	.422
AA	Pearson Correlation	.519**	.074	.118	.435**	.011	1	-.022	.104
	Sig. (2-tailed)	<.001	.233	.057	<.001	.866		.725	.094
CH	Pearson Correlation	.020	.104	-.098	.012	-.026	-.022	1	-.026
	Sig. (2-tailed)	.747	.095	.113	.841	.682	.725		.681
MT	Pearson Correlation	.265**	.109	.242**	.149*	-.050	.104	-.026	1
	Sig. (2-tailed)	<.001	.079	<.001	.016	.422	.094	.681	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

c. Listwise N=260

(Source: Authors own works)

In the next step, the author examines the level of influence of teamwork factors that met the requirements of the Pearson correlation analysis on ASD project success in Hanoi's software outsourcing companies. The Ordinary Least Squares (OLS) method and Enter (including all variables simultaneously) methods were chosen to conduct multiple regression analysis. The regression results show that the sig. value of the t-test regression coefficients of the independent factors is all less than 0.05. The independent factors are all significant to explain the dependent factor in the research model. The VIF coefficients of the independent factors are all less than 2 (VIF coefficients of the independent factors ranged from 1.036 to 1.258), indicating that no multicollinearity occurred in this model. The results are expressed in the following equation (see Table 5 for detailed results of the linear regression analysis):

$$PS = 0.509 * CC + 0.263 * AA + 0.135 * CE + 0.119 * MT + 0.094 * SL \quad (1)$$

The results of regression results also supported hypothesis testing, as shown in Table 6.

Table 5. Results of linear regression analysis

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.334	.234		1.429	.154		
	SL	.098	.044	.094	2.218	.027	.965	1.036
	CE	.130	.042	.135	3.090	.002	.910	1.099
	CC	.369	.034	.509	10.919	<.001	.795	1.258
	AA	.183	.032	.263	5.685	<.001	.806	1.241
	MT	.094	.034	.119	2.754	.006	.923	1.083

a. Dependent Variable: PS

(Source: Authors own works)

Table 6. Hypotheses testing results

Hypotheses	Standardized Coefficients β	Sig.	Results
H1: Shared leadership has a positive impact on the ASD project success.	0.094	0.027	Accept
H2: Coordination of expertise has a positive impact on the ASD project success.	0.135	0.002	Accept
H3: Communication has a positive impact on the ASD project success.	0.509	0.000	Accept
H4: Peer feedback has a positive impact on the ASD project success.	-	-	Reject
H5: Adaptability has a positive impact on the ASD project success.	0.263	0.000	Accept
H6: Mutual trust has a positive impact on the ASD project success.	0.119	0.006	Accept
H7: Cohesion has a positive impact on the ASD project success.	-	-	Reject

(Source: Authors own works)

5. Managerial Implications and Conclusions

This study explored the influence of teamwork factors on the success of ASD projects in Hanoi's software outsourcing companies. The research revealed that all hypotheses were accepted, except for H4 (Peer feedback) and H7 (Cohesion). These findings suggest that effective agile teamwork in outsourcing environments relies primarily on coordination efficiency, adaptive collaboration, and structured interaction rather than on social or feedback-driven mechanisms. More importantly, the results indicate that teamwork mechanisms commonly associated with Agile success in Western studies may not operate in outsourcing environments within emerging economies.

Communication ($\beta = 0.509$, $p = 0.000$) was the strongest determinant of project success. This aligns with prior studies emphasizing the importance of transparent and timely communication in agile teams, which enables members to quickly adapt to changes and resolve challenges [7-8]. This evidence reinforces Agile's emphasis on frequent interaction as critical to delivering value.

Similarly, adaptability ($\beta = 0.263$, $p = 0.000$) showed a significant effect, reflecting the agile principle of responding to change rather than following rigid plans. As [14] noted, adaptability allows teams to identify opportunities, innovate, and maintain alignment with shifting requirements, which are vital in today's dynamic markets.

Coordination of expertise ($\beta = 0.135$, $p = 0.002$) also contributed positively, consistent with findings that the effective integration of individual skills improves outcomes [1, 6, 24]. The findings show that coordination of expertise is an important component of Agile project management. In other words, Teams that recognize and leverage members' expertise are better equipped to generate solutions and meet client needs.

Mutual trust ($\beta = 0.119$, $p = 0.006$) further supported success, according to [18], who argued that trust fosters collaboration and constructive conflict resolution. However, its weaker effect suggests that trust alone is insufficient without strong communication and coordination mechanisms.

Shared leadership ($\beta = 0.094$, $p = 0.027$) had the smallest effect. Although prior research links shared leadership to cohesion and knowledge sharing [34], its limited impact may reflect Hanoi's cultural preference for centralized decision-making. This finding implies that while shared leadership aligns with agile principles, its practical role may be moderated by cultural context.

In contrast, peer feedback (H4) did not show a significant effect on project success. A possible explanation is that, in outsourcing-based agile teams, feedback processes often function as routine or procedural activities rather than as mechanisms that directly influence decision-making or performance outcomes. Additionally, cultural tendencies toward indirect communication may limit the depth and effectiveness of peer feedback, reducing its impact on project results. This finding contrasts with Western Agile environments, where peer feedback is often considered essential for continuous learning, psychological safety, and performance improvement. In Hanoi's outsourcing firms, project success appears to depend more on delivery efficiency and managerial coordination than on peer-based learning processes.

Similarly, team cohesion (H7) was not found to significantly affect project success. This may be attributed to the fluid and task-oriented nature of outsourcing teams, where members frequently rotate across projects and prioritize task completion over interpersonal bonding. In such environments, project outcomes are more strongly driven by coordination and execution efficiency than by social attachment among team members. Unlike many Western studies that emphasize cohesion as a source of commitment and collaboration, the present findings suggest that cohesion plays a less direct role when teams are evaluated primarily on delivery performance and client satisfaction.

Overall, these findings highlight that, in outsourcing-based agile settings, performance is shaped more by coordination-oriented mechanisms than by relational factors. Taken together, the non-significant effects of peer feedback and cohesion suggest that the effectiveness of Agile teamwork mechanisms is contingent upon organizational and cultural contexts, thereby highlighting important boundary conditions for existing Agile teamwork theories and extending the literature beyond its predominantly Western foundations.

This study contributes to the growing body of knowledge on Agile Software Development (ASD) by providing empirical evidence from an emerging economy context-specifically, Hanoi's software outsourcing sector. These findings enhance our understanding of how teamwork dynamics shape ASD project success beyond Western settings, where most prior research has been conducted. By identifying five key teamwork factors-communication, adaptability, coordination of expertise, mutual trust, and shared leadership-this study demonstrates that effective agile performance relies on both interpersonal and structural team dynamics. Furthermore, the non-significant effects of peer feedback and cohesion challenge assumptions commonly reported in Western Agile literature and suggest important contextual boundary conditions for Agile teamwork theories. The relatively weaker effects of mutual trust and shared leadership further indicate that organizational and cultural conditions may moderate the effectiveness of Agile practices. Together, these findings suggest that

coordination- and communication-oriented mechanisms play a more prominent role than culture-related factors in determining project success in outsourcing-based Agile environments. Consequently, this research offers both theoretical and practical insights for managing agile teams in emerging economies.

From a managerial perspective, managers in Hanoi should adopt a hybrid leadership approach that balances Agile servant leadership with the prevailing preference for centralized decision-making. Specifically, strategic decisions such as project priorities and client commitments should remain under managerial control, while day-to-day problem-solving and task coordination should be delegated to team members. A "centralized strategy–decentralized execution" approach can help balance leadership accountability with team autonomy in sprint planning, task execution, and technical decision-making. Such an approach supports autonomy, trust, and collaboration while maintaining managerial oversight. Managers should also prioritize communication quality, adaptability, and expertise coordination rather than assuming that team-building activities and feedback rituals will automatically improve project outcomes.

Despite its contributions, this study has several limitations. First, its focus on the Hanoi region limits the generalization of the findings to other cultural and regional contexts. Second, although the sample size was adequate, a larger and more diverse dataset across industries would enhance applicability. Third, this study examined teamwork's overall impact without considering industry-specific differences. Fourth, reliance on self-reported data may introduce bias, which affects the reliability. Fifth, the cross-sectional design limits insigts into how teamwork dynamics evolve over time. Finally, rapid changes in Agile practices and technologies may reduce the relevance of the study to current industry trends.

Future research should further validate and expand the relationship between teamwork and agile software project success. Studies across diverse industries such as healthcare, finance, e-commerce, and education could reveal unique challenges and opportunities, offering broader practical insights. Longitudinal research is also valuable in showing how teamwork factors evolve over time and affect long-term performance. Future studues should also examine whether the non-significant effects of peer feedback and cohesion persist across different organizational and cultural contexts. In addition, examining specific agile methodologies, including Scrum, Kanban, or Extreme Programming, could identify context-specific best practices. Employing mixed methods, including both qualitative case studies and quantitative surveys, would provide richer insights into how teamwork shapes agile outcomes. Future studies should also consider team composition factors, including skill diversity, experience, and cultural backgrounds, as well as hierarchy and outsourcing arrangements, which may moderate teamwork effectiveness. Finally, exploring behavioral and psychological aspects such as trust, conflict resolution, and psychological safety would deepen our understanding of Agile project success.

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