

Analysis of Goal Scoring Patterns in the 2018 FIFA World Cup

by
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The aim of this study was to analyse the goal scoring patterns during the 2018 FIFA World Cup. All goals scored during the tournament were analysed using the InStat video analysis system. The results showed that 169 goals (open play: 60.9%; set play: 39.1%) were scored during the competition. While 85 goals (82.5%) were scored from elaborate attacks, 18 goals (17.5%) came from counter attacks. A chi-square test indicated that there was a significant difference in the type of possession ($\chi^2(1, n = 103) = 43.58, p = 0.00$). The highest number of goals was yielded from the final third (35%) as compared to the first (33%) and middle (32%) thirds. The results also indicated that most goals accounted from short passes (69.9%), while 13.6% of goals came from long passes and 16.5% from mixed passes ($\chi^2(2, n = 103) = 62.12, p = 0.00$). Soccer coaches should incorporate set pieces in their training sessions in view to improve goal-scoring opportunities.

Key words: goals, set pieces, open play, tactics, performance.

Introduction

Soccer is the world's favourite sport, played by over 240 million players in 1.4 million teams registered in 300,000 clubs around the world (Acar et al., 2009). Every four years, billions of people in more than 200 countries watch the month-long FIFA World Cup, which is undoubtedly the biggest tournament in association soccer (Acar et al., 2009). The World Cup is the greatest prize in soccer and provides an opportunity to examine the best national teams and players in the world. In addition to the anthropometric, psychological and physiological research, analysis of performance of soccer players in the field in terms of techniques and tactics has become popular (Acar et al., 2009).

Scoring goals is the ultimate determinant of successful soccer team performance and has received extensive attention among researchers (Jones et al., 2004; Tenga et al., 2010; Yiannakos and Armatas, 2006). This is prompted by the fact that goal scoring is paramount for any team's success (Hughes and Churchill, 2005). Armatas et al. (2009) evaluated goals scored in soccer matches during the 2006–2007 Greek Super League season and

found that 59% of the goals were scored in the second half. Alberti et al. (2013) also indicated that a significantly higher frequency of goals was recorded in the second half, with the highest scoring rate noted in the final 15-min period of the game during major European soccer leagues.

Mitrotasios and Armatas (2014) analysed 76 goals scored from 31 matches during the 2012 European Football Championship in Poland-Ukraine. They reported that most goals were scored during open play (72.4%), while 27.6% came from set play. The possession style of play and corner kicks were the most productive sources of open play and set piece goals, respectively. Regarding the starting zone of attack, 56.6% of goals began from the attacking half, with 43.4% from the defending half. This demonstrates that teams should tailor their tactics in such a way that they win ball possession in the final third in order to improve goal scoring opportunities. With regard to the different lengths of possession, 61.8% of goals were scored from less than four passes (Mitrotasios and Armatas, 2014).

Despite that a substantial body of literature

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exists on goal scoring patterns in soccer (Acar et al., 2009; Mitrotasios and Armatas, 2014; Yiannakos and Armatas, 2006), there is a need to analyse how and when goals are scored in soccer because the game tactics continuously evolve and it is important for coaches to be cognisant of recent trends in goal scoring patterns especially at the FIFA World Cup. Additionally, such information could be very useful to soccer coaches in designing and implementing training programmes and choosing appropriate goal scoring tactics, thus enhancing the chances of team success (Yiannakos and Armatas, 2006). Therefore, this study was carried out to analyse the goal scoring patterns during the 2018 FIFA World Cup.

Methods

Match sample and data source

A total of 169 goals were scored at the group and knockout stages of the FIFA World Cup held in Russia from the 14th of June to the 15th of July 2018. Videotapes of all goals scored during the tournament were analysed using the InStat video analysis system. InStat is a Russian-based private company that analyses individual and team performances in soccer. Ethical clearance was obtained from the Ethics Committee of Tshwane University of Technology, Pretoria, South Africa.

Performance variables

Performance variables in the present study consisted of (1) the number of goals scored from set pieces (corner kicks, free kicks, penalties, throw-ins), (2) the frequency of goal scoring from open play during a 15-min interval (1–15, 16–30, 31–half time, 45–60, 61–75, 76–full time), and (3) the offensive variables of goals scored from open play. Offensive variables included the team possession type (counter and elaborate attacks), starting zone (first, middle and final thirds), pass number (short, medium and long possession), and pass length (short, long and mixed passes). Operational definitions of these offensive variables are provided in Table 1.

Reliability testing

An intra-observer test using the kappa measure of agreement was undertaken to assess the reliability of all variables. Of 103 goals scored from open play, 13 (12.6%) randomly selected were analysed and reanalysed by the principal investigator after three weeks in order to reduce learning effects (O'Donoghue, 2015). The kappa

values ranged from 0.81 to 1.00, demonstrating that the strength of agreement was *very good* for all performance variables (Table 2).

Statistical analysis

Descriptive statistics such as frequencies and percentages were used to analyse the data. A chi-square goodness-of-fit test was applied to examine whether any significant differences existed regarding the possession type, starting zone, pass number and pass length. A probability level of $p \leq 0.05$ was used to indicate significance. Data were analysed using the Statistical Package for Social Sciences (SPSS) version 25.

Results

The results showed that 169 goals were scored with an average of 2.64 goals per match during the tournament. While 66 goals (39.1%) were scored from set play, 103 (60.9%) came from open play. From a set play perspective, most goals emerged from penalties (34.9%), followed by corner kicks (31.8%), free kicks (30.3%) and throw-ins (3.0%). Concerning the frequency of goal scoring during open play, most goals were scored in the second half (63%), with the highest number of goals recorded in the 45–60 minutes of the game (28%) (Figure 1). Presented in Table 2 are summary statistics of goals scored from open play.

Eighty-five goals (82.5%) came from elaborate attacks, while 18 goals (17.5%) resulted from counter attacks. A chi-square test showed that there was a significant difference in the type of possession ($\chi^2 (1, n = 103) = 43.58, p = 0.00$). Short ball possession (50.5%) yielded a significantly higher number of goals scored than long (31.1%) and medium (18.4%) ball possession. With regard to the starting zone, 35, 33 and 32% goals resulted from the final, first and middle thirds, respectively ($p > 0.05$). The results also indicated that most goals came from short passes (69.9%) in contrast to long (13.6%) and mixed (16.5%) passes, which yielded a significant difference ($\chi^2 (2, n = 103) = 62.12, p = 0.00$).

Table 1*Operational definitions of offensive variables (Tenga et al., 2010)***Categories and variables****Possession type**

Elaborate attack: starts by winning the ball in play and progresses either (a) without utilising or attempting to utilise a degree of imbalance, or (b) by creating or attempting to create a degree of imbalance by using late (third or later, evaluated qualitatively) penetrative passes or dribbles. Not utilising a degree of imbalance means seeking penetration in such a way that a defending team manages to regain a high degree of balance before the end of team possession. Elaborate attacks often progress relatively slowly

Counter attack: starts by winning the ball in play and progresses by either (a) utilising or attempting to use a degree of imbalance from start to the end, or (b) creating or attempting to create a degree of imbalance from start to the end by using early (i.e. first or second, evaluated qualitatively) penetrative passes or dribbles. Utilising a degree of imbalance means seeking penetration in such a way that a defending team fails to regain a high degree of balance from the start to the end of team possession. Counterattacks progress relatively quickly

Starting zone

First third: that third of the playing field estimated from own goal line to the middle third

Middle third: that third of the playing field estimated from the end of the first third to the final third

Final third: that third of the playing field estimated from the end of the middle third to the opponent's goal line

Pass number

Short possession: one or two passes per team possession

Medium possession: three or four passes per team possession

Long possession: five or more passes per team possession

Pass length

Long passes of 30 m or more estimated distance and shorter estimated distances for short passes

Long: only long pass

Mixed: combination of long and short passes

Short: only short pass

Table 2*Reliability test analysis*

Reliability test	Variable	Kappa value	Strength of Agreement (Altman, 1995)
Intra-observer	Possession type	0.81	Very good
Intra-observer	Starting zone	0.88	Very good
Intra-observer	Pass number	0.88	Very good
Intra-observer	Pass length	0.86	Very good
Intra-observer	Frequency of goal scoring	1.00	Very good

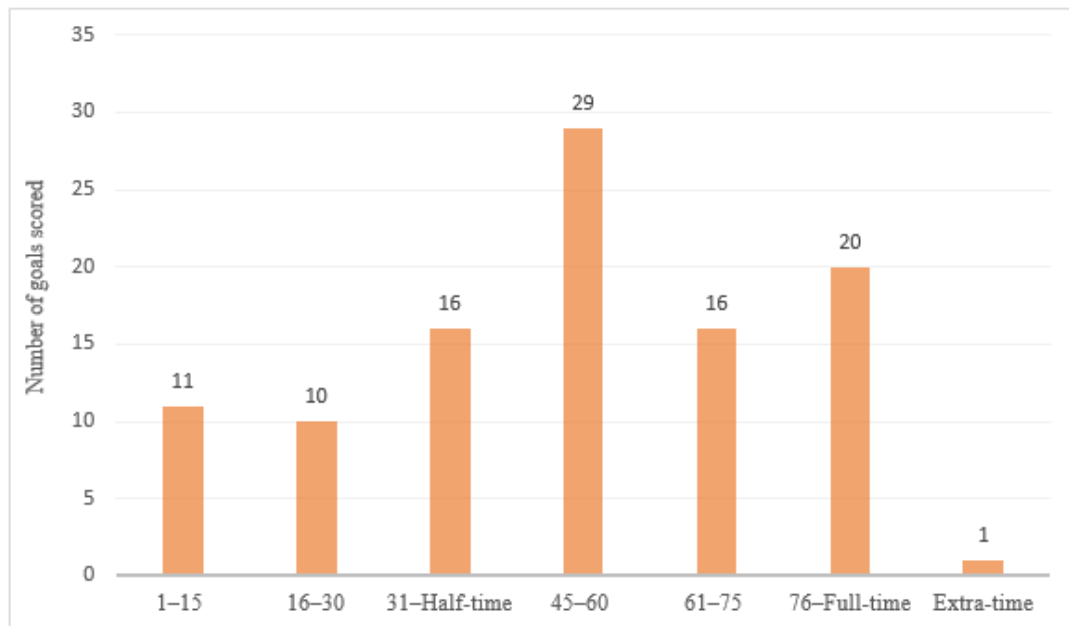


Figure 1

Number of goals scored per 15-min period

Table 3

Offensive variables of goals scored from open play during the tournament

	n	%	χ^2	p
Possession type			43.58	0.00*
Elaborate attack	85	82.5		
Counter attack	18	17.5		
Starting zone			0.14	0.93
First third	34	33.0		
Middle third	33	32.0		
Final third	36	35.0		
Pass number			16.10	0.00*
Short possession	52	50.5		
Medium possession	19	18.4		
Long possession	32	31.1		
Pass length			62.12	0.00*
Short pass	72	69.9		
Long pass	14	13.6		
Mixed pass	17	16.5		

**Significant at 0.05*

Discussion

The purpose of this study was to investigate the goal scoring patterns at the 2018 FIFA World Cup. The findings show that 63% of goals were recorded during the second half of the game. This scoring rate was higher than 57% of goals scored in the second half during the 2014 FIFA World Cup in Brazil (Michailidis, 2014). The high number of goals scored during the second half could be explained by the fact that players' physical performance tends to deteriorate during this period due to the onset of fatigue. Consequently, fatigued players experience lapses in concentration that may lead to tactical errors, thereby increasing the vulnerability of the defence to conceding goals (Carling et al., 2005).

The results of this study further showed that most goals were scored in the first 15 minutes of the second half and the latter part of the game. Specifically, players seek physical means of registering their presence on the opposition at the start of the second half, whilst in the last quarter such players contest for possession and usually become more desperate. Therefore, the late surge in goals scored may be an inherent factor in the game as play becomes more exigent towards the end (Carling et al., 2005). Teams that are losing seem to have a sense of urgency towards the end of the game because they always strive to draw or win during tournaments. Subsequently, such teams usually take risks by pushing more players forward to gain an advantage over the opponents in order to create more goal scoring chances, thereby scoring or conceding goals (Reilly, 1997).

From a set play viewpoint, the highest number of goals at the 2018 FIFA World Cup emerged from penalties. This could be attributed to the use of Video Assistant Referees (VARs) which was designed to review video footage on contested or uncertain decisions and advise the referee accordingly if a wrong call was made (FIFA, 2018). Consequently, more penalties were awarded which resulted in most goals being scored from this type of a set piece. The finding in which most goals were scored from corner kicks substantiates the results reported by Njororai (2013), who indicated that corner kicks were the most productive sources of set piece goals in the 2010 FIFA World Cup competition hosted in South Africa. Relatively few goals scored through throw-ins in this study could be attributed to the

fact that they provide an excellent opportunity to maintain ball possession (Carling et al., 2005). Overall, the upward trend in the number of goals scored from set plays was observed, increasing from 22% in the 2014 World Cup to 39% in the 2018 World Cup. This result demonstrates that scoring from open play is becoming more difficult and consequently, soccer coaches should pay more attention to practicing set plays in their training sessions in order to create more goal-scoring opportunities.

Additionally, more goals resulted more from short passes than long passes. Oberstone (2009) reiterated that employing short passes was a more reliable way of advancing the ball to the opponent's half than moving the ball with a higher proportion of less accurate, long passes. The finding in which most goals came from short possession is consistent with that of Wright et al. (2011). Acar et al. (2009) are of the view that playing fast and being well organised in attacking positions yields more scoring opportunities. The current study indicated that a higher number of goals emanated from the final third than the first and middle thirds of the field. However, it should be noted that regaining ball possession in the final third requires players to have high levels of fitness needed to efficiently execute match tactics which involves pressurising the defence throughout the game (Wright et al., 2011).

Practical implications

The findings of the present study provide practical implications for coaches. Soccer scientists and coaches should modify their training programmes such that players are well-conditioned in order to tolerate fatigue. This will ensure that players have high levels of fitness to maintain concentration and match tactics efficiently throughout the game. Soccer coaches should pay more attention to practicing set plays, especially corner kicks and free kicks, more effectively because of their potential to team success. Finally, coaches should deploy tactics which would allow players to play short passing game and regain ball possession in the opponent's half in order to increase goal-scoring opportunities.

Conclusion

The results indicated that most goals were scored during the second half of the game, with a greater number of goals conceded in the first 15 minutes of the second half and the final period of

the game. While a downward trend was observed in goals scored during open play, there has been an increase in the number of goals scored from set plays in the last two successive world cups. More

goals were scored from short passes than long and mixed passes. Most goals emerged from the final third in contrast to first and middle thirds.

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