e-ISSN: 2600-7568

Available online at
https://gadingssuitm.com/index.php/gadingss

GADING Journal for the Social Sciences 29(1) 2026, 376 – 388

GADING Journal for the Social Sciences

Comparative Analysis of Selected Performance Indicators between the Top Two Teams in the 2023 Rugby World Cup

Norasrudin Sulaiman[1*], Nor Sharizat Shariman[2], Rahmat Adnan[3], Shariman Ismadi Ismail[4], Mohd. Zulkhairi Mohd. Azam[5], Muhammad Hazwan Abdul Rahman[6]

[1.2.3.4.5]*Faculty of Sport Science and Recreation, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia.*
[6]*Unit of Performance Analysis, National Sport Institute, Bukit Jalil, 57000 Kuala Lumpur, Malaysia.*

ARTICLE INFO

Article history:
Received 23 November 2025
Revised 18 April 2026
Accepted 26 April 2026
Online first
Published 30 April 2026

Keywords:
performance analysis
performance indicators
Rugby World Cup 2023
notational analysis
Rugby Union

DOI:
https://doi.org/10.24191/gading.v290i1.753

ABSTRACT

Performance indicators (PI's) are widely used to understand the match outcome and team strategies in elite rugby 15-a-side competition. This research investigates the differences in selected performance indicators among top two team compete in Rugby World Cup 2023. A total of 14 matches (n=14) involving both team from group match until final was analysed with using hand notational analysis. The analysis based on 23 selected performance indicators namely; scrum, scrum won, percentage of scrum, percentage of scrum over playing time, maul, maul won, percentage of maul won, percentage of maul over playing time lineout, lineout won, lineout steal, percentage of lineout won, percentage of lineout won over playing time, try, point scored, percentage of point scored over playing time, tackle made, tackle missed, Percentage of tackle miss, defenders beat, offloads, red card, yellow cards. The data were analysed with using the IBM Statistical Package for Social Science (SPSS), version 29 with the significant value set at $p \leq 0.05$. In conclusion, result demonstrate there are a significant different between top two team in percentage of lineout won, defender beaten and tackle miss while the rest of the PI's shows no significant difference among them. The findings may provide valuable insight for coached in formulating an effective training programme.

1. INTRODUCTION

This study examines key performance indicators (PIs) in the two leading teams at the 2023 Rugby World Cup, aiming to clarify how tactical execution and physical demands differ at the highest level of competition. While performance analysis in rugby union has developed considerably, there remains limited insight into the specific match behaviours that distinguish top teams in major tournaments. To address this, selected PIs were analysed alongside key contextual factors, including match status and opposition quality. A quantitative notational analysis approach was applied to identify meaningful differences in performance.

[1*] Corresponding author. Norasrudin Sulaiman. *E-mail address*: noras878@uitm.edu.my

The findings reveal clear contrasts in the performance profiles of the two finalists, providing practical insights to support tactical preparation and performance optimisation in elite rugby environments.

Rugby union is widely regarded as one of the most physically demanding team sports, involving frequent high-intensity collisions, structured tactical play, and continuously evolving game strategies (Bunker, 2020). Since its introduction in 1987, the Rugby World Cup has become the sport's most important international competition, with the 2023 tournament in France drawing global attention. The sustained success of teams such as New Zealand and South Africa reflects the level of consistency and adaptability required to win at this level. Over time, the game itself has changed considerably. For example, Bunker (2020) reported a substantial increase in ball-in-play time between 1995 and 2011, indicating a faster and more physically demanding style of play. These changes have driven a shift in coaching practice, with greater reliance on systematic performance analysis rather than intuition alone.

Performance analysis in rugby union has developed from simple descriptive statistics into more structured and detailed systems of tactical evaluation. Early work by Hughes and colleagues emphasised the need for clear operational definitions before conducting notational analysis (Hughes et al., 2011). More recent studies have extended this approach by incorporating contextual variables that influence performance. For instance, Wedding et al. (2023) showed that factors such as match status, opposition strength, and venue can significantly shape team behaviour. Similarly, Watson et al. (2022) identified differences in ball-in-play characteristics across competition levels, while Jones et al. (2015) demonstrated that tactical patterns vary between winning and losing teams, particularly across different tournament stages. However, most existing studies analyse performance across broad samples or entire competitions, rather than focusing specifically on the top teams within the same tournament. As a result, there is limited evidence to guide preparation against elite-level opposition.

In rugby union, performance indicators refer to the observable and measurable elements of match play, such as tackles, rucks, mauls, scrums, lineouts, possession, and scoring outcomes (Hughes et al., 2011). These indicators can be analysed individually or compared directly between teams to evaluate performance. In this study, "top-ranked teams" denotes those that finished first and second in the 2023 Rugby World Cup, with final position used as a proxy for elite performance. Match status is defined by the scoreline at given moments in the game (leading, tied, or trailing), while contextual variables include opposition ranking and stage of competition (pool or knockout). A recurring limitation in the literature is the limited focus on performance at the highest competitive level. Studies that aggregate data across teams, tournaments, and contexts often miss the specific traits that separate championship-winning sides from the rest. As a result, it becomes difficult for coaches to identify the benchmarks required for success in major tournaments. Two research questions guided the analysis: (1) Are there significant differences between the champion and the runner-up? and (2) which indicators best distinguish them. Which performance indicators best distinguish between the two teams?

The present study contributes to the literature by isolating performance differences at the top end of international rugby. Rather than examining a broad or mixed sample, it focuses solely on the two teams that reached the final of the 2023 Rugby World Cup, while controlling for contextual influences. This approach provides more precise benchmarks for coaches and analysts involved in high-performance environments. The findings can inform tactical planning, training design, and opponent-specific strategies. From a methodological perspective, the study adopts a positivist stance, treating match data as objective evidence that can be systematically coded and analysed. Performance is viewed as a measurable outcome, although it is recognised that contextual factors influence how these behaviours translate into match results. This perspective supports the use of quantitative methods and allows the findings to be applied to similar elite competition settings.

2. LITERATURE REVIEW

The Rugby World Cup (RWC) is the highest level of international rugby, held every four years and contested by twenty nations. The 2023 tournament is especially useful to study because it was the first

https://doi.org/10.24191/gading.v29i1.753

major event after the COVID-19 pandemic, offering a fresh look at elite performance under current playing conditions. Despite its importance, there is still limited research on the performance indicators that separate the very best teams in World Cup competition. This study helps address that gap by comparing the champions, South Africa, and the runners-up, New Zealand, to identify the key technical and tactical factors behind success at the highest level.

Performance indicators (PIs) are the measurable elements used to assess how well teams and players perform. As highlighted by Hughes et al. (2011), clear and consistent definitions of these behaviours are essential for reliable analysis. In rugby, common PIs include tackles made, rucks contested, mauls retained, scrum success, lineout efficiency, possession, and territory. To ensure accuracy, these indicators need to be coded carefully and, where possible, validated with coaching staff (Hughes et al., 2011). Although these measures are widely used in both domestic and international rugby, their importance can change depending on the level of competition and the specific match context.

Previous research shows that certain PIs are linked to winning, but these relationships are not always consistent. For example, Bunker (2020) found that successful playoff teams tend to be involved in fewer rucks, while higher ruck numbers are more common in group-stage wins. Colomer et al. (2020) identified several key predictors of success in international tournaments, including lineout success on opposition throws, tries scored, conversion rates, line breaks, tackles completed, turnovers won, and possession. More recently, Wedding et al. (2023) added context to this understanding by showing how factors such as match status, quality of opposition, and positional roles influence performance. Their findings suggest that forwards often perform more high-intensity transitions than backs, and that tactical decisions shift under pressure.

However, most of this research focuses on domestic competitions or combines data from multiple international tournaments. As a result, it misses the opportunity to examine what makes teams successful within a single World Cup. No study has directly compared the champion and runner-up teams in the same tournament. This study addresses that gap by exploring how South Africa and New Zealand differed across key performance areas during the 2023 Rugby World Cup. By doing so, it aims to clarify whether winning at this level is driven more by technical execution, tactical choices, or the ability to perform under specific match conditions. These insights can help refine both performance analysis and coaching practice in elite rugby.

Performance analysis in rugby union is grounded in the theoretical framework of notational analysis, developed to address a fundamental limitation in human observation namely, the inconsistency and inaccuracy of memory when recalling complex match events (Hughes & Franks, 2004). Within this framework, systematic observation and objective measurement form the basis for identifying performance indicators (PIs), defined as observable and quantifiable behaviours that distinguish successful from unsuccessful outcomes. As highlighted by Hughes et al. (2011), the use of clearly defined variables and validated coding protocols is essential to ensure analytical reliability. This process shifts performance evaluation away from subjective coaching impressions towards evidence-based assessment. While this theoretical foundation underpins much of contemporary rugby research, recent scholarship has raised concerns about how consistently these principles are applied in practice.

Empirical studies have identified a range of PIs that differentiate winning from losing teams in elite rugby. Key indicators such as tries scored, offloads, line breaks, tackle success, and set-piece efficiency have been consistently associated with match success (Nicholls et al., 2024). In addition, relative performance indicators where team performance is evaluated in relation to the opposition have been shown to provide stronger predictive value than absolute metrics alone (Scott et al., 2023). However, these relationships are not stable across contexts. For example, Bunker (2020) reported that successful teams in knockout stages engaged in fewer rucks compared to those winning in earlier rounds, suggesting a shift in tactical approach as competition intensity increases. Similarly, analysis of the 2023 Rugby World Cup indicated that the effectiveness of ball possession varied significantly between winning and losing teams,

https://doi.org/10.24191/gading.v29i1.753

challenging the assumption that commonly cited indicators hold universal relevance (Villarejo-García et al., 2026).

Such inconsistencies point to a broader methodological limitation within the literature: insufficient consideration of contextual variables. A systematic review by den Hollander et al. (2020) found that more than half of the studies examined relied on univariate analyses, failing to account for key situational factors such as opposition quality, match location, and stage of competition. This lack of contextualisation can lead to misleading interpretations, as performance behaviours are inherently shaped by environmental and competitive constraints. Supporting this view, Wedding et al. (2023) demonstrated that tactical decision-making is influenced by match status, positional demands, and the relative strength of the opposition. These findings suggest that performance indicators cannot be interpreted in isolation, as their significance varies depending on the specific match context.

Within Rugby World Cup (RWC) research, this issue is particularly evident. Existing studies often aggregate data across multiple tournaments (e.g., Colomer et al., 2020), compare group and knockout stages within a single competition (Bunker & Spencer, 2020), or analyse dominant teams against weaker opposition. While such approaches provide broad insights, they introduce confounding factors related to rule changes, evolving tactical trends, and varying competitive standards over time. Studies examining RWC finals between 1987 and 2015 have identified both attacking output and defensive efficiency as key discriminators of success; however, combining data across different eras limits the specificity and applicability of these findings. Notably, there remains an absence of research directly comparing the champion and runner-up within a single tournament. This represents a critical gap, as finalists compete under equivalent conditions and against opposition of comparable quality, offering a more precise context for identifying performance determinants at the highest level.

The 2023 Rugby World Cup provides a valuable opportunity to address this limitation. As a contemporary tournament conducted within a consistent regulatory and tactical environment, it allows for a focused examination of elite performance without the confounding influence of historical variation. A direct comparison between South Africa and New Zealand, the champion and runner-up, enables analysis within a controlled elite-performance context. This approach isolates the marginal differences that separate championship success from near-success, offering insight into whether outcomes are driven primarily by technical execution, tactical decision-making, or the ability to perform effectively under high-pressure conditions.

Accordingly, this study aims to contribute to the field of rugby performance analysis by presenting a focused comparison between the top two teams of a single Rugby World Cup. By integrating validated performance indicators with contextual analysis, it seeks to clarify the mechanisms underpinning success at the highest level of the game. The findings are expected to extend current theoretical understanding while providing practical implications for coaching, performance analysis, and athlete development pathways.

3. METHODOLOGY

3.1. Research Approach and Rationale

This study used a quantitative approach to examine performance differences between elite rugby union teams at the 2023 Rugby World Cup. Quantitative methods allow for systematic measurement and statistical comparison of discrete performance events, generating evidence that can inform coaching practice (O'Donoghue, 2010). The study is grounded in a positivist perspective, assuming that performance can be objectively captured through observable and countable actions derived from video analysis (Hughes & Franks, 2008).

In team sports, performance analysis relies on quantifying tactical and technical behaviours to distinguish successful teams from less successful ones (Lago-Peñas et al., 2010). Rugby union is well suited to this approach due to its structured phases, such as scrums, lineouts, and tackles. These features allow for consistent observation and measurement. Accordingly, this study focuses on identifying performance

https://doi.org/10.24191/gading.v29i1.753

indicators that differentiate championship-level teams, a question best addressed through numerical comparison rather than interpretive methods.

A purely quantitative design was selected to align with the research aim and practical constraints. While qualitative insights (e.g., coaching decisions or player perceptions) could add context, the study prioritises measurable performance outcomes (Vaz et al., 2010). In addition, reliance on secondary video data limits opportunities for direct participant engagement.

3.2 Research Design

The design specifically involves comparative observational analysis, contrasting performance indicators between the champion and runner-up across multiple matches. Tracking both teams over seven matches provide a more complete picture than single-match analysis, capturing consistency and tactical changes throughout the tournament (Jones et al., 2004).

Focusing on the top two teams reflects the study's emphasis on elite performance. Differences at this level are often marginal, and including lower-ranked teams could mask these distinctions. This approach is consistent with research on expert performance (Ericsson, 2006).

3.3 Study Context and Setting

Data were drawn from the 2023 Rugby World Cup in France (8 September–28 October 2023), involving twenty national teams. South Africa (champion) and New Zealand (runner-up) were selected based on final standings, with South Africa winning the final 12–11. The tournament structure provides a realistic high-performance environment, with teams facing varied opponents and increasing pressure across stages. This variation strengthens external validity, as findings reflect performance under different competitive demands rather than isolated matches. Differences in venue, weather, and playing style introduce variability, but also enhance relevance to real-world elite rugby contexts (Williams & Kendall, 2007).

3.4 Target Population and Data Sources

The target population included all knockout-stage teams (n=8), while the accessible sample consisted of matches played by the top two teams. The primary data source was full-match video recordings obtained from a third-party platform compiling Rugby World Cup footage. Each video covered the entire match, allowing all relevant performance indicators to be coded. The dataset included fourteen matches, seven match's for South Africa (n=7) and 7 matches for New Zealand. Inclusion criteria were official tournament matches with complete, high-quality footage involving either team. Exclusion criteria included incomplete recordings, poor-quality footage, and non-tournament matches.

3.5 Sampling Strategy and Justification

A purposive census approach was used, analysing all available matches for both teams. This avoids selection bias and captures full performance trajectories across the tournament (Battaglia, 2008). Restricting the sample to finalists aligns with the study's focus on elite-level differences. Including all teams would introduce wider variability and reduce sensitivity to subtle distinctions between top performers (Vaz et al., 2010).

The dataset comprised 14 matches and 23 indicators per match (322 data points). While modest, this aligns with typical sample sizes in rugby performance analysis. The number of matches is sufficient to capture variation while remaining manageable for detailed coding. Post-hoc power analysis (G*Power 3.1) indicated acceptable power (0.70) for detecting large effects (d=1.0), consistent with effect sizes reported in rugby literature.

https://doi.org/10.24191/gading.v29i1.753

3.6 Data Collection Methods and Instruments

Data were collected using systematic hand notation analysis, a standard method in rugby performance research (Hughes & Franks, 2004). Trained observers repeatedly reviewed match footage to record performance indicators. Twenty-three indicators were selected based on established frameworks (Jones et al., 2004; Vaz et al., 2010; Ortega et al., 2009). The twenty-three selected performance indicators including; scrum, scrum won, percentage of scrum, percentage of scrum over playing time, maul, maul won, percentage of maul won, percentage of maul over playing time lineout, lineout won, lineout steal, percentage of lineout won, percentage of lineout won over playing time, try, point scored, percentage of point scored over playing time, tackle made, tackle missed, Percentage of tackle miss, defenders beat, offloads, red card and yellow cards.

All indicators were clearly defined using World Rugby guidelines. A structured Excel coding sheet was developed to organise data, including match details, indicator values, calculated percentages, and notes. Pilot testing on two matches helped refine definitions, particularly for ambiguous events such as mauls.

3.7 Data Analysis

Data analysis combined descriptive and inferential approaches using SPSS. Descriptive statistics, including means, standard deviations, and frequencies, were used to summarise team performance and to build overall performance profiles for direct comparison across indicators. Normality was assessed using the Shapiro–Wilk test. Where assumptions were satisfied, independent samples t-tests were applied; otherwise, Mann–Whitney U tests were used. Statistical significance was set at $\alpha = 0.05$. Effect sizes (Cohen's d and r) were calculated to provide insight into the practical relevance of observed differences. Given the number of comparisons, results are presented with both unadjusted p-values and Bonferroni-adjusted thresholds. No missing data were observed in the dataset.

4. FINDING & DISCUSSION

The objective of this study is to identify the differences in selected performance indicators among the top two ranking in RWC 2026. The independent variable is the ranking (New Zealand and South Africa), while the dependent variable comprises the selected PI's.

4.1 Descriptive Statistical Analysis

The video and notational analysis data are subsequently examined using means and standard deviation (SD). The mean represents central tendency, while the standard deviation measures variability. The research compares the top two ranked teams in the Rugby World Cup 2023. The detailed analysis is presented in table below:

Table 1. Descriptive statistics of the top two ranking teams in Rugby World Cup 2023

Performance Indicators	Group (Teams)			
	South Africa		New Zealand	
	Mean	SD	Mean	SD
Scrum	12.57	2.15	10.00	2.71
Scrum Won	7.57	2.15	5.86	2.34
Percentage of Scrum Won	60.15	16.40	61.51	24.49
Percentage of Scrum over Playing Time	15.71	2.69	12.50	3.39
Maul	8.29	4.11	6.71	4.31
Maul Won	5.43	4.61	4.14	3.19
Percentage of Maul Won	55.50	27.31	51.49	31.53
Percentage of Maul over Playing Time	10.36	5.14	8.39	5.39
Lineout	27.86	5.18	23.29	6.26
Lineout Won	12.29	6.18	13.00	4.83

https://doi.org/10.24191/gading.v29i1.753

Lineout Steal	1.00	0.82	2.00	1.16
Percentage of Lineout Won	42.68	18.08	55.32	10.32
Percentage of Lineout over Playing Time	34.82	6.47	29.11	7.83
Try	3.86	4.30	7.00	5.13
Point Scored	29.71	24.58	48.00	32.83
Percentage of Point Scored over Playing Time	37.14	30.73	60.00	41.04
Tackle Made	138.86	38.47	123.43	58.49
Tackle Missed	24.86	9.49	15.43	8.14
Percentage of Tackle Missed	17.97	4.68	12.52	2.53
Defenders Beat	15.43	5.00	30.00	10.12
Offloads	6.00	2.58	10.71	4.96
Red Card	0.00	0.00	0.29	0.49
Yellow Card	0.43	0.79	0.57	0.79

Table 1 presents descriptive statistics for the top two ranked teams in the Rugby World Cup 2023. The study analysed 23 performance indicators, as listed in the table. Notably, South Africa exhibits the highest scrum rate (Mean±SD, 12.57±2.15), followed by New Zealand (10.00±2.71). Conversely, New Zealand has the lowest scrum won rate (5.86±2.34), compared to South Africa (7.57±2.15). In terms of maul performance, South Africa outperforms New Zealand with rates of 8.29±4.11 and 6.71±4.31, respectively. Similarly, South Africa excels in mauls won (5.43±4.61) compared to New Zealand (4.14±3.19). Additionally, South Africa dominates in lineouts (27.86±5.18) compared to New Zealand (23.29±6.26). When it comes to tackles made and tackles missed, South Africa maintains the highest rates: 138.86±38.47 and 24.86±9.49, respectively, while New Zealand has the lowest rates: 123.43±58.49 and 15.43±8.14.

New Zealand boasts the highest lineout steal rate (2.00±1.16), surpassing South Africa's rate of 1.00±0.82. In terms of lineout success, South Africa has the lowest percentage of lineouts won (42.68±18.08), while New Zealand performs better at 55.32±10.32. When it comes to tries scored, New Zealand leads with a rate of 7.00±5.13, compared to South Africa's 3.86±4.30. Additionally, New Zealand excels in points scored (48.00±32.83) and the percentage of points scored over playing time (60.00±41.04), whereas South Africa achieves rates of 29.71±24.58 and 37.14±30.73, respectively. In terms of defenders beaten, New Zealand maintains the highest rate (30.00±10.12), while South Africa has the lowest rate (15.43±5.00). Lastly, South Africa records the lowest rate for offloads (6.00±2.58), whereas New Zealand's rate is higher at 10.71±4.96.

4.2. Normality Test

Inferential statistics involves drawing conclusions about a larger population based on data from a sample. Confidence in the sample's accuracy in reflecting the population is crucial. To assess normality, the Shapiro-Wilk test is applied to the 23 selected performance indicators. Table two reveals that 19 indicators are normally distributed (including scrum, percentage of scrum won, percentage of scrum over playing time, maul, maul won, percentage of maul won, percentage of maul over playing time, lineout, lineout won, lineout steal, percentage of lineout won, percentage of lineout over playing time, try, point scored, percentage of point scored over playing time, tackle made, percentage of tackle missed, defenders beat, and offloads), while four indicators (scrum won, tackle missed, red card, and yellow card) are not. For normally distributed data, the Independent T-test is used, while the Mann-Whitney U-test is employed for non-normally distributed data. The details are as shown in the Table 2.

https://doi.org/10.24191/gading.v29i1.753

Table 2. Normality Test of the Selected Performance Indicators

Performance Indicators	Group (Teams)			
	SOUTH AFRICA		NEW ZEALAND	
	Shapiro-Wilk		Shapiro-Wilk	
	df	Sig.	df	Sig.
Scrum	7	0.25	7	0.42
Scrum Won	7	0.01	7	0.25
Percentage of Scrum Won	7	0.22	7	0.90
Percentage of Scrum over Playing Time	7	0.25	7	042
Maul	7	0.84	7	0.85
Maul Won	7	014	7	0.29
Percentage of Maul Won	7	0.38	7	1.00
Percentage of Maul over Playing Time	7	0.84	7	0.85
Lineout	7	0.06	7	0.39
Lineout Won	7	0.18	7	0.30
Lineout Steal	7	0.14	7	0.14
Percentage of Lineout Won	7	0.25	7	0.27
Percentage of Lineout over Playing Time	7	0.06	7	0.39
Try	7	0.13	7	0.36
Point Scored	7	0.12	7	0.48
Percentage of Point Scored over Playing Time	7	0.12	7	0.48
Tackle Made	7	0.82	7	0.05
Tackle Missed	7	0.01	7	0.04
Percentage of Tackle Missed	7	0.16	7	0.59
Defenders Beat	7	0.44	7	0.20
Offloads	7	0.40	7	0.76
Red Card	7	0	7	0
Yellow Card	7	0	7	0.02

4.3. Hypothesis Testing

This section compares key performance indicators between the champions, South Africa (n=7), and the runners-up, New Zealand (n=7), across all matches in the 2023 Rugby World Cup. Independent t-tests were used for normally distributed data, while Mann–Whitney U-tests were applied where normality was not met. Statistical significance was set at $p \leq 0.05$, with full results reported in Table 3.

Table 3. Inferential Statistic Comparing Team Based on Team Ranking

Performance Indicators	Total (n=14)	South Africa (n=7)	New Zealand (n=7)	95% Confidence Interval		Sig.
	Mean (Std. Deviation)	Mean (Std. Deviation)	Mean (Std. Deviation)	Lower	Upper	
Scrum	11.29 (2.70)	12.57 (2.15)	10.00 (2.71)	-0.09	2.16	0.67[t]
Scrum Won	6.71 (2.34)	7.57 (2.15)	5.86 (2.34)	-0.34	1.84	0.24[w]
Percentage of Scrum Won	60.83 (20.04)	60.15 (16.40)	61.51 (24.49)	-1.11	0.98	0.29[t]
Percentage of Scrum Over Playing Time	14.11 (3.38)	15.71 (2.69)	12.50 (3.39)	-0.09	2.16	0.67[t]
Maul	7.50 (4.13)	8.29 (4.11)	6.71 (4.31)	-0.69	1.42	0.95[t]
Maul Won	4.79 (3.87)	5.43 (4.61)	4.14 (3.19)	-0.74	1.37	0.18[t]
Percentage of Maul Won	53.50 (28.41)	55.50 (27.31)	51.49 (31.53)	-0.92	1.18	0.92[t]
Percentage of Maul Over Playing Time	9.38 (5.16)	10.36 (5.14)	8.39 (5.39)	-0.69	1.42	0.95[t]
Lineout	25.57 (6.01)	27.86 (5.18)	23.29 (6.26)	-0.31	1.87	0.35[t]

https://doi.org/10.24191/gading.v29i1.753

Lineout Won	12.64 (5.34)	12.29 (6.18)	13.00 (4.83)	-1.18	0.92	0.25 [t]
Lineout Steal	1.50 (1.09)	1.00 (0.82)	2.00 (1.56)	-2.10	0.14	0.40 [t]
Percentage of Lineout Won	49.00 (15.59)	42.68 (18.08)	55.32 (10.32)	-1.94	0.26	**0.04** [t]
Percentage of Lineout Over Playing Time	31.96 (7.51)	34.82 (6.47)	29.11 (7.83)	-0.313	1.87	0.35 [t]
Try	5.43 (4.83)	3.86 (4.30)	7.00 (5.13)	-1.73	0.43	0.43 [t]
Point Scored	38.86 (29.44)	29.71 (24.58)	48.00 (32.83)	-1.70	0.46	0.27 [t]
Percentage of Point Scored Over Playing Time	48.57 (36.79)	37.14 (30.73)	60.00 (41.04)	-1.70	0.46	0.27 [t]
Tackle Made	131.14 (48.23)	138.86 (38.47)	123.43 (58.49)	-0.75	1.36	0.20 [t]
Tackle Missed	20.14 (9.81)	24.86 (9.49)	15.43 (8.14)	-0.08	2.18	0.05 [w]
Percentage of Tackle Missed	15.25 (4.59)	17.97 (4.68)	12.52 (2.53)	0.23	2.62	0.13 [t]
Defenders Beat	22.71 (10.77)	15.43 (5.00)	30.00 (10.12)	-3.07	-0.53	0.03 [t]
Offloads	8.36 (4.52)	6.00 (2.58)	10.71 (4.96)	-2.32	-0.02	0.06 [t]
Red Card	0.14 (0.36)	0.00 (0.00)	0.29 (0.49)	-1.91	0.29	0.14 [w]
Yellow Card	0.50 (0.76)	0.43 (0.79)	0.57 (0.79)	-1.23	0.87	0.65 [w]

[t] - Independent T-Test, [w] - Mann-Whitney U-Test

4.4 Set-piece Performance

Overall, the set-piece offered little to separate the two teams. Scrum involvement was similar, with no meaningful difference in frequency between South Africa (M=12.57, SD=2.15) and New Zealand (M=10.00, SD=2.71). Measures of scrum success for both team in absolute terms and as percentages also showed no clear distinction. A similar pattern appeared in maul performance. The number of mauls, outcomes, and efficiency rates were closely matched, with neither team holding a statistical advantage across these indicators. The lineout, however, told a slightly different story. While total lineouts, successful throws, and steals were broadly comparable, lineout efficiency emerged as one of the few points of difference. New Zealand recorded a higher success rate (M=55.32%, SD=10.32) than South Africa (M=42.68%, SD=18.08), and this difference reached statistical significance (p=0.04).

4.5Scoring performance

In attack, New Zealand tended to produce higher outputs, but the differences were not statistically significant. They scored more tries (M=7.00 vs 3.86) and accumulated more total points (M=48.00 vs 29.71), yet the variability across matches meant these trends did not reach significance. When adjusted for playing time, the pattern remained the same, clear but not enough to determine the outcome.

4.6 Defensive Performance

Defensive results were more mixed. Both teams made a similar number of tackles, suggesting comparable defensive workload and structure. The key difference lay in tackling accuracy. South Africa missed more tackles on average (M=24.86, SD=9.49) than New Zealand (M=15.43, SD=8.14), and this difference was statistically significant (p=0.05). However, when expressed as a percentage, the gap was less pronounced and did not reach significance.

https://doi.org/10.24191/gading.v29i1.753

4.7 Attacking Performance

Clearer separation appeared in attacking effectiveness. New Zealand consistently beat more defenders (M=30.00, SD=10.12) than South Africa (M=15.43, SD=5.00), and this difference was statistically significant (p=0.03). Offloads followed a similar trend, with New Zealand producing more, although the difference fell just short of significance (p=0.06). Together, these indicators point to a more expansive attacking approach from New Zealand.

4.8 Summary

Only three indicators clearly separated the two teams: lineout success rate, defenders beaten, and tackles missed. Across the remaining measures, South Africa and New Zealand performed at a similar level. This overall parity suggests that the difference between first and second place in this tournament was shaped by a small number of key moments and efficiencies, rather than broad dominance across all areas of play.

5. CONCLUSION

This study explored the tactical and performance differences between champion (South Africa) and runners-up team (New Zealand) during the 2023 Rugby World Cup, with the aim of identifying what separated the champions from the runners-up. The findings suggest that South Africa's success was built on set-piece control and defensive intensity. They recorded higher rates in scrums (12.57), mauls (8.29), and lineouts (27.86), along with the highest overall work rate in the tournament (138.86). In contrast, New Zealand led the attacking metrics, averaging 7 tries and 48 points per game, and producing more offloads (10.7) compared to South Africa's (6). These contrasting profiles highlight that winning a championship does not depend on dominating every performance category. Instead, success appears to come from a clear tactical identity, where strengths are maximised and weaknesses are effectively managed.

This study adds to the rugby performance analysis literature by focusing on the top two teams within a single tournament. By doing so, it avoids the limitations of studies that combine data across different competitions and seasons, where contextual differences can blur interpretation. The findings also question the assumption that performance indicators consistently predict success across all stages of competition. In particular, they suggest that knockout rugby follows a different tactical logic compared to pool matches or league formats.

From a practical perspective, the results point to the value of building a game model around key strengths rather than striving for balance across all areas. Coaches and analysts may benefit from prioritising tactical clarity and making informed trade-offs, rather than aiming for uniform excellence. Future research should consider models that account for tournament stage, opposition quality, and match context when identifying performance indicators linked to success in elite international rugby.

ACKNOWLEDGEMENTS/FUNDING

The authors would like to acknowledge the support of Faculty of Sports Science and Recreation, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia for providing the facilities and financial support on this research.

CONFLICT OF INTEREST STATEMENT

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

AUTHORS' CONTRIBUTIONS

Norasrudin Sulaiman and Nor Sharizat Shariman carried out the research, wrote and revised the article. Rahmat Adnan and Shariman Ismadi Ismail conceptualised the central research idea and ran the statistical analysis. Mohd Zulkhairi Mohd Azam designed the research. Muhammad Hazwan Abdul Rahman

supervised the research progress. All the team members anchored the review, revisions and approved the article submission.

REFERENCES

Adeyemo, V. E., Palczewska, A., Jones, B., Weaving, D., & Whitehead, S. (2022). Optimising classification in sport: A replication study using physical and technical-tactical performance indicators to classify competitive levels in rugby league match-play. *Science and Medicine in Football*, *8*(6), 586–593. https://doi.org/10.1080/24733938.2022.2146177

Bennett, M., Bezodis, N., Shearer, D. A., Locke, D., & Kilduff, L. P. (2019). Descriptive conversion of performance indicators in rugby union. *Journal of Science and Medicine in Sport*, *22*(3), 330–334. https://doi.org/10.1016/j.jsams.2018.08.008

Bunker, R. (2020). The evolution of game play in rugby union. *International Journal of Sports Science & Coaching*, *15*(4), 556–567.

Bunker, R. P. (2020). Performance indicators associated with success in elite rugby union. *International Journal of Performance Analysis in Sport*, *20*(4), 583–598. https://doi.org/10.1080/24748668.2020.1776096

Bunker, R., & Spencer, K. (2020). Discriminating winning and losing teams in the Rugby World Cup. *International Journal of Performance Analysis in Sport*, *20*(4), 571–589.

Bunker, R., Fujii, K., Hanada, H., & Takeuchi, I. (2021). Supervised sequential pattern mining of event sequences in sport to identify important patterns of play: An application to rugby union. *PLOS ONE*, *16*(9), e0256329. https://doi.org/10.1371/journal.pone.0256329

Colomer, C. M. E., Pyne, D. B., Mooney, M., McKune, A., & Serpell, B. G. (2020). Performance analysis in rugby union: A critical systematic review. *Sports Medicine - Open*, *6*(1), 4. https://doi.org/10.1186/s40798-019-0232-x

Crewther, B. T., Potts, N., Kilduff, L. P., Drawer, S., & Cook, C. J. (2020). Performance indicators during international rugby union matches are influenced by a combination of physiological and contextual variables. *Journal of Science and Medicine in Sport*, *23*(4), 396–402. https://doi.org/10.1016/j.jsams.2019.10.011

Hughes, M., & Franks, I. M. (2004). *Notational analysis of sport: Systems for better coaching and performance*. Routledge.

Hughes, M. D., Cooper, S. M., & Nevill, A. (2011). Analysis procedures for non-parametric data from performance analysis. *International Journal of Performance Analysis in Sport*, *4*(1), 6–20.

Hughes, M. D., Hughes, M. T., Williams, J., James, N., Vuckovic, G., & Locke, D. (2011). Performance indicators in rugby union. *Journal of Human Sport and Exercise*, *7*(2), 383–401.

Hughes, M., Franks, I. M., & Dancs, H. (2019). *Essentials of performance analysis in sport* (3rd ed.). Routledge.

Jones, N. M., James, N., & Mellalieu, S. D. (2015). An objective method for depicting team performance in elite professional rugby union. *Journal of Sports Sciences*, *33*(8), 829–839.

Lantz, B., Andersson, R., & Manfredsson, P. (2016). Preliminary tests of normality when comparing three independent samples. *Journal of Modern Applied Statistical Methods*, *15*(2), 135–148. https://doi.org/10.22237/jmasm/1478002140

Nicholls, M., Coetzee, D., Schall, R., & Kraak, W. (2024). Analysing match-related performance indicators in Super Rugby competitions: A study of the 2017–2019 seasons. *International Journal of Sports Science and Coaching*, *19*(1), 178–191. https://doi.org/10.1177/17479541231198211

Sauliere, G., Dedecker, J., Moussa, I., Schipman, J., Toussaint, J.-F., & Sedeaud, A. (2019). Quantifying collective performance in rugby union. *Frontiers in Sports and Active Living*, *1*, Article 12. https://doi.org/10.3389/fspor.2019.00012

Scott, G. A., Bezodis, N., Waldron, M., Bennett, M., Church, S., Kilduff, L. P., & Brown, M. R. (2023). Performance indicators associated with match outcome within the United Rugby Championship. *Journal of Science and Medicine in Sport*, *26*(1), 63–68. https://doi.org/10.1016/j.jsams.2022.11.006

Sulaiman, N., Mohd Fauzi, H. I., Cik Sofi, M. S. N., & Mohamad Ariffin, M. R. (2022). Differences in selected performance indicators among top four teams in Dubai Men's World Rugby Sevens Series 2019/20. *Environment-Behaviour Proceedings Journal*, *7*(SI7), 489–493. https://doi.org/10.21834/ebpj.v7isi7.3821

Till, K., Hendricks, S., Scantlebury, S., Dalton-Barron, N., Gill, N., den Hollander, S., Kemp, S., Kilding, A. E., Lambert, M., Mackreth, P., O'Reilly, J., Owen, C., Spencer, K., Stokes, K., Tee, J., Tucker, R., Vaz, L., Weaving, D., & Jones, B. (2023). A global perspective on collision and non-collision match characteristics in male rugby union: Comparisons by age and playing standard. *European Journal of Sport Science*, *23*(7), 1131–1145. https://doi.org/10.1080/17461391.2022.2160938

Vaz, L., Hendricks, S., & Kraak, W. (2019). Statistical review and match analysis of Rugby World Cup finals. *Journal of Human Kinetics*, *66*, 247–255. https://doi.org/10.2478/hukin-2018-0075

Villarejo-García, D. H., Pino-Ortega, J., Becerra-Patiño, B. A., & Navarro-Martínez, C. (2026). Performance determinants in elite men's sport: A tactical analysis of ball possession effectiveness at the 2023 Rugby World Cup. *Journal of Men's Health*, *22*(3), 12–19. https://doi.org/10.22514/jomh.2026.022

Watson, N., Durbach, I., Hendricks, S., & Stewart, T. (2022). On the validity of team performance indicators in rugby union. *International Journal of Performance Analysis in Sport*, *17*(4), 609–621.

Wedding, C. J., Gomez, M. A., Woods, C. T., Sinclair, W. H., & Leicht, A. S. (2023). Effect of match-related contextual factors on positional performance in the National Rugby League. *International Journal of Sports Science & Coaching*, *18*(3), 892–901. https://doi.org/10.1177/17479541221092525

Whitehead, S., Till, K., Jones, B., Beggs, C., Dalton-Barron, N., & Weaving, D. (2020). The use of technical-tactical and physical performance indicators to classify between levels of match-play in elite rugby league. *Science and Medicine in Football*, *4*(1), 30–38.

Woods, C. T., Robertson, S., Sinclair, W. H., & Collier, N. F. (2017). Non-metric multidimensional performance indicator scaling reveals seasonal and team dissimilarity within the National Rugby League. *Journal of Science and Medicine in Sport*, *20*(12), 1–7.

Zanin, M., Azzalini, A., Ranaweera, J., Till, K., Darrall-Jones, J., & Roe, G. (2022). Designing a small-sided game to elicit attacking tactical behaviour in professional rugby union forwards. *Journal of Sports Sciences*, *40*(20), 2304–2314. https://doi.org/10.1080/02640414.2022.2117953

About the Authors

Norasrudin Sulaiman, PhD is a senior lecturer in the Faculty of Sports Science, Universiti Teknologi MARA, Shah Alam, Malaysia. His main research activities are in performance analysis in sports and exercise testing and fitness evaluation. He also conducts sophisticated performance analysis studies in

rugby sevens, using notational analysis to identity team performance indicators across different tournament levels and rankings. He can be reached through his email at noras878@uitm.edu.my.

Nor Sharizat Shariman, is a post graduate student in the Faculty of Sports Science, Universiti Teknologi MARA, Shah Alam, Malaysia. His main research activities are in Performance Analysis in Sport and and focuses on tactical in team sports. He can be reached through his email norsharizatshariman@gmail.com.

*Rahmat Adnan i*s a senior lecturer in the Faculty of Sports Science, Universiti Teknologi MARA, Shah Alam, Malaysia. His main research activities are in exercise physiology, rehabilitation and strength and conditioning focusing on intervention such as core-stability for chronic back pain. He also investigates assessment validity, including blood-preasure measurement during exercise. Mr Rahmat Adnan can be reached through his email at rahmatadnan@uitm.edu.my

Shariman Ismadi Ismail, PhD is a senior lecturer in the Faculty of Sports Science, Universiti Teknologi MARA, Shah Alam, Malaysia conducts advance research at the intersection of sport biomechanics and sports engineering. His work includes motion-analysis studies, such as examining change-of-direction and traction on difference playing surfaces in futsal. He can be reached through his email at shariman_ismadi@uitm.edu.my.

Mohd Zulkhairi Mohd Azam, PhD is a senior lecturer in the Faculty of Sports Science, Universiti Teknologi MARA, Shah Alam, Malaysia. His research primarily focuses on talent identification in sport, including the use of @D:4D digit ratio and relative age effect to predict athletic potential and sport performance related to age. He can be reached through his email at zulkhairiazam@uitm.edu.my.

Mohamad Hazwan Abdul Rahman, is the Head of the Department of Performance Analysis at the National Sports Institute (ISN), Malaysia. His main contributions are on the analysis of para-athletes representing national and international tournaments including the Para Asia and Paralympic games. He can be reached through his email at hazwan@isn.gov.my.

https://doi.org/10.24191/gading.v29i1.753