# *Long-term influence of technical, physical performance indicators and situational variables on match outcome in male professional Chinese soccer*

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## Abstract

The purpose of this study was to determine whether the role of every performance indicator in determining match outcome has varied from a long-term analysis (seasons 2012 to 2017) of the Chinese Soccer Super League (CSL). The sample included 1,429 CSL matches where 17 technical performance-related indicators, 11 physical performance-related indicators and two situational variables (match location and quality of opposition) were analysed. Binary logistic regression models were used to measure the level of association between these factors and match outcome over the six seasons studied. Results revealed that shots on target, possession, total distance in ball possession, total distance out of ball possession, and match location exerted a decreased influence on winning the matches from 2012 to 2014 seasons. However, these indicators play a more important role in winning matches from 2014 to 2017 seasons. Additionally, the quality of opposition has a continuously increased negative effect on the match outcome. The key performance indicators and their role in winning the matches changed over the six seasons studied reflecting the performance development of Chinese soccer. These results provide valuable information about key performance indicators and situational variables on winning the matches from a long-term approach.


## 1. Introduction

In game sports, performance indicators can capture global or partial aspects of complex, dynamic and non-linear properties of performance (McGarry, O'Donoghue, & Sampaio, 2013). The importance of definition and validity of key performance indicators (KPI) has been widely investigated in several sports (e.g., soccer, basketball, handball, water polo, rugby, Australian football, etc.) defining the most relevant aspects of players and teams' performances (Escalante, Saavedra, Mansilla, & Tella, 2011; Gómez, Lorenzo, Sampaio, José Ibáñez, & Ortega, 2008; Lago-Peñas, Lago-Ballesteros, Dellal, & Gómez, 2010; Lorenzo, Gomez, Ortega, Ibanez, & Sampaio, 2010; Meletakos, Vagenas, & Bayios, 2011; Robertson, Back, & Bartlett, 2016; Vaz,

Van Rooyen, & Sampaio, 2010). Specifically, the definition and selection of KPI has been related to winning and losing or successful and unsuccessful teams (Castellano, Casamichana, & Lago, 2012; Gómez et al., 2008; Harrop & Nevill, 2017; Lago-Ballesteros & Lago-Peñas, 2010; Vaz et al., 2010).

In terms of the influence of several constraints, it is necessary to combine performance indicators and situational variables (e.g., match location and quality of opposition) to determine match performances (Aquino, Munhoz Martins, Palucci Vieira, & Menezes, 2017; Bradley, Lago-Penas, Rey, & Sampaio, 2014; Liu, Hopkins, & Gomez, 2016; Taylor, Mellalieu, James, & Barter, 2010). Firstly, the technical-tactical indicators (e.g., shots on target, successful passes, possession) associated with winning or having positive effects on the match outcome have been identified in the research (Harrop & Nevill, 2017; Lago-Ballesteros & Lago-Peñas, 2010; Lago-Peñas et al., 2010; Liu, Gomez, Lago-Penas, & Sampaio, 2015; Liu et al., 2016; Mao, Peng, Liu, & Gomez, 2016). Secondly, although previous studies indicate that overall technical and tactical effectiveness are more important than physical performance in determining success in soccer (Di Salvo, Gregson, Atkinson, Tordoff, & Drust, 2009), recent work shows that high-intensity actions are related to the outcome of the match (Aquino et al., 2017; Zhou, Zhang, Lorenzo Calvo, & Cui, 2018). Barnes, Archer, Hogg, Bush, and Bradley (2014) also revealed that the players' physical ability demands have increased with the soccer development. Thirdly, the situational variables, match location and quality of opposition, are two factors that can affect the match outcome (Gómez, Serna, Lupo, & Sampaio, 2016; Lago-Penas, Lago-Ballesteros, &

53 Rey, 2011). Previous studies have showed that the influence of these two situational
54 variables on match outcome have changed over the development (e.g., the last two
55 decades) of soccer sport (Bradley et al., 2016; Pollard & Pollard, 2005). In fact, the gap
56 between successful teams was narrowing across seven consecutive England Premier
57 League seasons (2006-07 to 2012-13) (Bradley et al., 2016) indicating that it could
58 change across seasons. Along these lines, soccer has evolved across time because of
59 rule changes and match tactics and strategies, increases in professionalism, the use of
60 new technologies, global exposure, and transformations in training and selection
61 process (Wallace & Norton, 2016). Understanding these evolutionary tendencies can
62 provide valuable information to estimate, for example, future match and training
63 demands, to assist in the player selection and talent identification, or to predict the
64 impact of rule changes. In practice, soccer coaches not only need to be familiar with
65 the demands of modern players in technical-tactical and physical aspects, but also
66 understand the KPI and their impact along the seasons when determining the match
67 outcome in combination with situational variables (Barnes et al., 2014; Bush, Barnes,
68 Archer, Hogg, & Bradley, 2015; Robertson & Joyce, 2018). However, from the
69 available research in soccer, few studies can provide this information due to most of
70 them were focused on identifying KPI in single a season/championship or few seasons
71 and exploring the variability/stability of performance indicators along the seasons
72 (Barnes et al., 2014; Bradley et al., 2016; Bush et al., 2015). So far, Robertson and
73 Joyce (2018) used binary logistic regression models to determine the level of
74 association between some factors (performance indicators and situational variables)

and match outcome in a long period in Australian football with concluding remarks (e.g., the influence of playing away from home on match difficulty became stronger as the season progressed). However, no research has studied the influence of KPI on the match outcome in soccer considering a longitudinal approach.

Recently, there has been growing interest in the Chinese soccer (Gai, Leicht, Lago, & Gomez, 2019; Lago-Peñas, Gómez-Ruano, & Yang, 2018; Mao et al., 2016; Yang, Leicht, Lago, & Gomez, 2018; Zhou et al., 2018) analysing the KPI, team playing styles and comparisons between domestic and foreign soccer players in the Chinese Soccer Super league (CSL). Specifically, technical (e.g., shot on target, shot accuracy, possession) and physical indicators (sprinting distance in ball possession) were related to match outcome in the CSL (Mao et al., 2016; Yang et al., 2018; Zhou et al., 2018). Additionally, investigations have been confined to long-term trend study in Chinese elite soccer. CSL is the highest level of professional soccer match in China, which starts in March (spring in China) and ends in November (winter) every season. As a developing of the league, playing patterns in CSL are different from European leagues or international championships (e.g., World Cup), the effects of match regulation, signing policies, and economical investment, which are unique to China soccer, would lead to some changes in match performances across seasons. Specifically, this information would help to monitor training and match strategy selection for coaching staffs. Therefore, the aim of the present study was to determine whether the role of every performance indicator has varied over six seasons in the CSL. It was

hypothesized that the KPI and situational variables were not stable over the seasons showing different performance trends in the CSL.

## 2. Method

### *2.1. Sample, data resource and variables*

CSL is the highest level of professional soccer match in China (16 teams playing a balanced schedule against their opponents both at home and away from March to November every season, 30 matches per team and 240 matches per season). The end-of-season rank was determined by the final accumulated points (win for 3 points, draw for 1, loss for 0). A total of 1,429 matches (data from 11 matches were missed) were selected as the sample of the current study from 2012 to 2017 seasons in the CSL.

Teams' data were collected by AMISCO (Amisco, Nice, France) tracking system. The reliability and validity of the system in measuring player movement has been evaluated and verified (Zubillaga, Gorospe, Mendo, & Villaseñor, 2007). In line with previous related literature (Bradley et al., 2014; Carling, Bradley, McCall, & Dupont, 2016; Mao et al., 2016; Yang et al., 2018), 17 technical performance-related parameters, 11 physical performance-related parameters and 2 situational variables were chosen as indicators in the analysis. The grouping and definition of these variables are presented in the Table 1.

115 ***Table 1 near here***

116 ***2.2. Procedure and statistical analysis***

117 Descriptive statistics (Mean ± SD) were calculated for each indicator during the
118 six seasons under analysis. In addition, in order to make comparisons ignoring the scale
119 units of each indicator, the variables were standardized using *z*-scores (Norman &
120 Streiner, 2008). A binary logistic regression was used to identify the relationship
121 between match outcome and indicators (Robertson & Joyce, 2018). In the league, teams
122 usually pursue wining instead of drawing or even losing, so we set match outcome as
123 Win = 1 and Unwin (Draw and Loss) = 0 (Liu et al., 2016). We used backward (LR)
124 stepwise method to avoid multicollinearity between variables (Harrop & Nevill, 2017).
125 Odds ratios (OR) and corresponding 90% confidence intervals (90% CI) were also
126 reported in order to provide a standardized measure of the influence of each indicator
127 included in the model of six seasons. Relationships were assessed as effects of one-
128 standard deviation (SD) increase in the value of the indicator on the change (decrease
129 or increase) in the probability of a team winning a match (Menard, 2011). Performance
130 of the model was evaluated as the percentage of match outcomes correctly classified.
131 All analyses were undertaken using the statistical software IBM SPSS Statistics 22
132 (Armonk, NY: IBM Corp) and the level of significance was set at $p \leq 0.05$.

133 **3. Results**

134 Descriptive statistics of performance-related match events and actions per season (from
135 2012 to 2017) and total results in the CSL are presented in Table 2.

136

137 ***Table 2 near here***
138
139 Table 3 shows the OR for fixed factors related to the logistic regression models
140 for each season (six models). The classification accuracies were 82.0%, 80.6%,
141 76.8%, 83.3%, 83.4% and 85.7%, for the seasons 2012 to 2017, respectively. The
142 results identified ten statistically significant technical-tactical variables: Shots
143 (OR=0.58-0.66), Shots on target (OR= 1.76-4.50), Corners (OR= 0.67), Crosses (OR=
144 0.29-0.61), Possession (OR= 5.46-138.51), Passes (OR= 2.68-2.69), Pass accuracy
145 (OR= 0.47-0.50), Forward passes (OR= 0.42-0.62), Forward pass accuracy (OR= 1.78-
146 1.93), 50-50 challenge won (OR= 1.72), fouls committed (OR= 1.43). In addition, the
147 models showed seven significant physical variables= Total distance (OR= 1.79-2.06),
148 Total distance in ball possession (OR= 0.02-0.16), Total distance out of ball possession
149 (OR= 2.75-57.03), Sprinting efforts (OR= 0.47-5.18), High-Speed distance (OR=2.23-
150 69.13), High- speed distance in ball possession (OR= 0.11-0.19), High-speed distance
151 out of ball possession (OR= 0.03-0.33); and two situational variables= Quality of
152 opponent (OR= 0.19-0.40) and Match location (OR= 1.78-7.06). However, only Shots
153 on target, possession, total distance in possession of the ball, total distance without ball
154 possession, match location and quality of opposition exerted a significant effect on
155 winning the match in all the seasons ($p<0.05$).
156
157 ***Table 3 near here***
158

In order to identify the long-term effect, the six statistically significant KPI and situational variables on winning the match were selected and accounted for into next analysis. Figure 1 shows the changes in OR of the six KPI and situational variables during six seasons. Results showed that shots on target, possession, total distance in ball possession, total distance out of ball possession, and match location exerted a decreased influence on winning the game from 2012 to 2014 season. However, these variables have a more powerful role when winning the match from 2014 to 2017 season. Additionally, the quality of opposition has a continuously increased role on the match outcome.

***Figure 1 near here***

## 4. Discussion

The aim of this study was twofold: (i) to explore key performance indicators across six seasons; and (ii) to determine whether the role of every KPI in impacting on match outcome has varied over the six seasons in the CSL. As was argued, the KPI and situational variables were not stable in affecting the match outcome over the seasons and showing different performance trends in the CSL. The main findings showed that the significant KPI were not same during the seasons under analysis. Specifically, there were six significant variables (Shots on target, possession, total distance in possession of the ball, total distance out of ball possession, match location and quality of opposition) that exerted a meaningful influence on winning the match in all the seasons and every KPI plays a different role across six seasons.

Although the role of shots on target on winning the match has declined from 2012 to 2014 season, it has rebounded and stabilized in recent years. In recent years, the CSL teams have increased its financial budged for players' recruitment. Especially in the 2015 season, CSL clubs spent £81m on players and coaches, placing in the second league that most invested (most of the players signed were midfielders or forward foreign players), and only the EPL spent more money than CSL (Connell, 2018). The advantage of these foreign attackers in offense, especially in shooting skills, may be the cause of the increase roles of shots on target on winning the match in recent years (Gai et al., 2019). The number of shots on target is the most important factor affecting the match outcome in soccer (Lago-Ballesteros & Lago-Peñas, 2010; Lago-Peñas et al., 2010; Mao et al., 2016; Yang et al., 2018). The current results showed that a one-SD increase in the value of shot on target could bring a 0.79-3.50 times higher probability of winning matches. Then, the sustaining positive impact of the shots on target on winning the match, requires the soccer coaches to still pay attention to this indicator and set more practice to improve players' shot capacity. In addition to the number of shots, the match competition and trainings should be more focused on shooting accuracy (Mao et al., 2016).

In the present study, possession is a factor affecting the match outcome positively and plays a more important role in the match during the recent seasons. The current result is supported by a previous study focused on the EPL (Bush, Archer, Barnes, Hogg, & Bradley, 2017) that found the recruitment of more outstanding foreign players and coaches could contribute to the development of possession-based playing

strategies in the CSL. This finding indicates that obtain and use more possession is essential to win the match in the CSL. It is arguable whether the possession is a key performance indicator in determining the match outcome (Collet, 2013; Kempe, Vogelbein, Memmert, & Nopp, 2014; Lago-Penas & Dellal, 2010; Lago, 2009; Lago & Martin, 2007). In particular, Chassy (2013) demonstrated that speed and precision of passes generated positive match outcomes rather than the percentage of possession. However, Kempe et al. (2014) showed that not only the percentage of ball possession but also the variables related to the possession have an impact on the match outcome. In one study related to the CSL (Zhou et al., 2018), the authors found that the number of passes per possession was the variable that best differentiated winning, drawing and losing (match outcomes) during close matches when KPI were normalized by possession of the ball. The different influence of possession on the match outcome in these studies may be related to the differences of match samples used, different variables selected and different methods of analysis. Further research on CSL should pay more attention on the relationship between possessions and passing patterns.

Regarding the physical aspect, although the total distance does not influence the match outcome in the CSL, the physical distribution does. Total distance in possession has a negative effect on winning the game while total distance out of possession has a positive effect on winning the match. Hoppe, Slomka, Baumgart, Weber, and Freiwald (2015) pointed out that the total distance in possession of the ball has a positive correlation with final points accumulated in the German Bundesliga, and it is related to the high-level of ball possession due to the superior technical/tactical skills of

successful teams. The present results suggested that when teams have the same percentage of possession, less distance covered in ball possession and more distance covered out of ball possession can increase the winning probability. This is in accordance with previous studies (Almeida, Ferreira, & Volossovitch, 2014; Vogelbein, Nopp, & Hokelmann, 2014) which indicated that the players from better teams employed proactive defensive strategies via covering more distance to press the opposition and regain the ball possession quickly when their teams are out of the ball possession. Once the winning team regains the ball in CSL, they prefer to maintain the ball possession to keep the physical conditioning, creating the space to attack in CSL.

In this study, match location and quality of opposition have a significant influence on the match outcome, which is in accordance with the previous studies (Lago, 2009; Liu et al., 2016). For instance, the home advantage (HA) has experienced some changes and plays a more important role when winning the match (shown in Figure 1) in the latest four seasons. There may be several factors that contribute to this phenomenon. On the one hand, Pollard and Gómez (2014) identified a HA effect of 63.82% in Chinese Super League (the fourth league in the Asian countries ranked by HA effect and similar to the main European countries such as England or Spain). Specifically, some factors are likely to affect the degree of home advantage such as crowed effects, travel effects, local derbies, familiarity with local conditions, referee bias, territoriality, special tactics, rule factors, team composition and psychological factors. In particular, the increasing financial budged of clubs, players' recruitment or

the increased match attendance (crowd size) due to society and economy development in China could be related to the increased importance of HA.

Differences between the end-of-season rankings of the competing teams can truly reflect the strength gap between the two teams (Bradley et al., 2014). The increased role of the quality of the opposition on match results demonstrates that the performance gap between the teams in the CSL is widening, it is getting harder to beat stronger opponents. This phenomenon may indicate that the Chinese teams acknowledge more about each opponent and can arrange the corresponding tactics in advance. On the other hand, the weaker teams lack corresponding changes in tactics in the face of the stronger teams.

## 5. Conclusion

This study demonstrates that the influence of various factors exerts on match outcome change over six seasons. The results showed the significant trends of factors influencing the match outcome: shots on target, possession, total distance possession of the ball, total distance out of ball possession. Additionally, match location exerted a decreased influence on winning the game from 2012 to 2014 season and increased their impact when winning the match from 2014 season. Lastly, the quality of opposition has a continuously increased negative influence on the match outcome.

## Practical applications

The role of KPI and situational variables in the CSL was evaluated over the six seasons. Therefore, identifying how these factors alter their influence on the match

outcome throughout the seasons is of practical use in monitoring the training, players' selection, even talent identification. On the one hand, the more percentage of ball possession is related when winning the match in the CSL, less distance covered when a team in ball possession and more distance covered without ball possession could be the most important task in the training practice. On the other hand, match location and quality of opposition have a huge influence on the match outcome. The coach should set up some targeted training (e.g., psychological skill) and try to improve the stability of player's performance in home and away. The coach should consider the quality of the opponent and analyse the playing patterns of the opponent, formulating the corresponding match strategy and practice in advance.

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## Figures

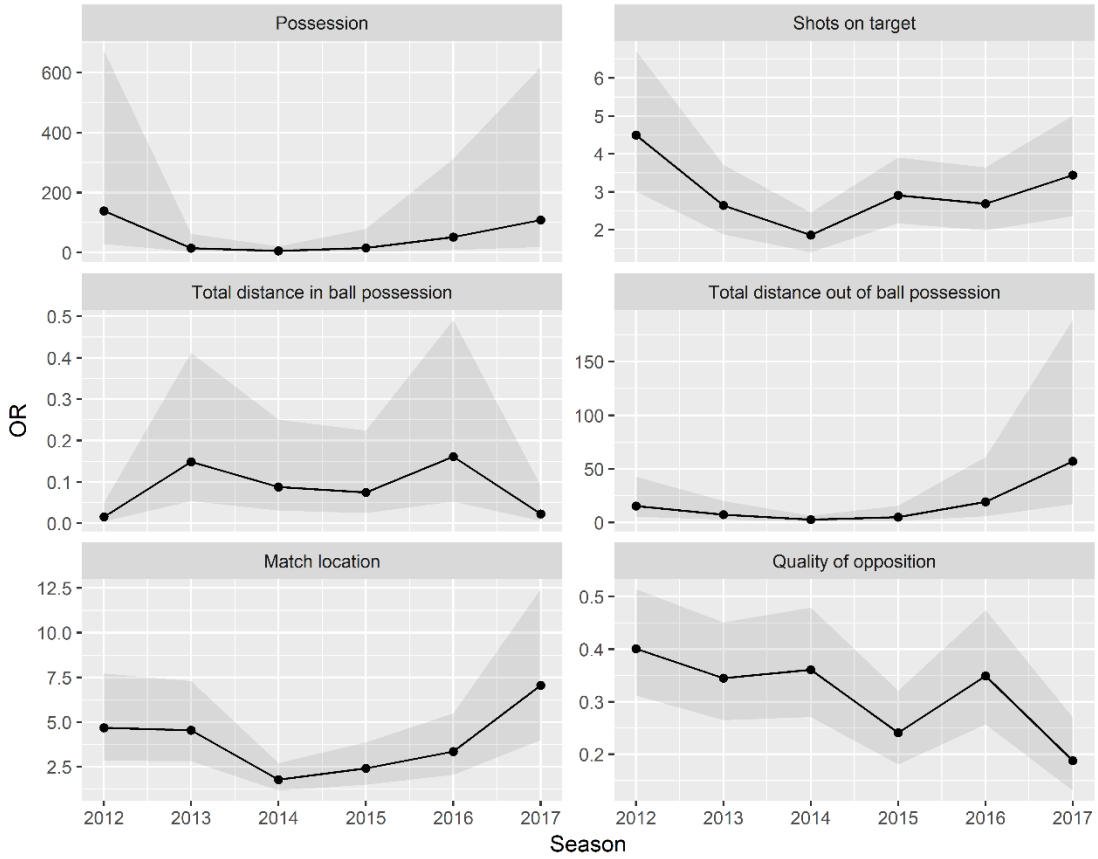


Figure 1. Changes in odds ratios for six factors relating to the match outcome over 6 seasons. Black line represents the mean value of OR and 90% confidence interval.

401 # Tables

**Table 1. Selected variables definition**

| **Technical performance-related parameters: operational definition** | |
|---|---|
| Shot | An attempt to score a goal, made with any (legal) part of the body, either on or off target |
| Shot on target | An attempt to goal which required intervention to stop it going in or resulted in a goal/shot which would go in without being diverted |
| Possession (%) | The duration when a team takes over the ball from the opposing team without any clear interruption as a proportion of total duration when the ball was in play |
| Possession in opponent half (%) (PIOH%) | Possession of a team in opponent's half of pitch |
| Pass: | An intentional played ball from one player to another |
| Pass accuracy (%) | Successful passes as a proportion of total passes |
| Forward pass | An intentional played ball from one player to another who is located closer to the opponent goal. |
| Forward pass accuracy (%)（FPA %）: | Successful forward passes as a proportion of total forward passes |
| Opponent 35m entry | Number of times when the ball (possessed by the attacking team) enters the 35m area of the opponent's half of pitch |
| Opponent penalty area entry （OPAE） | Number of times when the ball (possessed by the attacking team) enters the penalty area of the opponent's half of pitch |
| Cross | Any ball sent into the opposition team's area from a wide position |
| Corner | Ball goes out of play for a corner kick |
| Offside | Being caught in an offside position resulting in a free kick to the opposing team |
| 50-50 challenge won (%) | 50%-50% challenge duels won by a team as a proportion of total duels of the match |
| Foul committed | Any infringement that is penalised as foul play by a referee |
| Yellow card | Where a player was shown a yellow card by the referee for reasons of foul, persistent infringement, hand ball, dangerous play, time wasting, etc. |
| Red card | Where a player was sanctioned a red card by the referee, including straight red card and a red card from the second yellow card |
| **Physical performance-related parameters: operational definition** | |
| Total distance (m): | Distance covered in a match by all the outfield players of a team |
| Total distance IP(m): | Total distance covered when in ball possession |
| Total distance OP(m): | Total distance covered when out of ball possession |
| Sprinting distance (m): | Distance covered at the speed over 23km/h in a match by all the outfield players of a team |
| Sprinting effort: | Number of sprinting in a match by all the players of a team |
| Sprinting distance IP (m): | Sprinting distance covered when in ball possession |
| Sprinting distance OP (m): | Sprinting distance covered when out of possession |
| High-speed running distance (m): | Distance covered at the speed of 19.1-23km/h in a match by all the outfield players of a team |
| High-speed running effort: | Number of high-speed running in a match by all the outfield players of a team |
| High-speed running distance IP (m): | High-speed running distance covered when in ball possession |
| High-speed running distance OP (m): | High-speed running distance covered when out of ball possession |
| **Situational variables** | |
| Match location: | Playing at home or away |
| Quality of oppsition: | The difference between end-of-season rankings of the competing teams, i.e. quality of oppsition = $R_A - R_B$, where $R_A$ is the ranking of sampled team and $R_B$ is the ranking of the opponent |

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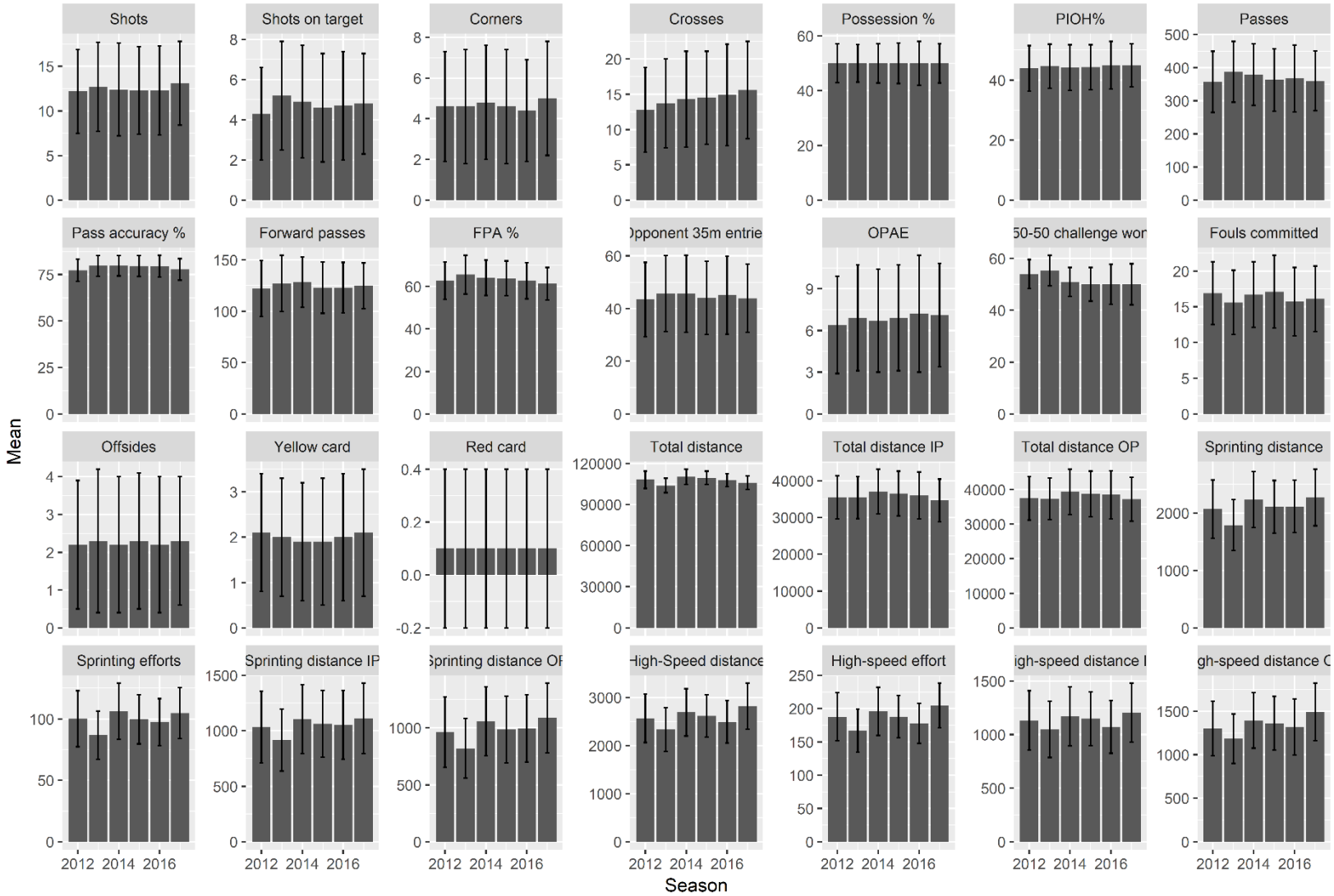
Table 2. Performance indicators across the 2012 to 2017 seasons. Data are displayed as means and standard deviations.

| | Total | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|
| Shots | 12.5±4.9 | 12.2±4.7 | 12.7±5.0 | 12.4±5.2 | 12.3±4.9 | 12.3±5.0 | 13.1±4.7 |
| Shots on target | 4.8±2.6 | 4.3±2.3 | 5.2±2.7 | 4.9±2.8 | 4.6±2.7 | 4.7±2.7 | 4.8±2.5 |
| Corners | 4.7±2.7 | 4.6±2.7 | 4.6±2.8 | 4.8±2.8 | 4.6±2.8 | 4.4±2.5 | 5.0±2.8 |
| Crosses | 14.3±6.7 | 12.8±6.0 | 13.7±6.3 | 14.3±6.8 | 14.5±6.6 | 14.9±7.2 | 15.6±6.9 |
| Possession % | 50.0±7.3 | 50.0±7.1 | 50.0±6.9 | 50.0±7.2 | 50.0±7.4 | 50.0±8.0 | 50.0±7.2 |
| PIOH% | 44.5±7.5 | 43.9±7.6 | 44.6±7.4 | 44.2±7.6 | 44.3±7.5 | 45.0±7.9 | 44.9±7.2 |
| Passes | 369.0±94.3 | 357.2±92.0 | 387.4±91.8 | 379.2±92.9 | 362.7±94.7 | 367.0±101.1 | 360.0±90.0 |
| Pass accuracy % | 78.9±5.8 | 77.3±5.9 | 79.7±5.6 | 79.8±5.5 | 79.6±5.7 | 79.5±5.9 | 77.8±5.8 |
| Forward passes | 124.7±25.3 | 122.1±27.2 | 127.1±27.4 | 128.3±24.5 | 122.9±24.9 | 123±24.7 | 124.7±22.3 |
| FPA % | 63.4±8.5 | 62.7±8.8 | 65.6±9.1 | 64.1±8.3 | 63.8±8.2 | 62.7±8.5 | 61.3±7.7 |
| Opponent 35m entries | 44.6±14.1 | 43.4±14.1 | 45.7±14.4 | 45.6±14.6 | 44.0±13.9 | 45.1±14.8 | 43.9±12.9 |
| OPAE | 6.9±3.8 | 6.4±3.5 | 6.9±3.8 | 6.7±3.7 | 6.9±3.8 | 7.2±4.2 | 7.1±3.7 |
| 50-50 challenge won | 51.7±6.9 | 54.0±5.6 | 55.3±5.9 | 50.9±5.6 | 50.0±6.5 | 50.0±7.7 | 50.0±7.9 |
| Fouls committed | 16.4±4.7 | 16.9±4.4 | 15.6±4.5 | 16.7±4.6 | 17.1±5.1 | 15.7±4.8 | 16.1±4.6 |
| Offsides | 2.2±1.8 | 2.2±1.7 | 2.3±1.9 | 2.2±1.8 | 2.3±1.8 | 2.2±1.8 | 2.3±1.7 |
| Yellow card | 2.0±1.3 | 2.1±1.3 | 2.0±1.3 | 1.9±1.3 | 1.9±1.4 | 2.0±1.4 | 2.1±1.4 |
| Red card | 0.1±0.3 | 0.1±0.3 | 0.1±0.3 | 0.1±0.3 | 0.1±0.3 | 0.1±0.3 | 0.1±0.3 |
| Total distance | 107,575.9±5,710.6 | 108,116.1±6,264.1 | 103,874.9±5,251.0 | 110,203.3±5,646.4 | 109,475.9±4,873.8 | 107,866.4±4,741.5 | 105,925.1±4,842.6 |
| Total distance IP | 35,842.2±6035.0 | 35,485.1±5861.4 | 35,391.3±5733.4 | 37,066.2±6060.4 | 36,510.1±6083.6 | 35,965.4±6384.3 | 34,628.9±5786.6 |
| Total distance OP | 38,097.2±6,503.3 | 37,435.4±6,279.6 | 37,357.2±6,000.8 | 39,345.8±6,566.2 | 38,752.6±6,555.2 | 38,496.4±6,946.6 | 37,198.2±6,370.9 |
| Sprinting distance | 2,098.2±500.3 | 2,069.7±509.3 | 1,790.4±444.1 | 2,234.3±488.2 | 2,109.5±458.5 | 2,116.3±457.8 | 2,272.0±493.6 |
| Sprinting efforts | 99.1±21.9 | 100.1±22.8 | 86.7±19.7 | 106.2±23.0 | 99.6±20.0 | 97.4±19.1 | 104.8±20.8 |
| Sprinting distance IP | 1,047.2±313.2 | 1,033.6±322.2 | 915.8±278.9 | 1,105.4±309.1 | 1,062.9±300.1 | 1,054.3±309.2 | 1,112.1±318.7 |
| Sprinting distance OP | 985.6±307.7 | 963.3±310.4 | 820.6±262.6 | 1,059.3±303.1 | 987.1±293.3 | 997.6±295.9 | 1,087.7±307.5 |
| High-Speed distance | 2,587.8±493.3 | 2,568.4±503.5 | 2,332.6±456.1 | 2,692.7±492 | 2,616.6±439.1 | 2,494.6±441.1 | 2,823.1±479.2 |
| High-speed effort | 186.7±35.5 | 187.5±36.1 | 166.8±32.1 | 195.8±36.2 | 187.9±31.7 | 177.7±29.9 | 204.7±33.7 |
| High-speed distance IP | 1,128.1±270.1 | 1,131.1±278 | 1,047.1±262 | 1,168.5±275.4 | 1,146.6±249.8 | 1,070.2±245.8 | 1,205.4±275.3 |
| High-speed distance OP | 1,341.6±327.0 | 1,301.8±314.5 | 1,184.3±283.8 | 1,393.9±319.7 | 1,360.1±308.5 | 1,319.6±321.7 | 1,491.5±331.8 |


Shots
Shots on target
Corners
Crosses
Possession %
PIOH%
Passes
Pass accuracy %
Forward passes
FPA %
Opponent 35m entrie
OPAE
50-50 challenge wor
Fouls committed
Offsides
Yellow card
Red card
Total distance
Total distance IP
Total distance OP
Sprinting distance
Sprinting efforts
Sprinting distance IP
Sprinting distance OF
High-Speed distance
High-speed effort
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Mean
2012 2014 2016
Season

Table 3. Odds ratios for fixed factors relating to the 6 seasons logistic backward (LR) stepwise regression models

| | Standardized OR mean (± 90% CI) | | | | | |
|---|---|---|---|---|---|---|
| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Shots | 0.58 (0.39,0.85) * | 0.59 (0.40,0.87) * | 0.66 (0.49,0.89) * | | | 0.63 (0.43,0.92) * |
| Shots on target | 4.50 (3.01,6.72) * | 2.64 (1.88,3.72) * | 1.86 (1.41,2.45) * | 2.91 (2.17,3.90) * | 2.69 (1.98,3.64) * | 3.44 (2.36,5.01) * |
| Corners | 0.71 (0.52,0.96) | 0.67 (0.51,0.89) * | | 0.76 (0.58,0.99) | | |
| Crosses | 0.51 (0.35,0.74) * | 0.55 (0.39,0.78) * | | 0.52 (0.37,0.73) * | 0.29 (0.21,0.41) * | 0.61 (0.45,0.84) * |
| Possession % | 138.51 (28.53,672.44) * | 14.31 (3.29,62.32) * | 5.46 (1.47,20.38) * | 15.47 (3.03,78.96) * | 51.22 (8.39,312.55) * | 108.49 (19.05,618.02) * |
| Passes | | | 2.68 (1.30,5.50) * | | | 2.69 (1.16,6.25) * |
| Pass accuracy % | | | 0.50 (0.32,0.80) * | 1.54 (1.04,2.29) | 0.47 (0.25,0.88) * | |
| Forward passes | | | | | 0.62 (0.40,0.98) | 0.42 (0.25,0.70) * |
| FPA % | | | 1.93 (1.34,2.79) * | | 1.78 (1.04,3.05) | |
| 50-50 challenge won | | | | | 1.72 (1.36,2.17) * | |
| Fouls committed | | | | | | 1.43 (1.11,1.83) * |
| Red card | | | | 0.66 (0.46,0.96) | | |
| Total distance | 1.79 (1.18,2.72) * | | 2.06 (1.27,3.33) * | 1.98 (1.14,3.43) * | | |
| Total distance IP | 0.02 (0.01,0.05) * | 0.15 (0.05,0.41) * | 0.09 (0.03,0.25) * | 0.08 (0.03,0.22) * | 0.16 (0.05,0.49) * | 0.02 (0.01,0.09) * |
| Total distance OP | 15.40 (5.53,42.90) * | 7.32 (2.68,19.97) * | 2.75 (1.16,6.51) * | 5.13 (1.68,15.63) * | 19.32 (6.11,61.08) * | 57.03 (17.23,188.68) * |
| Sprinting distance | | | 3.43 (2.30,5.11) * | 0.31 (0.19,0.53) * | 0.06 (0.02,0.15) * | |
| Sprinting efforts | | 0.47 (0.28,0.78) * | | | 5.18 (2.12,12.65) * | |
| Sprinting distance IP | 2.57 (1.91,3.46) * | 5.13 (3.18,8.28) * | | 4.53 (2.80,7.35) * | 9.79 (5.58,17.17) * | 1.81 (1.34,2.45) * |
| Sprinting distance OP | 0.31 (0.21,0.44) * | | 0.18 (0.12,0.27) * | | | 0.68 (0.49,0.96) |
| High-Speed distance | 1.61 (1.06,2.43) | 2.41 (1.26,4.62) * | | 2.23 (1.15,4.31) * | 42.00 (4.11,429.80) * | 69.13 (11.04,432.73) * |
| High- speed distance IP | | | | | 0.11 (0.03,0.44) * | 0.19 (0.06,0.54) * |
| High-speed distance OP | | 0.33 (0.17,0.64) * | | 0.45 (0.23,0.90) | 0.05 (0.01,0.27) * | 0.03 (0.01,0.11) * |
| Quality of opponent | 0.40 (0.31,0.51) * | 0.35 (0.27,0.45) * | 0.36 (0.27,0.48) * | 0.24 (0.18,0.32) * | 0.35 (0.26,0.47) * | 0.19 (0.13,0.27) * |
| Match location | 4.69 (2.85,7.72) * | 4.54 (2.82,7.30) * | 1.78 (1.17,2.71) * | 2.41 (1.50,3.87) * | 3.36 (2.05,5.49) * | 7.06 (4.01,12.43) * |
| Chi-square | 254.36 | 224.08 | 184.32 | 256.36 | 273.92 | 287.16 |
| Cases correctly classified | 82.0% | 80.6% | 76.8% | 83.3% | 83.4% | 85.7% |

* $p \leq 0.05$