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Performance Indicators in Football: Examining the Impact of Passing and Crossing Efficiency on Team Rankings

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Abstract

Background: Passing and crossing efficiency are recognized as key factors in football performance, yet their contextual influence in Southeast Asian competitions has been underexplored. The 2024 Mitsubishi Electric Cup offers a vital setting to examine how these technical indicators affect team tactics and rankings within the region's evolving football landscape.
Aims: This study aims to analyze team distribution performance through accurate passes, pass success rates, and crossing accuracy, and to determine how these variables relate to team rankings and tactical strategies in both offensive and defensive phases.
Methods: A quantitative approach was employed using descriptive statistics, Pearson correlation, and regression analysis. Data were collected from official tournament databases. The independent variables were accurate passes, pass success rate, and crossing accuracy, while team ranking served as the dependent variable.
Results: Data from ten teams were analyzed. Thailand recorded the highest pass success rate (85%) and passing volume (3,373 passes), showing strong possession control. Vietnam achieved the highest crossing accuracy (60%), indicating effective wide-play. Correlation analysis revealed a moderate relationship between pass success rate and crossing accuracy ($r = 0.65$, $p < 0.05$). Regression results confirmed that pass success rate significantly predicted passing volume ($R^2 = 0.45$, $p < 0.05$).
Conclusion: Teams with higher pass accuracy demonstrated superior control and competitive performance, while crossing efficiency was more context-dependent. Coaches and federations should emphasize structured passing drills and possession-based play, integrating crossing strategies selectively. Future studies should apply AI-assisted tactical modeling to enhance distribution and performance analysis in regional and global football.

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INTRODUCTION

Football performance is increasingly understood through quantitative indicators that integrate technical execution with tactical coherence. Among these, passing and crossing efficiency are regarded as central determinants of possession control, attacking construction, and overall team success. Teams that exhibit high passing accuracy and effective crossing strategies generally demonstrate superior spatial control, tempo regulation, and offensive productivity (Piskin et al., 2024; Siyahtaş & Ceviz, 2025). In elite football, precise passing sustains attacking momentum and enables fluid transitions, while accurate crossing transforms controlled possession into decisive scoring opportunities (Redwood-Brown et al., 2019; Merlin et al., 2022).

Extensive research in European competitions has established passing accuracy as a reliable indicator of tactical intelligence and technical quality. Players in high-performing teams typically achieve superior accuracy through refined biomechanics, rapid perceptual processing, and heightened situational awareness (Anzer & Bauer, 2022). Moreover, studies such as those conducted on the Turkish Super League and the FIFA World Cup 2022 show that maintaining a pass success rate above 80% correlates firmly with top-tier league performance (Subak, 2022; Kahlouche, 2023).

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Recent analytical developments using spatiotemporal data have further advanced understanding of ball distribution, with predictive models identifying early ball trajectory and player movement as key determinants of pass completion (Wang & Qin, 2020).

Similarly, crossing efficiency has emerged as a decisive tactical mechanism in converting possession into goal-scoring opportunities. Its success, however, is heavily context-dependent, varying according to formation, opposition pressure, and game state (Sarkar, 2018; Merlin et al., 2022). Modern football analytics, integrating positional and temporal data, now allow for detailed mapping of passing and crossing networks to optimize team structure and width exploitation (Kempe et al., 2018; Håland et al., 2020; Muñoz et al., 2024a).

Yet, despite these global advancements, regional competitions in Southeast Asia remain critically underrepresented in football analytics research (Nazarudin et al., 2025). While European data have shaped most theoretical and tactical models, Southeast Asian football operates under distinct contextual realities, different developmental pathways, playing styles, and physical demands. For instance, previous editions of the Mitsubishi Electric Cup recorded average pass success rates of 79% and crossing accuracies of 42%, figures notably below the European benchmarks of 85% and 50%, respectively (Subak, 2022; Kahlouche, 2023). These discrepancies highlight not only performance disparities but also the absence of localized analytical frameworks that reflect regional tactical identities.

The research gap, therefore, lies in the lack of empirical understanding of how passing precision and crossing accuracy interact to shape competitive outcomes in ASEAN tournaments. While extensive literature exists on European and global contexts (e.g., Caicedo-Parada et al., 2025; González-Rodenas et al., 2023), there remains limited investigation into the interactional dynamics of passing and crossing within Southeast Asian competitions. Prior analyses have emphasized that passing metrics such as pass completion, progression efficiency, and possession control serve as key discriminators of team success (Stafylidis et al., 2024a; Ramos Pérez et al., 2021). Similarly, studies on crossing performance indicate its importance in offensive conversions but highlight that efficiency depends on spatial zones and tactical synchronization (Vantarakis & Stafylidis, 2023).

However, it remains unclear whether teams with strong passing structures effectively translate their distribution dominance into productive wide-play and to what extent these variables jointly determine ranking and tactical success (Moustakidis et al., 2023; Martín-Castellanos et al., 2025). This gap limits both theoretical development in football analytics and the practical application of data-driven training systems across Southeast Asian football nations, where match tempo, environmental conditions, and playing styles differ markedly from European contexts (Modric et al., 2019; Tienza-Valverde et al., 2023; Junior, N. K. M., & Pinillo, I. R., 2025).

Addressing this gap, the present study introduces a novel, region-specific analytical framework that examines passing and crossing efficiency across all ten national teams competing in the Mitsubishi Electric Cup 2024. By linking distribution metrics directly to team rankings and tactical performance indicators, this research moves beyond the Eurocentric analytical paradigm, offering new insight into how technical precision and tactical integration operate in a distinct regional environment (Caicedo-Parada et al., 2025; Moustakidis et al., 2023).

The study not only provides scientific novelty by contextualizing performance indicators within Southeast Asian football but also enhances practical relevance, offering coaches, analysts, and federations empirical benchmarks for performance optimization (Klemp et al., 2021; Ramos Pérez et al., 2021). Ultimately, the objective is to establish an evidence-based understanding of how passing and crossing efficiency underpin both offensive and defensive success, thereby supporting data-driven tactical evolution across the ASEAN football landscape (Martín-Castellanos et al., 2025; Stafylidis et al., 2024b).

To address these gaps, this study outlines three core objectives: to analyze team performance through accurate passes, pass success rates, and crossing accuracy while considering match-specific contextual variables; to identify distribution efficiency patterns and their relationship with team rankings; and to examine how passing and crossing indicators collectively shape offensive and defensive strategies across participating teams. Through this approach, the study contributes a regionally grounded analytical framework that bridges contextual, technical, and tactical dimensions of performance, thereby offering both scientific novelty and practical relevance by contextualizing performance indicators within Southeast Asian football and providing coaches, analysts, and

federations with empirical benchmarks for data-driven tactical evolution and performance optimization (Klemp et al., 2021; Ramos Pérez et al., 2021; Martín-Castellanos et al., 2025; Stafylidis et al., 2024b).

METHOD

Research Design

This study employed a quantitative research design integrating descriptive and inferential statistical analyses to examine the relationship between passing and crossing efficiency and team performance. The design emphasizes originality by combining officially validated data sources, full-population sampling, and key performance indicators (KPIs), providing a comprehensive evaluation rarely applied in Southeast Asian football contexts (Nazarudin et al., 2025). Regression analysis was selected as the primary method because it offers a transparent and interpretable assessment of how distribution metrics predict competitive success. While alternative models, such as network analysis or multivariate structural modeling, can capture greater tactical complexity (Kempe et al., 2018; Muñoz et al., 2024a; Motshware et al., 2025), regression provides direct, practical insights that are both statistically robust and easily transferable to applied football settings (Wang & Qin, 2020).

Sample and Population

The study employed a full-population (census) design, analyzing data from all ten national teams participating in the Mitsubishi Electric Cup 2024, namely Thailand, Vietnam, Malaysia, Indonesia, Singapore, the Philippines, Cambodia, Laos, Brunei, and Timor-Leste. This approach ensured that the dataset represented the complete tournament population, thereby eliminating sampling bias and allowing valid inter-team comparisons. Official match statistics were obtained from multiple verified sources, including ASEAN Football Federation (AFF) official reports, tournament performance summaries, and third-party football analytics platforms such as FootyStats. The FootyStats system utilizes a dual-layer verification process that combines automated optical tracking with manual analyst review based on broadcast footage, enhancing data reliability and minimizing observational bias (Subak, 2022; Kahlouche, 2023). To further strengthen accuracy, all extracted data were cross-validated against AFF match reports.

Data collection followed a systematic three-stage procedure designed to ensure validity, consistency, and replicability. In the first stage, raw data on passing and crossing performance were gathered from verified databases and tracking systems. The second stage involved data cleaning and standardization, during which discrepancies between sources were reconciled and all indicators harmonized for uniform comparison. In the final stage, statistics were organized on a match-by-match basis to capture both individual actions and aggregated team outcomes. This multi-step process ensured transparency and measurement precision, consistent with best practices in performance analysis research (Håland et al., 2020).

The analysis was conducted exclusively at the team level rather than the individual player level. Each national team's performance indicators, such as total accurate passes, pass success rate, and crossing accuracy, were aggregated to represent the collective output of all players within each match. This methodological decision was intentional and aligned with the study's objective of examining macro-level tactical performance rather than individual player behavior. Focusing on team-based data allowed the researchers to evaluate overarching distribution patterns, possession structures, and tactical tendencies characteristic of Southeast Asian football.

Consequently, no direct sampling of players was undertaken; instead, every player's in-game action contributed to the cumulative dataset representing their respective team's performance. This approach not only enhanced internal validity through comprehensive data inclusion but also strengthened external validity by increasing the transferability of findings to other Southeast Asian tournaments.

Measures, Data Collection, and Analysis

Performance indicators in this study were operationalized through key performance indicators (KPIs) that captured both technical execution and tactical effectiveness (Piskin et al., 2024; Redwood-Brown et al., 2019; Merlin et al., 2022). The independent variables (IVs) comprised four distribution metrics: accurate passes, pass success rate, accurate crosses, and crossing accuracy.

Accurate passes referred to the total number of completed passes, representing a team's ability to control possession and regulate match tempo (Zeng & Zhang, 2022; González-Rodenas et al., 2023).

The pass success rate, expressed as a percentage, reflects the proportion of completed passes relative to total attempts, serving as an indicator of technical proficiency and tactical cohesion (Anzer & Bauer, 2022; Moreira Praça et al., 2023; Prieto-González et al., 2024). Accurate crosses measured the number of successful crosses reaching teammates, capturing the effectiveness of wide-play strategies (Redwood-Brown et al., 2019; Wu et al., 2021; Vantarakis & Stafylidis, 2023). Crossing accuracy, calculated as the percentage of accurate crosses over total attempts, contextualizes teams' ability to utilize flank areas in building attacks and creating scoring opportunities (Merlin et al., 2022; Sarkar, 2018). The dependent variable (DV), team success, was operationalized through final team rankings from official tournament standings, representing the ultimate measure of competitive performance (Plakias et al., 2025).

Statistical analyses were performed using SPSS Version 29.0. The analytical procedures comprised descriptive statistics, correlation, and regression modeling. Descriptive statistics were employed to summarise team performance trends in passing and crossing, providing baseline comparisons across all ten national teams. Pearson correlation analysis was used to examine relationships among the distribution metrics and team performance, particularly between pass success rate, accurate passes, and crossing accuracy. Regression modeling was then applied to evaluate the predictive influence of passing and crossing efficiency on final team rankings. Regression analysis was selected for its ability to offer an interpretable and empirically grounded assessment of how distribution efficiency contributes to team success, while maintaining applicability and replicability in practical football analysis contexts (Anzer & Bauer, 2022; Wang & Qin, 2020).

Table 1. Statistical Analysis

Research Objective	Statistical Analysis Techniques
1. Examine team performance in terms of accurate passes, pass success rates, and crossing accuracy while considering match-specific factors, such as the number of games played and tactical variations.	Descriptive Statistics Mean, standard deviation, percentages Data visualization (graphs, comparative rankings)
2. Identify distribution efficiency patterns and their correlation with team rankings.	Pearson Correlation Analysis Examining relationships between: a) Pass success rate and crossing accuracy. b) Accurate passes and team ranking. c) Accurate crosses and team ranking.
3. Assessing the impact of passing and crossing statistics on offensive and defensive strategies.	Regression Analysis Linear regression models predicting: a) Effect of pass success rates on accurate passes. b) Impact of accurate passes on team ranking.

Methodological Contribution

The methodology employed in this study contributes originality through several distinctive features that enhance both analytical rigor and practical applicability. First, the research utilized officially validated and cross-verified datasets, thereby ensuring the reliability of measurements and minimizing potential sources of bias. Second, including the full population of participating teams eliminated concerns about representativeness and strengthened the comprehensiveness of the findings. Third, the integration of key performance indicators (KPIs) provided a critical linkage between micro-level technical execution and macro-level tactical outcomes, aligning with analytical approaches used in prior football performance research (Redwood-Brown et al., 2019; Merlin et al., 2022).

Finally, the use of transparent regression modeling ensured an optimal balance between statistical rigor and interpretability, allowing the results to be both scientifically robust and practically helpful for coaches and researchers (Kempe et al., 2018; Muñoz et al., 2024a). Collectively,

these methodological choices establish a rigorous, region-specific framework for analyzing football performance, advancing both theoretical understanding and applied practices within Southeast Asian competitions.

Scope and Limitations

While this study offers valuable insights into passing and crossing efficiency in regional football contexts, several limitations should be acknowledged. The first limitation concerns the dependence on match context, as variables such as defensive pressure, playing style, and situational dynamics were not explicitly controlled and may have influenced the interpretation of distribution metrics. Secondly, the study focused exclusively on team-level performance indicators, omitting individual player metrics that might reveal more nuanced tactical contributions and variations in technical execution.

Finally, the scope of analysis was confined to a single tournament, the Mitsubishi Electric Cup 2024, which, while highly relevant to Southeast Asian football, may limit the generalisability of the findings to other regional or international competitions. These limitations, however, also present opportunities for future research to incorporate contextual, longitudinal, and player-level data to strengthen the predictive modeling of football performance.

RESULTS AND DISCUSSION

Result

Distribution Metrics by Team

Figure 1 illustrates the comparative distribution metrics for all ten national teams participating in the Mitsubishi Electric Cup 2024, focusing on total accurate passes, average passes per game, pass success rate, and crossing accuracy. The visual trend underscores Thailand's clear dominance in possession play, registering 3,373 accurate passes (mean = 421.6 per game) and the highest pass success rate of 85%, reflecting their structured short-passing rhythm and disciplined ball circulation. Vietnam, meanwhile, emerged as the most effective team in width exploitation, attaining a crossing accuracy of 60%, which aligns with its tactical inclination toward flank-oriented attacks and overlapping runs.

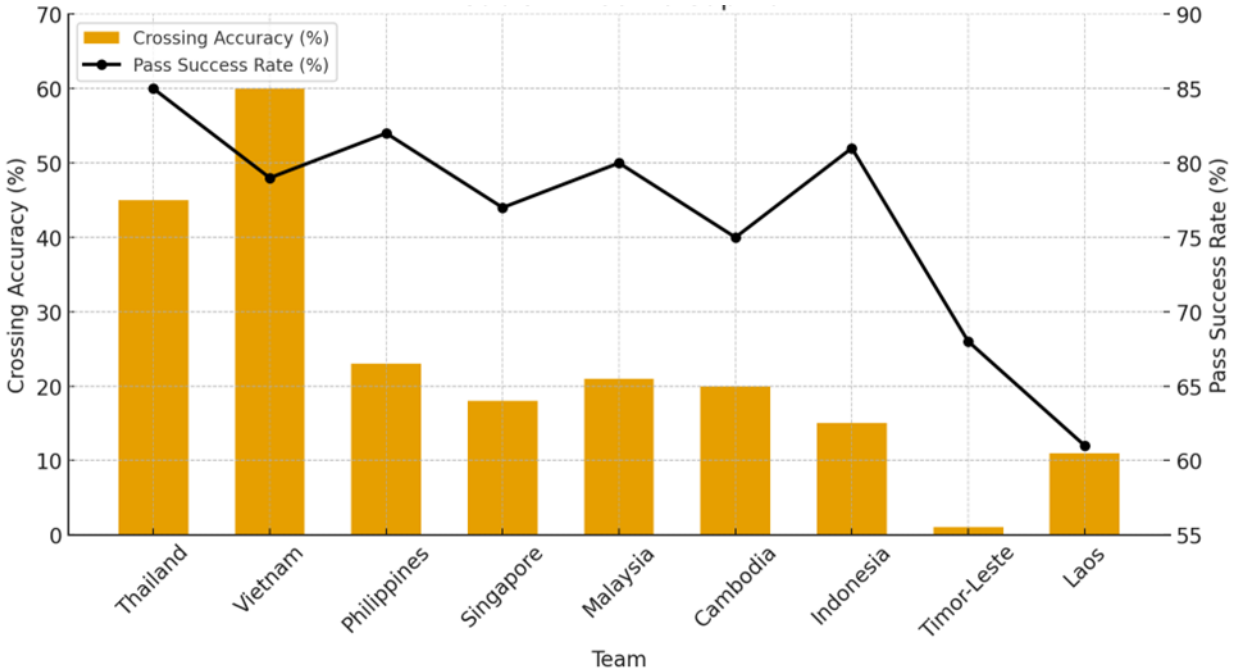

Figure 1. Comparative Distribution Metrics of Teams in the Mitsubishi Electric Cup 2024: Pass Success Rate and Crossing Accuracy

A noticeable mid-tier cluster comprising the Philippines, Singapore, and Malaysia—displayed competitive yet less consistent passing efficiency. The Philippines and Singapore achieved between

77% and 82% success rates, emphasizing technical stability but reduced penetrative transitions, while Malaysia maintained moderate values (80% success rate; 21% crossing accuracy) consistent with a controlled but conservative build-up strategy. Cambodia and Indonesia showed comparable distributions, suggesting emerging tactical organization but limited passing depth and final-third accuracy.

At the lower spectrum, Laos and Timor-Leste recorded the weakest technical output, with pass success rates of 61% and 68%, and crossing accuracies of only 11% and 1%, respectively. These metrics suggest structural deficiencies in ball retention and offensive link-up, typical of teams with less-developed transition management and reduced exposure to high-tempo opposition.

Overall, the results depict a distinct stratification of technical quality across ASEAN teams, ranging from Thailand's possession mastery and Vietnam's wide-play precision to the transitional struggles of the lower-ranked sides. The performance gap between the top and bottom tiers (24 percentage points in passing and 59 percentage points in crossing accuracy) illustrates the tactical heterogeneity of the region. From an analytical viewpoint, passing efficiency emerged as a more consistent differentiator of competitive strength, while crossing accuracy appeared to be situational and style-contingent, varying according to formation, player profile, and opponent structure.

Correlation Analysis

The heatmap in Figure 2 visualizes the correlation strengths among three key distribution indicators: pass success rate, crossing accuracy, and accurate passes. Color intensity represents the magnitude of the Pearson *r* coefficient, where deeper blue tones indicate stronger positive associations.

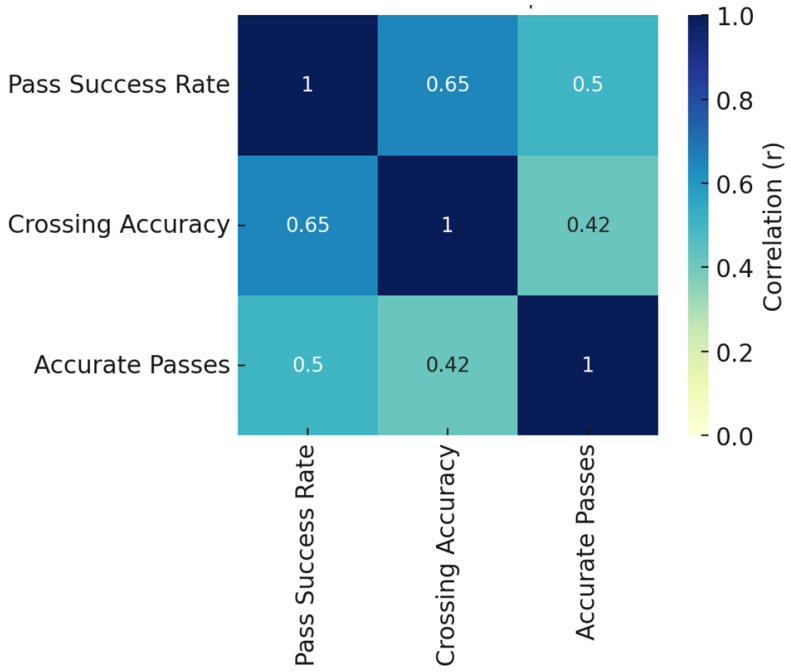

Figure 2. Correlation Heatmap of Distribution Indicators in the Mitsubishi Electric Cup 2024

A distinct pattern emerges, with success rate showing a moderate positive correlation with crossing accuracy (r = 0.65, p < .05), suggesting that teams capable of sustaining precise passing sequences are more likely to execute accurate wide deliveries. In contrast, accurate passes demonstrate only a weaker relationship with crossing accuracy (r = 0.42, p < .05), implying that the sheer volume of passes contributes less to attacking productivity than the quality of distribution. This visualization, therefore, reinforces the study's central finding that technical precision, not passing density, drives effective build-up play and final-third success. Practically, the result underlines the tactical value of structured possession and controlled tempo for Southeast Asian teams seeking to improve offensive consistency and competitive outcomes.

Regression Analysis

The scatterplot and fitted regression line depict the predictive association between passing efficiency and total passing output across all participating teams. In Figure 3, the positive slope and coefficient of determination (R^2 = 0.45, p < .05) reveal that nearly half of the variance in accurate passes can be explained by improvements in pass success rate. Teams such as Thailand and Vietnam, positioned toward the upper right of the plot, exemplify high technical precision and ball retention, achieving consistent possession control. In contrast, lower-ranked teams like Timor-Leste and Laos appear below the regression line, reflecting weaker cohesion and transitional instability. The visualization confirms that possession quality rather than quantity predicts distribution effectiveness, reinforcing the study's argument that sustained accuracy under pressure forms the tactical foundation of successful play in Southeast Asian football.

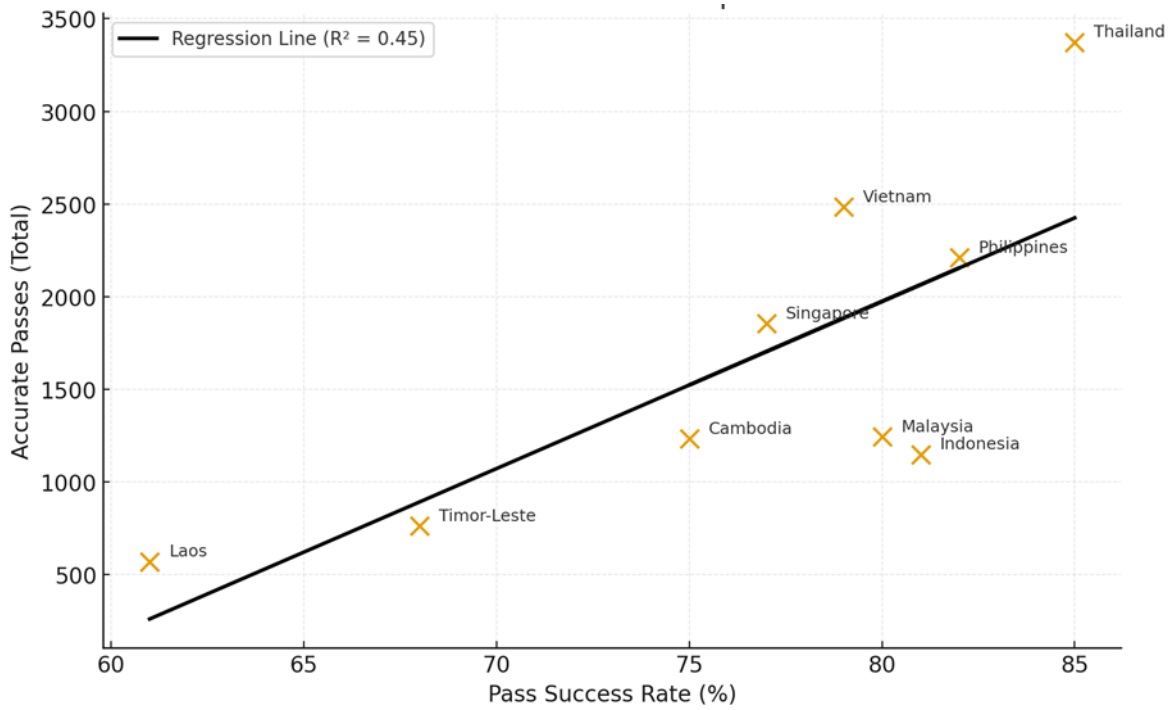

Figure 3. Regression Relationship between Pass Success Rate and Accurate Passes in the Mitsubishi Electric Cup 2024.

Discussion

Implications

The findings of this study emphasize that passing and crossing efficiency represent pivotal determinants of tactical success within Southeast Asian football, extending beyond regional dynamics to hold relevance in the global context of modern football analytics. The statistical patterns revealed in the analysis, particularly the positive correlations among pass success rate, crossing accuracy, and team performance outcomes, mirror well-established benchmarks observed in international competitions such as the FIFA World Cup and the UEFA European Championship. In these elite tournaments, the synchronization between passing precision and effective use of width is consistently linked to sustained competitive performance and strategic dominance (Otero-Saborido et al., 2024; Caicedo-Parada et al., 2025; Stafylidis et al., 2024a). By situating these relationships within the context of the Mitsubishi Electric Cup 2024, this study provides localized empirical evidence that contributes to the evolving global discourse on tactical evolution, performance efficiency, and data-driven coaching within football ecosystems (Moustakidis et al., 2023; Martín-Castellanos et al., 2025).

The quantitative outcomes indicate that maintaining a pass success rate above 80% is not merely a descriptive indicator of technical skill but a tactical requirement that underpins match control, tempo regulation, and defensive security. Teams that exhibit this threshold of accuracy consistently demonstrate structured transitions, reduced turnover frequency, and a higher

probability of converting possession into meaningful territorial or offensive advantage (Ramos Pérez et al., 2021; Modric et al., 2019). The high pass success rate observed in teams such as Thailand and Vietnam confirms that consistent ball circulation forms the basis of strategic superiority, particularly in competitions where positional fluidity and transition speed differentiate elite teams from mid-tier competitors. Vietnam's crossing accuracy of 60%, the highest in the tournament, reflects a disciplined adaptation of global tactical patterns where effective wide-play serves as both a creative and statistical instrument to generate high-quality scoring opportunities. This outcome parallels tactical developments in top European clubs, where crossing efficiency directly correlates with shot creation and final-third penetration (Vantarakis & Stafylidis, 2023; González-Rodenas et al., 2023).
Beyond confirming theoretical relationships, these findings offer tangible implications for applied football coaching and performance development within ASEAN contexts. The data reveal that technical efficiency and tactical adaptability must coexist within an integrated framework if regional teams are to evolve competitively. The results advocate for adopting data-informed training models that emphasize not only passing volume but also contextual precision, measuring player decision-making under time pressure, spatial awareness, and synchronized positional movement. Implementing such frameworks requires that national federations, coaching academies, and elite development programs embed Key Performance Indicators (KPIs) like pass accuracy, progression rate, and crossing precision into their player evaluation systems. These metrics should inform both tactical rehearsal sessions and player selection criteria, ensuring that data analytics are embedded as a continuous feedback mechanism rather than a post-match evaluation tool.

Furthermore, the findings underscore that technical drills must be systematically linked with tactical simulation. Passing exercises should replicate match-specific pressures such as opponent proximity, fatigue, or rapid directional shifts, allowing players to translate mechanical skill into situational competence. Similarly, crossing drills should integrate realistic spatial conditions, emphasizing timing, body orientation, and anticipatory cues from attacking teammates. These adaptations transform traditional drill-based training into performance-representative environments, enabling players to internalize tactical objectives through embodied repetition. Federations may also utilize video-assisted feedback and real-time data dashboards to review team distribution dynamics, allowing coaches to modify in-game strategies based on empirical observations. This integration of analytics with coaching pedagogy represents a crucial step toward bridging the persistent gap between theoretical understanding and practical application in Southeast Asian football (Coppola et al., 2019; Klemp et al., 2021).

The comparative interpretation of team-specific patterns provides additional insight into how different nations operationalize their tactical models. Thailand's high pass accuracy and volume (85% and 3,373 passes, respectively) exemplify a control-oriented philosophy that relies on possession dominance and strategic composure (Caicedo-Parada et al., 2025). This model demonstrates that maintaining rhythm through coordinated passing sequences can neutralize faster, transition-based opponents. In contrast, Vietnam's wide-play efficiency, reflected in its exceptional crossing accuracy, illustrates how structured flank play and overlapping full-backs can compensate for limitations in central penetration. These two examples represent viable tactical archetypes for the ASEAN region: possession-dominant control and width-driven penetration. However, other teams, such as Indonesia and Cambodia, displayed less cohesion between passing accuracy and output, suggesting inconsistency in transition phases and inadequate linkages between midfield build-up and final-third execution. These variations highlight the urgent need for hybrid tactical systems, where teams alternate between structured possession and opportunistic transitions depending on match state, opposition strategy, and game tempo.

From a policy and institutional perspective, the implications are equally significant. Football federations in the ASEAN region should establish centralized performance analysis units responsible for collecting, interpreting, and disseminating tactical data to both professional and developmental programs. The incorporation of artificial intelligence-assisted tracking and spatiotemporal analytics could elevate analytical depth by revealing interaction patterns, off-ball positioning, and network centrality among players. These insights can inform both macro-level decisions, such as national training priorities, and micro-level interventions, including position-specific tactical instructions. Such institutional measures will accelerate the standardization of evidence-based coaching

frameworks, aligning regional football development with international analytical and tactical paradigms.

Critically, the findings also reflect an underlying shift in football philosophy within Southeast Asia from reactive, instinctive play toward proactive, data-literate tactical intelligence. The evidence shows that competitive performance is no longer determined by athleticism or effort alone but increasingly by cognitive awareness, spatial adaptability, and technical precision under pressure. Embedding these principles in grassroots academies, university programs, and elite national teams will enable a more consistent and sustainable talent pipeline, cultivating players who understand both the why and how of tactical execution. As football continues to globalize through shared analytics and strategic exchange, Southeast Asian nations must position themselves not as passive learners but as active contributors to the global football knowledge ecosystem.

In conclusion, the outcomes of this study extend beyond empirical observation. They advocate for a systemic transformation in how Southeast Asian football conceptualizes and measures success, shifting from raw physical metrics to integrated tactical intelligence grounded in measurable efficiency. The integration of passing precision and crossing quality as key evaluative dimensions provides both theoretical and practical direction for coaches, analysts, and governing bodies. These findings confirm that distribution precision, rather than density, serves as the primary determinant of tactical success, reaffirming that quality-oriented possession, adaptive spacing, and coordinated width exploitation must form the foundation of ASEAN football's modern identity. Implemented effectively, this approach can close the competitive gap with higher-ranked nations, fostering a regional football culture defined by analytical awareness, tactical coherence, and sustainable performance excellence.

Research Contributions

This study offers an original and multi-layered contribution to the growing field of football performance analytics, both empirically and conceptually, by situating Southeast Asian football within a framework traditionally dominated by European data and theoretical assumptions. Its significance lies not only in the statistical results but also in the methodological and contextual advancement it introduces to sports science discourse.

Empirically, the study presents one of the first large-scale, systematically validated datasets on passing and crossing efficiency across all ten national teams competing in a major Southeast Asian tournament. Unlike prior studies that draw from fragmented or single-team samples, this research applied a full-population approach that eliminates sampling bias and enhances comparative validity. By employing cross-verified data sources, official ASEAN Football Federation (AFF) match reports, and external tracking systems, the study establishes a reliable model for performance monitoring within developing football nations. This dataset is not merely descriptive; it provides a benchmark for future regional analytics and a replicable foundation for longitudinal performance assessment. In practical terms, this empirical base supports a transition from anecdotal coaching judgments toward evidence-based tactical management, a critical evolution for sports systems aspiring to international parity (Caicedo-Parada et al., 2025; Ramos Pérez et al., 2021; Moustakidis et al., 2023).

Conceptually, the study advances football analytics by reframing established European-centric frameworks through the lens of regional playing realities. Most football research treats passing accuracy and crossing efficiency as universal constants. Still, this study demonstrates that these variables acquire distinct meanings in tropical, high-humidity, and high-tempo conditions characteristic of Southeast Asian competitions. The integration of micro-level technical indicators, accurate passes, and crossing precision with macro-level competitive outcomes, such as final team rankings, produces a scalable model that allows tactical efficiency to be interpreted contextually rather than comparatively. This shift encourages scholars and analysts to acknowledge the environmental and cultural contingencies of performance, extending the global understanding of football analytics beyond its Eurocentric foundations (Kempe et al., 2018; Muñoz et al., 2024b; González-Rodenas et al., 2023; Martín-Castellanos et al., 2025, Sharma & Gera, 2025).

The study's methodological novelty also strengthens its contribution. Through a combination of regression-based modeling, correlation analysis, and descriptive mapping, the research connects technical execution with competitive outcomes in a transparent and reproducible manner. The use of a full-population design ensures that the findings reflect the true variability of regional football

performance rather than selective or idealized samples. By standardizing data cleaning and cross-verification procedures, the research sets a quality benchmark for sports analytics in emerging football nations, promoting consistency in how match statistics are gathered, interpreted, and communicated. This level of methodological transparency serves as a reference for regional federations seeking to integrate analytical tools into their developmental programs (Jacinto et al., 2024; Stafylidis et al., 2024a; Modric et al., 2019).

Beyond technical advancement, the study contributes a strategic and pedagogical dimension to the field. It translates complex statistical outcomes into actionable insights for coaches, analysts, and policy makers. The analytical model proposed, which links passing precision, crossing accuracy, and tactical outcomes, serves as a practical decision-support framework that federations can implement to evaluate coaching effectiveness, talent development, and competitive readiness. For example, maintaining a pass success rate above 80% is not just an academic observation but an actionable target that coaches can integrate into training drills, match evaluation criteria, and player assessment protocols. In this sense, the study bridges the persistent divide between sports science research and on-field application.

In broader disciplinary terms, this research expands the epistemological boundaries of sports analytics by positioning Southeast Asian football as a valid site of scientific inquiry rather than a peripheral or derivative subject. The methodological rigor and contextual specificity showcased here demonstrate that high-quality data analysis can emerge from developing football systems, challenging the assumption that innovation in performance analytics is exclusive to elite European leagues. This repositioning empowers local institutions to produce knowledge that is both globally comparable and regionally grounded, reinforcing the academic sovereignty of ASEAN sports research (Klemp et al., 2021; Tienza-Valverde et al., 2023; Caicedo-Parada et al., 2025).

Furthermore, the study's conceptual synthesis linking statistical efficiency with cultural and tactical interpretation contributes to the theoretical development of football performance science. It encourages future studies to move beyond mechanical descriptions of player behavior toward more integrated models of decision-making, adaptability, and tactical intelligence. By doing so, it connects quantitative analytics with the psychological and sociocultural dimensions of sport, paving the way for interdisciplinary approaches that unite performance science, coaching education, and applied technology. The novelty of this study, therefore, lies in three intertwined achievements: Establishing the first empirically verified analytical model for passing and crossing efficiency in Southeast Asian football; Providing a contextual reinterpretation of global tactical principles, aligning them with the realities of regional play; Creating a replicable methodological standard that can inform both academic inquiry and practical decision-making in coaching, federation policy, and talent development.

Collectively, these contributions mark a step forward for the sports analytics community by bridging scientific precision with applied coaching insight. The study not only enriches global football literature but also signals a paradigm shift in how data are used to shape strategy, pedagogy, and policy in emerging football regions. By framing performance analysis within a regional identity, it offers a sustainable pathway for ASEAN football to cultivate a data-driven, culturally intelligent, and tactically progressive sporting ecosystem.

Limitations

Despite its strengths, this study acknowledges several limitations inherent in its design and context. First, the analysis is constrained by match-context dependence, as factors such as defensive pressure, tactical variations, and situational play conditions were not directly controlled. These contextual dynamics may influence the observed relationships between distribution efficiency and performance outcomes. Second, the study focuses exclusively on team-level metrics, excluding individual player contributions that could reveal more profound insights into decision-making, positional play, and passing behavior. Player-level tracking or positional heat mapping could strengthen future analyses of tactical networks and decision-making under pressure.

Third, the scope of the data is limited to a single tournament, the Mitsubishi Electric Cup 2024, which, although representative of ASEAN football, may not fully capture longitudinal or cross-continental performance patterns. However, these limitations also provide valuable directions for future inquiry. Recognizing such constraints is essential not as a weakness, but as a reflection of

methodological honesty and a basis for extending research toward more comprehensive, multi-tournament, and player-specific investigations.

Suggestions

This study opens new directions for football performance research in Southeast Asia. The findings show that passing and crossing efficiency are not only tactically essential but also helpful in developing data-based training and policy improvements. Future studies should move beyond simple statistics and use AI-assisted tracking and spatiotemporal modeling to analyze player movement, ball trajectory, and space use in real time. This approach can create intelligent performance profiles that predict tactical success, supported by broader datasets from tournaments such as the AFC Asian Cup and SEA Games. Research should also include human-centered aspects by integrating cognitive and biomechanical data—such as heat maps, decision-making patterns, and neuromotor activity—to understand how perception and anticipation affect performance (Piskin et al., 2024; Forcher et al., 2021). Environmental factors like heat and humidity must be considered to model realistic match conditions. Practically, ASEAN football federations should develop Performance Intelligence Units (PIUs) to collect and interpret data locally, reducing dependence on foreign systems (Modric et al., 2019; Moustakidis et al., 2023). Finally, analytics training should become part of coach certification. By combining scientific rigor, technology, and regional context, Southeast Asian football can build its own analytical identity—transforming data into strategic insight.

CONCLUSION

This study concludes that passing precision and crossing efficiency operate as interdependent tactical mechanisms shaping football performance in Southeast Asia. Accurate passing and effective wide-play are key to maintaining possession, controlling tempo, and generating scoring chances. Teams like Thailand and Vietnam exemplified how consistent passing accuracy and intelligent crossing improve cohesion and outcomes. Statistical evidence confirmed that pass success predicts possession volume, while crossing accuracy enhances chance creation, aligning with global football analytics. These insights highlight the need for ASEAN coaching programs to integrate data-driven KPIs—such as pass accuracy, crossing precision, and tempo management—into training and evaluation. Scenario-based passing drills, dynamic crossing under pressure, and transition play can translate findings into tactical improvement. Despite limitations related to aggregate data and coding reliability, future research should employ AI-assisted player tracking and spatiotemporal analysis across tournaments like the AFC Asian Cup and SEA Games. Overall, this study provides a conceptual and practical roadmap for strengthening Southeast Asian football through evidence-based performance analytics and coaching innovation.

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AUTHOR CONTRIBUTION STATEMENT

MNN and AO contributed to the introduction, interpretation of results, and discussion of this study. RMM and LX assisted with proofreading and statistics.

AI DISCLOSURE STATEMENT

The author utilized Quillbot to improve the clarity, structure, and overall flow of the manuscript during its preparation. After using Quillbot, the author carefully reviewed and manually edited the content to ensure accuracy and quality, assuming full responsibility for the final version of the publication. The authors affirm that the research was conceptualized, conducted, written, and edited without the assistance of artificial intelligence.

CONFLICTS OF INTEREST

The authors declare that they have no financial, institutional, or personal conflicts of interest that could have influenced the conduct of this study, the analysis of the data, the preparation of the manuscript, or its publication.

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