

**Exploring the Association between Indicators of Football Performance and
Match Outcome: A Qatar Stars League Perspective**

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Abstract

This study explores the association between performance indicators and match outcome in football in Qatar. To the best of the author's knowledge, there have been no published match analysis studies in the Middle East focusing solely on technical indicators of football performance. Previous match analysis research has been largely focused on physical performance indicators and there have only been a few recent studies on technical performance indicators. These studies have found outcomes such as goals, shots and shots on targets were determinants of success, however this study looked deeper into the actions leading up to these actions to determine other performance indicators that had a positive association with match outcome.

Using pre collected data from the eight seasons of the Qatar Stars League (2011-2019), 23 performance indicators were analysed using a Poisson regression to determine their association with match outcome. Participants in the study were players in the Qatar Stars League from 2011 - 2019 and were full time professional footballers. Although this study did not use any individual data, the combined totals of 905 players were used. Data was collected by the external company STATS using six elevated fixed cameras in each stadium as well as the footage of the match broadcast by the Al Kass television channel. Data was downloaded from a secure online database to access the 23 performance indicators for each team for each match.

Key findings in the study were that winning teams had had more goals scored and shots on target (as per previous studies), but fewer crosses, successful crosses, opposition third entries, corners, and passes than losing teams. This suggested that it is the of quality of performance indicators that lead to goals, rather than just the quantity. In terms of defensive performance indicators, winning teams had less goals and shots conceded as per previous research but also more clearances and tackles. This highlighted the value of defensive actions and making appropriate decisions of when to clear instead of attempting to pass. Higher ranked teams had more passes and shots when they won showing they value possession no matter what the score. Lower ranked teams had more clearances when they won, further highlighting the importance of this action.

Although this study was based in the Middle East, this research could be applied in other leagues to determine if there are differences between leagues, or at a team level to assist coaching staff in their decision making. One novel finding of this study was the

importance of clearances. Team staff may wish to address this in training to increase successful results for their team. This study has highlighted which performance indicators have an association with match outcome at a team level, but future research may wish to consider performance indicators by position, the timing of performance indicators in the match, or the integration of physical performance indicators.

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Attestation of Authorship

I hereby declare that this submission is my own work and that, to the best of knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.



Gary Connell

Date:

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Ethical Approval

The application for ethical approval to AUTEK – AUT University’s ethics committee was completed in July 2020. The ethics application was referred to the AUT University Ethics Committee.

Ethical approval was granted on 29 July 2020 by AUTEK. Reference: 20/175 (Appendix 1)

Chapter 1: Introduction

1.1 Aim of the Study

The aim of this study was to investigate the teams in the Qatar Stars League and determine the association between performance indicators (PIs) and the match outcome, and whether this differs between teams of different league rank. Previous studies like this have found outcomes such as goals, shots and shots on target are determinants of success but this study looks to go into more depth about the actions leading to these outcomes, as well as defending PIs. The ultimate goal of the current research was to be able to provide each team with specific and individualised PIs that can be used to help determine success.

1.2 Research Questions and Purpose

The objective was to examine professional football teams to determine what is the association between PIs and the match outcome (win, loss or draw), and whether this differed among teams. The research questions were:

1. What is the association between different PIs and match outcome in the Qatar Stars League?
2. Does the association between PIs and match outcome differ among teams of different ranking?

1.3 Background and Significance of Research

Performance in football is the result of dynamic interactions of tactical, technical and physical and movements from all players (Bradley et al., 2011). Past research on football players focuses primarily on physical performance analysis or a combination of physical and few technical parameters, whilst studies focusing primarily on technical and tactical performance were not as common (Russell, Rees, & Kingsley, 2013). Furthermore, these studies reported contradictory findings (Clemente, Figueiredo, Martins, Mendes, & Wong, 2016). Despite the smaller amount of research devoted to the area, the technical actions are better predictors of success in football compared to pure physical parameters (Bush, Barnes, Archer, Hogg, & Bradley, 2015; Russell et al., 2013).

Knowledge of specific PIs and their association with match outcome is critical and has been used to identify areas to focus increased attention (Castellano, Casamichana, & Lago, 2012; Lepschy, Wäsche, & Woll, 2020). Diaz-Diaz et al., (2019) noted that the advantage of assessing performance over a long period such as a season, rather than looking at a single match, was that it allowed discovery of the important PIs of the teams involved in the analysis, and what impact they consistently had on match outcome. This is an important point as it removes the opposition as a key factor in the results as there will be multiple opposition included. Identifying these PIs in football has been a topic of increased research in recent years in league competition as well as international tournaments.

Prior to 2015, research tended to focus on only a small number of PIs and there have only recently been a few studies that have included greater than 20 variables in professional football (Lepschy, Wäsche, & Woll, 2020; Liu, Hopkins, & Gomez, 2016; Liu, Gomez, Lago-Penas, & Sampaio, 2015). Although there are some differences in PIs chosen, the studies agreed that defensive errors, goal efficiency, shots and shots on target, and penalty area entries had the greatest impact on match outcome (Lepschy, Wäsche, & Woll, 2020; Mao, Peng, Liu, & Gomez, 2016). These studies have displayed an effective way of exploring the relationship between PIs and match outcome in both international football and professional European football. However, not all recorded events and variables can be attributed as meaningful, because meaningful PIs should be related to the match outcome (Liu et al., 2016).

Although defending is considered as important as attacking to achieving a positive match outcome in football, it has not received as much attention in the literature (Low et al., 2018). This has increased recently due the introduction of modern tracking technologies and therefore readily available defensive PIs. Key defensive PIs that have been investigated are tackles (Lepschy, Wäsche, & Woll, 2018; Schauburger, Groll and Tutz, 2018) and clearances (Jamil, Liu, Phatak, & Memmert; 2021; Lepschy, Wäsche, & Woll, 2020; Modric, Versic, Sekulic, & Liposek, 2019). Furthermore, opposition PIs have been investigated such as shots, passes and chances which also give an indication of the defensive success of a team.

Other team sports such as Gaelic football (Gamble, Bradley, McCarren, & Moyna, 2019), beach soccer (Musa et al., 2019) and netball (McLean et al., 2019) have also tried to determine the PIs that are related to match performance. The studies involving Gaelic football and netball found similar PIs as football. They identified shooting, defensive factors and passing factors as PIs linked with match outcome. However, the study into beach soccer (a sub facet of football) returned the same factors as in football, but also highlighted that goalkeeper errors was a PI in identifying match outcome. It is important for football researchers to know the developments in other sports, as many team sports share the same PIs and could be used to guide future developments.

Kempton et al., (2015) found that there is far greater variability in technical measures than in physical factors, and that looking at one technical variable over time will provide little value. This suggested that understanding multiple technical PIs may lead to more meaningful association with match outcome. Therefore, the development of technical performance profiles that combine PIs is an important task to reveal new trends in football performance and, ultimately, contribute to improve performance in both training and matches (Liu, Gomez, Goncalves, & Sampaio, 2016).

There can be large differences in quality between the top and bottom teams in a league or even between the top and middle teams in a league. In general, the technical level of proficiency is better in higher ranked teams than in lower ranked teams (Sgro & Lipoma, 2016). Varley et al., (2016) found that top ranked teams have better defensive ratios in PIs than lower-ranked teams, and also had a greater number of shots and shots on target. Higher ranked teams also lose the ball less than lower ranked teams (Casal, Losada, Barreira, & Maneiro, 2021). Liu, Gomez, Goncalves and Sampaio (2016) showed that players from the top three teams in the Spanish league achieved more assists, shots on target, ball touches, passes, through balls, successful dribbles, and higher pass accuracy, highlighting that top teams have greater attacking PIs that have an impact on match outcome

There is limited research investigating how between-team differences relate to match outcome (Robertson, Back, & Bartlett, 2016). Perl and Memmert (2017) created a model that measured effectiveness in football however it has a high level of complexity and is unlikely to be used by coaches, as they would need a dedicated statistician to prepare this each week. A similar approach was introduced by Santos, Theron, Losada, Sampaio and Lago-Penas (2018) who used complex data analysis and geospatial data to

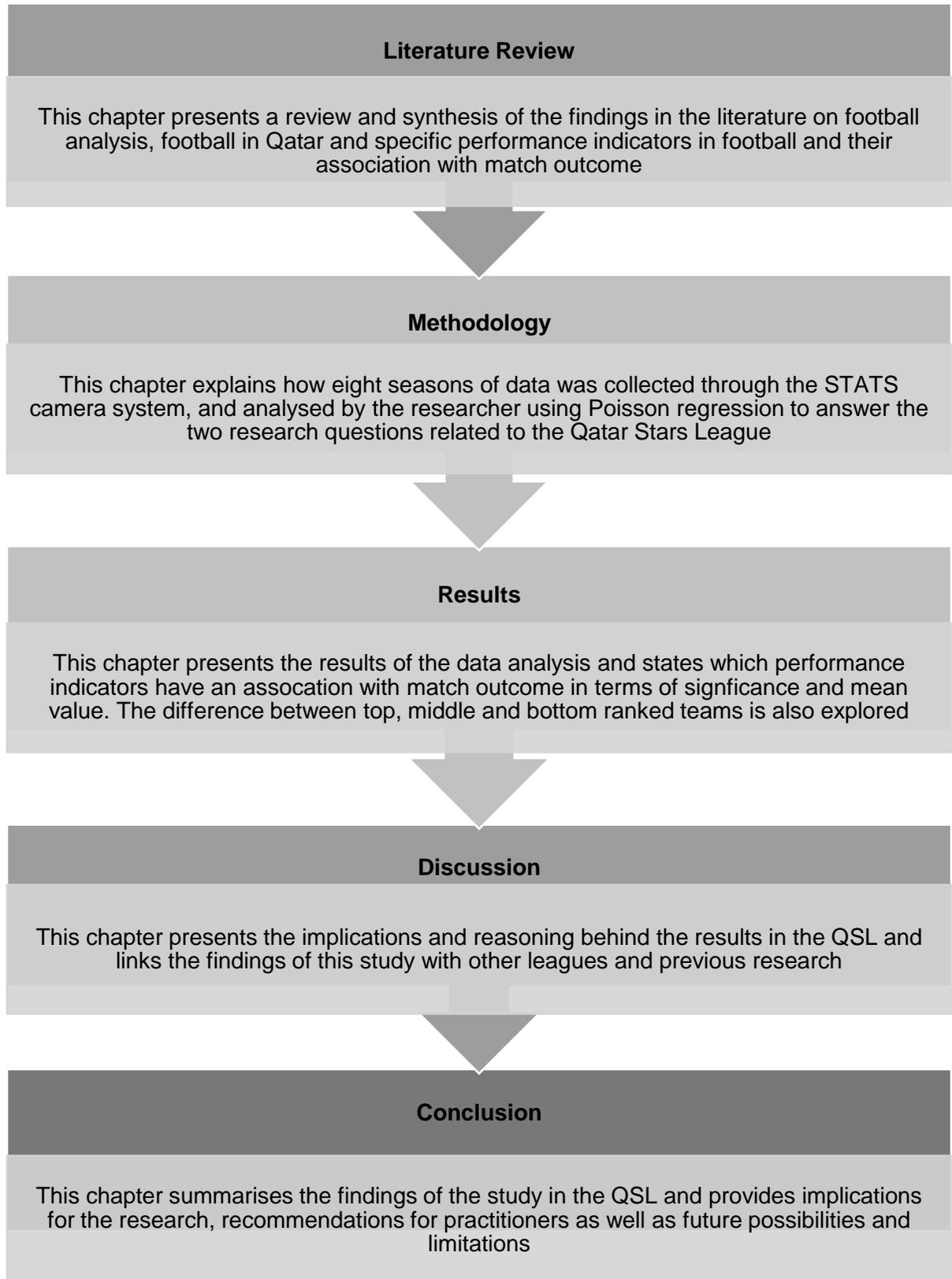
improve on the current data presentation techniques available in football. However, this has the same problem of needing an external expert to carry this out rather than the full time staff working with the football teams.

1.4 Choice of Research Methodology

The methodology used for this retrospective study was a quantitative research design. Quantitative research methods are concerned with collecting and analysing data that is structured and can be represented numerically (Goertzen, 2017). This kind of research is rooted in the empiricist or positivist paradigm wherein philosophical underpinnings, assumptions, and values are not explicitly articulated (Duffy & Chenail, 2009). Since quantitative research focuses on data that can be measured, it is useful for answering the 'how' or the 'what'. This is relevant for this study as it focusses on the association between PIs and match outcome.

This study was a descriptive study exploring the association of technical PIs with match outcome in football matches. The method chosen was the Poisson regression model, which is the standard statistical method used for the analysis of count data (Ishigami, 2016). To study associations in football and other sports, slightly modified Poisson distributions have been widely used in studies and practice (Wunderlich & Memmert, 2016). Applying this type of regression model makes it possible to estimate simultaneously, instead of individually, the magnitude of the effects of several PIs influencing the match outcome.

1.5 Overview of Thesis



Chapter 2: Literature Review

2.1 Introduction

Football, or soccer, is played in almost every country in the world at a professional level, making it the world's most popular sport with over 260 million participants worldwide (Liporaci, Saad, Grossi, & Riberto, 2017). It is the most popular sport in Qatar (Hukoomi, 2020), which will be at the centre of the footballing world in 2022, when it hosts the world's biggest sporting event; the FIFA World Cup (Qatar Ministry of Development Planning and Statistics, 2017). Football is a highly complex team sport, where performance is a consequence of tactical, technical and physical skills of the individual players (Bangsbo, 1994). This makes defining success in football difficult, despite the knowledge of success factors in professional football being critical (Lepschy, Wäsche, & Woll, 2020). Due to football being a low scoring game which makes scoring a goal a rare event. Therefore, the final match outcome does not provide a clear understanding of the team's performance and other factors must be considered.

The use of PIs is therefore useful to explain success. The PI is an action variable that defines an aspect of a successful performance (Hughes & Bartlett, 2002) and a key performance indicator (KPI) is a significant PI. The analysis of PIs relating to match outcome is useful from both a tactical and strategic perspective in football. Such information can be used to suggest areas that should be prioritised in training or to identify strengths and weaknesses of an opponent (Castellano, Casamichana, & Lago, 2012). Furthermore, this data can be used to inform coach decision-making with respect to focusing on those PIs which are of greatest relevance to achieving a positive match outcome (Robertson, Back, & Bartlett, 2016).

This review will focus on performance analysis in football in terms of technical, physical and tactical analysis. PIs and association with match outcome in football will be investigated and how this data is currently being used. Furthermore, specific areas of football analysis will be investigated including set plays, goal scoring, passing, defending and positional play. Situational variables can also have an impact on football success, and these will be investigated and related to how this can impact on match outcome. Football can also learn from other sports, particularly invasion sports, so studies in other sports around success will be reviewed. Finally, complex statistical approaches will be examined

as a method for predicting match outcome in football. Each perspective is then related back to the Qatar context where appropriate.

To conduct this literature review, the author searched the electronic databases SCOPUS and SPORTDiscus with Full Text (EBSCO) to find studies using the following search terms: 'Performance Indicators' and 'football' or 'soccer' and 'match outcome' or 'success'. An additional search was conducted removing the 'football' or 'soccer' search terms to identify studies in other sports. There were no restrictions on publish status or year of publication.

2.2 Football in Qatar

The Qatar National Team are ranked 42nd in the world (FIFA, 2021), and are the current Asian Champions, having won the Asian Cup for the first time in 2019. The top league in Qatar is the Qatar Stars League (QSL) which represents the highest standard of professional football in Qatar, and all players are full time professionals. There are 12 teams in the league, each made up of a maximum of 5 foreign professionals, with the rest being Qatari players. To give the QSL a global perspective, it is ranked as the 35th best football league in the world (The Kick Algorithms, 2020). In comparison, the English Premier League is rated as the best league in the world, the Australian A-League is rated as the 58th best league, and the New Zealand Premiership is rated as the 73rd best league in the World (The Kick Algorithms, 2020). The highest ranking QSL club is Al Sadd, rated as the 202nd best in the world (Club World Rankings, 2020) while the only New Zealand club rated is the Wellington Phoenix who play in the Australian A-League, which are the 519th best club in the world (Club World Rankings, 2020).

To the author's knowledge there has been no study focusing on the association between indicators of football performance and match outcome in professional football in Qatar, or indeed the Middle East. There have been studies in the Middle East focusing on physical match analysis and injury (Lolli et al., 2020), or a combination of physical and technical analysis in youth tournament football (Varley et al., 2016). However there have been no studies on technical PIs and their association with match outcome in professional leagues. One study which did look at PIs in football was during the 2015 Asian Cup (Ermidis, Randers, Krustup, & Mohr, 2019), which involved teams and players from the Middle East. However, this was focused on a short international tournament, and compared position to position rather than looking at the association of PIs with match at a team level. Adambekov (2014) investigated the PIs and association with match outcome in

the Kazakhstan Premier League team, however this was only looking at one team so cannot be said to represent the league. Furthermore, although Kazakhstan is in Asia, it is officially part of the Union of European Football Associations so this would be considered a European study. A study by Mitrotasios, Gonzalez-Rodenas, Armatas, and Aranda (2019) compared the goal scoring opportunities between four top European leagues. This is rare in the literature and provides a model for looking at between league differences and similarities, and to see if any findings are league specific or not. Although this was only in European leagues, this would be useful to compare to other parts of the world, including in Qatar.

2.3 Performance Analysis in Football

Football researchers have investigated the technical, tactical and physiological components of football since the 1960s in order to determine the PIs that have an impact on match outcome (Mackenzie & Cushion, 2013). Although performance analysis is now an integral part of coaching and is widely accepted among coaches, players, and sport scientists as a valuable part of the feedback process (Drust, 2010), previous research into football performance analysis has had a minimal impact on practice and performance (Drust & Green, 2013; Mackenzie & Cushion, 2013). This shows that there has been some disconnect between research and practice. McLean et al., (2019) stated that this was due to football consisting of multiple interacting components, operating within a dynamic and changing match environment, but the majority of studies do not reflect this. More recently, advances in technology such as computer and video match analysis systems have led to a substantial increase in football performance analysis literature and methods (McLean, Salmon, Gorman, Read, & Solomon, 2017). This has had substantial impact on technical match analysis as there are hundreds of readily available technical PIs which describes an action variable that defines an aspect of a positive performance (Hughes & Bartlett, 2002). Having readily available PIs will allow more time for team staff and researchers alike to interpret the PIs supplied and identify their association with match outcome.

Technical PIs in sports are a key topic of analysis for coaches, and increased analysis technology has provided coaches easy access to detailed information. Ziyagil and Kesilmis (2017) suggested that technical PIs in football determine the strengths and weaknesses of players and make it possible to identify individual skills and team structure composed of offensive and defensive tactics. In more recent times, video analysis

systems, such as OPTA and STATS, provide an extensive database of technical PIs automatically, reducing the workload on team staff. As a result of the introduction of these systems, coaches, team staff and researchers frequently utilize these to gain insights into football match performance and impact on match outcome (Gong, Cui, Gai, Yi, & Gomez, 2019). A vast collection of data is supplied to the teams either live or immediately after the match, allowing far more complex analysis than was previously possible. These external companies provide data on both technical and physiological PIs.

With the introduction of specific strength and conditioning coaches into high performance environments, there is a greater focus on the analysis of physical PIs of teams. One of the key roles of these fitness coaches is to monitor physical load, which has become a key factor for the control of the training process in sport (Rebello et al., 2012) and many clubs employ multiple practitioners in this area (Weston, 2018). Previous studies have looked at physical match analysis in detail in terms of PIs such as distance and sprinting (Sweeting, Cormack, Morgan, & Aughey, 2017), accelerations and decelerations (Harper, Carling, & Kiely, 2019) or a combination of multiple metrics (Andrzejewski, Chmura, Konefal, Kowalczyk, & Chmura, 2018) to determine what impacts match outcome. These studies assist coaching staff to determine which physical PIs are considered the most important for their team to achieve a successful match outcome. However, physical data should be used in conjunction with tactical and technical information, to have an increased understanding of their impact on match outcome (Beato & Jamil, 2017; Christopher, Beato, & Hulton, 2016).

Performance in football is the result of dynamic interactions of tactical, technical and physical and movements from all players (Bradley et al., 2011). Recent research on football players focuses primarily on physical performance analysis or a combination of physical and few technical PIs, whilst studies focusing primarily on technical and tactical performance are not as common. Despite the smaller amount of research devoted to the area, the technical PIs are better predictors of match outcome in football compared to pure physical parameters (Bush, Barnes, Archer, & Hogg, 2015; Russell et al., 2013). However, Kempton et al., (2015) found that there is far greater variability in technical PIs than in physical factors, and that looking at one technical variable over time will provide little value. This suggested that looking at multiple technical PIs would lead to more meaningful associations with match outcomes. Furthermore, the development of performance profiles that combine both technical and physical PIs could be an important task to reveal new trends in understanding which PIs positively have impact on match outcome and,

ultimately, contribute to improved performance in both training and matches (Liu, Gomez, Goncalves, & Sampaio, 2016). The final piece to football analysis is tactical analysis, which requires a different kind of analysis than physical and technical analysis due to its more subjective nature.

Coaches design the team tactics and select the plan for each game that needs to be carefully implemented by the players (Andrienko et al., 2019). However, it is only recently that performance analysis researchers have begun to analyse the tactics implemented by each team throughout the match. It has been suggested that this was due to the lack of accessible or reliable data, or because the tactics were too subjective to define (Rampinini, Coutts, Castagna, Sassi, & Impellizzeri, 2007). One key development that has emerged that does provide reliable tactical PIs are the tracking systems that study players' tactical behaviours (Memmert, Lemmink, & Sampaio, 2017; Rein & Memmert, 2016; Sarmiento et al., 2018). However, Rein and Memmert (2016) suggested that the gold standard to assess tactical behavior and team performance in general in elite soccer is based on individual game observations, rather than from data (Mackenzie & Cushion, 2013). This would involve a football expert, such as a coach, who observes a game and rates the tactics based on his own personal experiences. There are issues with this as it is very time consuming due to the manual observations. This is why simple tactical PIs from tracking system data are analysed more frequently to determine the impact on match outcome, but at a more basic level of understanding than subjective input.

2.4 Positive Match Outcomes in Football

Achieving a positive match outcome (win or draw) in elite football is a complex model that is influenced by a myriad of extrinsic and intrinsic elements of the game (Del Coso, de Souza, Campo, Blanco-Pita, & Resta, 2020). To identify the factors which lead to a positive match outcome in football, it is necessary to find PIs which significantly discriminate between the winning and losing teams (Lepschy, Wäsche & Woll, 2018). However, the identification of the PIs that impact performance in football pose a major challenge (Hughes & Franks, 2004). Recent studies have tried to determine these PIs comparing match statistics between winners and losers (Castellano, Casamichana, & Lago, 2012; Lago-Penas, 2012), or comparing teams between their ranking on the league table (Pappalardo & Cintia, 2018). Del Coso et al., (2020) proposed that to determine the PIs in football that have an impact on performance and eventually match outcome, the

indicators need only to be taken from high performing teams and not interpolating the data of lower performing teams. This suggestion would propose challenges due to how to define high performing teams; however it may be able to identify PIs of the most successful team or teams. Nevertheless, before beginning to analyse the PIs in football it is important to identify which indicators will be the most useful for a particular study.

Knowledge of specific PIs and their association with match outcome is critical and has been used to identify areas on which to focus more attention (Lepschy, Wäsche, & Woll, 2020; Castellano, Casamichana, & Lago, 2012). Diaz-Diaz et al., (2019) noted that assessing performance over a long period such as a season, rather than looking at a single match, allowed discovery of the important PIs of the teams involved in the analysis, and the impact they consistently had on match outcome. This was a key point as it removed the opposition as a main factor in the results, as there were multiple opponents included in the study. Identifying these PIs in football has been a topic of increased research in recent years at both club and national team level.

Prior to 2015, studies focused on only a small number of PIs (Evangelos et al., (2013) and there have only recently been a few studies that include more than 20 variables in professional football (Del Coso, et al., 2020; Lepschy, Wäsche, & Woll, 2020; Liu, Gomez, Lago-Penas, & Sampaio, 2015; Liu, Hopkins, & Gomez, 2016; Gomez, Mitrotasios, Armatas, & Lago-Penas, 2018). Although there are some differences in PIs chosen, the studies agreed that defensive errors, goal efficiency, shots and shots on target, and penalty area entries were found to have the greatest impact on match outcome (Lepschy, Wäsche, & Woll, 2020; Mao, Peng, Liu, & Gomez, 2016). Liu, Gomez, Lago-Penas, and Sampaio (2015) determined that match outcome in World Cup football was influenced by most of the 24 PIs included in their study, depending on the match and teams involved but found no conclusive PIs that affected match outcome. These studies have displayed an effective way of exploring the relationship between PIs and match outcome in both international football and professional European football. This could be applied to football in Qatar as the rules of the sport are the same despite the different location. However, not all recorded events and variables can be attributed as meaningful PIs, because meaningful PIs should be related to the match outcome (Liu et al., 2016). These meaningful PIs are defined as the ones that lead to goals and make a change to the usual flow in the game.

Previous studies in the association between indicators of football performance and match outcome have found specific attacking indicators such as goals, shots and shots on target have an association with match outcome, but further detailed understanding about the actions leading to these outcomes need to be investigated using the concept of perturbations. Perturbations are where the stable state of play is broken and a change in flow occurs (McGarry & Franks, 1996). James et al., (2012) analysed perturbation attempts in football which they defined as events which either caused a change in game state or did not. They described these actions as ones whose purpose was to create instability which in football meant to create a goal scoring opportunity. An attempt to create a goal scoring opportunity such as a pass into the penalty box, would be successful if an attacker was then in a position to score a goal and therefore cause a perturbation, and also alter the match outcome. Kim, James, Parmar, Ali and Vuckovic (2019) analysed 18 English Premier League matches, including three teams of different standard, and discovered that teams create these unstable situations differently, likely due to individual player characteristics, suggesting this may be why PIs differ between teams. The use of perturbations for determining the association between PIs and match outcome in football is an under researched topic in football analysis but may be useful once the appropriate number of PIs to include in a study has been established.

There have been numerous attempts to select the appropriate number of PIs to analyse when determining the association with match outcome in football. These studies, which have all been completed over the past five years, have looked at a larger number of PIs, for example Kim et al., (2020) examined 23 out of a potential 48 PIs. The values excluded were goalkeeper specific indicators, or actions that referred to a specific pitch area. This was similar to the approach by Lepschy, Wäsche, and Woll, (2018) who used 25 PIs. They determined 25 PIs in the categories of goal scoring, passing and defence. They concluded these were the appropriate number of PIs and categories based on previous studies (Castellano, Casamichana, and Lago, 2012; Liu, Gomez, Lago-Penas, and Sampaio, 2015; Liu, Gomez, Goncalves, and Sampaio, 2016). It is yet to be established what are the appropriate number of PIs to be used in a study examining the association with match outcome, however these previous studies have provided a guide to which PIs should be included in a study on football in Qatar.

Castellano, Casamichana and Lago (2012) found that the PIs related to attacking play that had the most impact on match outcome were total shots, shots on target and ball possession; and the most discriminating PIs related to defence were total shots conceded

and shots on target conceded. Similarly, PIs in the German Bundesliga that affect match outcome are frequencies of different types of shots (Konefal et al., 2018). However, Liu, Gomez, Lago-Penas, and Sampaio (2015) found that match outcome in football can be influenced by most of the 24 PIs included in their study on the 2014 FIFA World Cup and could not determine which were most important. This study was different because of the smaller amount of matches involved, and the fact it was a tournament played over a short period of time. However, Alves et al., (2019) found that the PIs that have the greatest impact on match outcome were ball possession and pass success during the group stage of the 2018 FIFA World Cup. This shows that there can be a variety of PIs that affect match outcome, but these seem to differ between league competition and international knockout competition, such as World Cups which are much shorter and involve less matches. Furthermore, when a team is playing to change a losing match outcome, the most important PIs that impact match outcome are frequencies of different types of passes and higher percentage of ball possession.

Although there are some differences, most studies agree that defensive errors, goal efficiency, shots and shots on target and penalty area entries showed to have the greatest impact on match outcome (Lepschy, Wäsche, & Woll, 2020; Liu, Gomez, Lago-Penas, & Sampaio, 2015; Mao, Peng, Liu, & Gomez, 2016). Teams that obtained a less successful match outcome were also shown to have less possession and less passes within a match (Jankovic, Leontijevic, Paisic, & Jelusic, 2011), while teams that obtain a positive match outcome complete more tackles (Schauberger, Groll, & Tutz, 2018). These studies have displayed an effective way of exploring the relationship between PIs and match outcome in both international football and professional European football. Although there have been many studies specifically considering PIs influencing match outcome in football, there are PIs in other sports that have also proved to be relevant.

Team sports such as Gaelic football (Gamble, Bradley, McCarren, & Moyna, 2019), beach soccer (Musa et al., 2019) and netball (McLean et al., 2019) have also tried to determine the PIs that are related to match performance. The studies involving Gaelic football and netball found similar PIs as football. They identified shooting, defensive factors and passing factors as PIs linked with match outcome. However, the study into beach soccer (a sub facet of football) returned the same factors as in football, but also highlighted that goalkeeper errors were a PI that can impact match outcome. One recent study in rugby sevens found that PIs leading to scoring points were a result of the PIs in the previous phase actions, which links to the idea of perturbations in sport (Barkell, Pope,

O'Connor, & Cotton, 2017). It is important for football researchers to know the developments in other sports, as many team sports share the same PIs and could be used to guide future developments. However, one difference in football is the use of tracking systems is far more prevalent in than any other sport so provides a much larger data set of PIs than other team sports.

2.5 Tracking Systems

Over the past decade, there has been extensive development of computer-aided tracking technology for the examination of player activity during both matches and training (Buchheit et al., 2014). To collect positional data and create PIs during official match-play, the worlds' top leagues, such as the English Premier League or German Bundesliga, as well as the Qatar Stars League, rely on optical tracking systems (Buchheit & Simpson, 2017). Such systems stitch the feed from multiple elevated cameras to record the entire pitch, which is then manually labelled with players (Sharma, Bhat, Gandhi, & Jawahar, 2018). The world's largest provider of tracking systems is STATS, which covers 3,900 competitions globally and 501,000 matches (STATS Perform, 2020). Several studies have examined the validity and reliability of the software such as the STATS software, which collects physical, technical and tactical PIs (Castellano, Alvarez-Pastor, & Bradley, 2014; Di Salvo, Collins, McNeill, & Cardinale, 2006; Linke, Link, & Lames, 2018). These studies validated the STATS tracking systems in a stadium environment and checked for positional accuracy and realism. These studies have concluded the PIs collected by these systems are valid, reliable and can be used to determine their association with match outcome. Since the tracking systems have been validated there has been an increase in studies using this data to investigate the association between PIs and match outcome.

Link, Lang and Seidenschwarz (2016) used multiple PIs gathered from tracking systems to represent the probability of scoring a goal in the Bundesliga and labelled it "Dangerousness." The closer they were to the goal, the more danger there was of a goal, therefore increasing the chancing of scoring and creating a positive match outcome. This adds a new concept to previously used PIs such as shots on goal, passing accuracy to determine association with match outcome. Carrilho et al., (2020) used tracking systems to identify team synergy as a new PI at the 2018 FIFA World Cup and it's impact on match outcome. The study found that synergy within the team increased when the team did not have possession as opposed to when it did, and that the home team had greater synergy than the away team. The greater the synergy within the team, the greater likelihood of a

positive match outcome. However, at a World Cup, despite one team being listed as 'Home' both teams are playing in a neutral country so this factor may be irrelevant. The data provided by tracking systems has huge potential for both team staff and for research, particular in Qatar where it is highly prevalent.

2.6 Football Analysis – Specific Areas

Tactics are hugely important in sport at the high performance level, where there is relatively little difference in technical skill level between players. Therefore, tactics can have a large impact on match outcome. Due to the importance of tactics, the evaluation of observable tactical behaviour in athletes has been a subject of substantial interest in recent years (Gonzalez-Villora, Serra-Olivares, Pastor-Vicedo, & da Costa, 2015). Since 2009, there have been several studies into tactical analysis, but these were based on observational data which discard most contextual information ([Rein & Memmert, 2016](#)). A key aspect of this is that PIs alone should not be used to determine tactics in a match and additional subjective context is required to establish the tactical objective of a team. This makes it difficult to link tactical behaviour to match outcome based solely on PIs. This has led to the processes underlying tactics in elite sport increasing while scientific approaches not evolving at the same pace (Rein & Memmert, 2016).

While both tactical analysis and physiological analysis have become the subject of increased use in recent years, linking physical PIs and analysis together to provide a combined association with performance is a relatively recent addition. However, the success of tactics depends on individual players' physical ability to carry out the required actions, (Rein & Memmert, 2016) so this kind of study would be very practical to coaches working in high performance sport. For example, Carling (2011) found that playing certain formations would require more total running distance than other formations. Therefore, to achieve positive match outcomes in certain formations, certain PIs relating to total running distance would be most important. This study was valuable as it looked across multiple seasons and looked at different teams as well as formations. Results like this indicate tactical behaviour and physiological PIs are linked, but valuable in-depth analyses are missing, as it is difficult to combine information about players' physiology with specific team tactics (Castellano, Alvarez-Pastor, & Bradley, 2014). Kempton et al., (2015) conducted a study into both physical PIs and tactical approaches and their associations with match outcome, but did not attempt to link the two together, which would have made

for a much more useful study such as that conducted by Carling (2011). Despite the tactics selected by the coach, the main outcome of any approach is to score goals.

The identification of goal-scoring patterns is one of the most relevant issues in football match analysis. As scoring a goal is needed to win a game, a goal scored or conceded is the most important PI in a game of football, and therefore one that is always linked to a positive match outcome. Despite this, there is a lack of research on goal scoring in adult male professional football leagues; the highest level of football (Pratas, Volossovitch, & Ciper, 2018). There are two forms of analysis of goal scoring; the static and the dynamic. In a static analysis, PIs are treated as final match statistics without considering the context of the match at a particular moment, while a dynamic perspective considers PIs in a chronological order (Prieto, Gomez, & Sampaio, 2015).

One of the most consistent findings from goal scoring analysis using the static approach is that goal scoring is always associated with a high percentage of shot efficiency (Lago-Penas, 2012; Prieto, Gomez, & Sampaio, 2015). This allows the conclusion that high shot efficiency is associated with a positive match outcome, and is therefore one of the most important PIs in football. This also helps to reach the conclusion that a particular tactical approach is not the determining factor for success, since top teams often play different styles, and that effectiveness of attacking actions has the most influence on match outcome. A recent study shows that the sequence of PIs also needs to be considered, as to score a goal the most common sequences are pass-shot-goal or can shot-rebound-shot goal (Fernandez, Silva, & Gonzalez-Ramires, 2019). This shows that the goal may not come from the first shot, but the second highlighting the importance of regaining the rebounding from a shot, which identifies regaining shot rebounds as a PI that has an association with positive match outcome. The static approach may be suitable in some situations, but it provides limited information about the game process and performance variability (Prieto, Gomez, & Sampaio, 2015).

The dynamic approach to goal scoring takes both time and match status of actions into account. Volossovitch and Carita (2016) found that the probability of a goal being scored is dependent on the current score, if there is already a goal for either team, the chance of a further goal is higher. This is linked to the change in tactical approaches of both teams changing due to a goal already being scored. Tsilimigkras (2019) found that the chance of scoring and successfully completing PIs depended on the previous PIs in the game. For example, multiple sequences of a high number of passes increases the

chances of an attacking PI. Also immediately following a goal, the opponent will have a surge in attacking PIs. This suggests that PIs may be best studied by the situation in a match such as a team having recently scored or recently conceded a goal. The dynamic approach in comparison to the static approach, provides the foundation for a better understanding of the game process and provides information on how the match outcome changes over time (Prieto, Gomez, & Sampaio, 2015). Despite a study being static or dynamic, one of the PIs leading up to a goal is usually a pass or combination of passes.

In football, the most frequent PI that occurs is a pass (Power, Wei, Lucey, & Ruiz, 2017). There has been debate recently about whether it is more effective to attack with longer or shorter possessions, or more or fewer passes, in order to achieve success (Rodenas et al., 2020). Furthermore, it is arguable whether the amount of possession or passes is a KPI in determining match outcome (Collet, 2013; Kempe, Vogelbein, Memmert, & Nopp, 2014). Studies by both Zhou, Calvo, Robertson, and Gomez (2021) and Bezzer and Anon (2020) found that higher number of passes affected the match outcome positively in the Chinese Super League and English Premier League respectively. However, Lago (2009) and Lago-Penas (2012) found that when teams had high possession this had a negative effect on outcome in the Spanish La-Liga. One study which went into more detail was by Chassy (2013) which demonstrated that speed and precision of passes generated positive match outcomes rather than simply the number of passes. Only counting the number of passes excludes other important elements of the type of attack, and a more detailed analysis of factors involved in the development of possessions and different types of passes would be needed to understand how the teams score goals (Pollard, 2019).

Not all passes are the same due to the length of pass, type of pass and area on the pitch where the pass occurs, therefore each type of pass has a different impact on match outcome. Within the last decade, there has been a progressive increase in the use of network analysis as a method for analysing the passing performance of football teams' (Sarmiento et al., 2018). Studies such as those by Lucey et al., (2013), Gyarmati and Angeura (2015), and McLean, Salmon, Gorman, Read, & Solomon, (2017) used passes to determine the characteristic playing patterns of teams. McLean and Salmon (2019) looked at the subject differently and analysed the unsuccessful broken links in a team to determine where the passing efficiency was slowed. These studies show that the impact of the pass performed on match outcome, can differ between who performed it and how many passes had happened in the pass sequence. Despite the method implemented,

these studies show that the network and sequence of passing and not just the last pass can have an impact on match outcome.

Among the analysis of PIs in football, study of passing networks has become more widespread (Ribeiro, Silva, Duarte, Davids, & Garganta, 2017). The advantages of using a network of multiple passes instead of a single pass is it includes a substantial amount more detail and provides quantifiable metrics (Wasche, Dickson, Woll, & Brandes, 2017). Buldu, Busquets, Echegoyen and Seirullo (2019) found that increasing the number of passes benefits the overall properties of passing networks, leading to greater probability of shots on goal, and therefore a higher impact on match outcome. This finding links with previous studies showing that the sequence of PIs can have an impact, rather than the individual PI themselves. Mendes, Clemente and Mauricio (2018) agreed and found that teams with positive match outcomes had higher overall passing sequences than less successful teams. These studies show that teams with more positive match outcomes have a greater number of passing sequences and identify specifically passing sequences as a key PI associated with match outcome rather than individual passes. It is clear passing and passing networks are PIs associated with match outcome but defending indicators can also be critical to match outcome.

Although defending is considered just as important as attacking to achieving a positive match outcome in football, it has not received as much attention in the literature (Low et al., 2018). However, with the introduction of modern tracking technologies, the detail of analysis into defending PIs has increased. Cintia, Pappalardo, Pedreschi, Giannotti and Malvaldi (2015) stated that when analysing a set of PIs, defensive indicators are crucial to achieving a positive match outcome and deserve the same amount of attention as attacking indicators. Schauburger, Groll and Tutz (2018) and Lepschy, Wäsche and Woll (2018) found that the most important defensive PI is a successful tackle, and this plays a key role in influencing match outcome. However, Delgado-Bordonau, Domenech-Monforte, Guzman and Mendez-Villanueva (2013) disagreed and stated that tackles are generally a behaviour of unsuccessful teams as they have the ball less than their opponents so are forced to defend more. When a team makes a successful tackle, they must make the tactical choice of retaining possession of the ball or attempting to perform a clearance to limit the danger of the opponent scoring.

A clearance in football is “An attempt to move the ball away from the current area where keeping possession is lower priority” (STATS, 2020). Clearances were shown to be

a predictor of success in league studies in the German Bundesliga (Lepschy, Wäsche, & Woll, 2020) and Kazakhstan Premier League (Modric, Versic, Sekulic, & Liposek, 2019) but were only mentioned in these studies and did not receive any specific focus. Lepschy, Woll, & Wasche, 2021 found that clearances had a significant positive effect on success, but noted that clearances were only rarely included in previous research. Conversley a study in several European 2nd division leagues, found that teams that cleared the ball often are significantly less likely to be successful (Jamil, Liu, Phatak, & Memmert, 2021). The mixture of results and lack of detail on the concept of clearances shows it remains an area that does not have significant focus in the literature.

Defensive PIs are effective at different levels as they also restrict the possibility of attacking PIs for the opposition. Most successful tackles happen in the defensive part of the field, but better ranked teams are more effective in applying defensive pressure in higher areas of the pitch, highlighting that the area of the pitch is relevant and not just the PI itself (Almeida, Ferreira, & Volossovitch, 2014; Maleki, Dadkhah, & Alahvisi, 2016). A recent study in the German Bundesliga showed that teams with more positive match outcomes were faster to regain ball possession after losing possession (Shafizadehkenari, Lago-Penas, Gridley, & Platt, 2014). This highlights the timing of the PI, and its association with match outcome rather than just the PI itself. This recent focus on defending PIs shows how essential successful defending is in achieving a positive match outcome in football and has highlighted its importance in any study, either globally or in Qatar.

Defending PIs and their association with match outcome can be analysed at not only an individual, but also at a group level. Andrienko et al., (2017) examined the pressure that defending players put on the ball and their opponents and how team members do this effectively together. This introduced pressure as a defensive PI, however this is difficult to define even with match tracking systems. As studies on defending analysis have become more popular, recent studies have begun to take into account defending factors in conjunction with attacking factors (Lepschy, Wäsche, & Woll, 2018; Sarmiento et al., 2018; Liu, Gomez, Goncalves, & Sampaio, 2016), which has been proven to be the best method of determining their association with match outcome rather than examining them in isolation. However, not all footballers perform the same actions in a match, as their role requirements differ between positions.

A recent trend in performance analysis research in football is to analyze the players by position. As players serve different roles in the field, they show different ranges in many

PIs (Kim et al., 2020). This study looked at defenders in the three top leagues in England, Spain and Germany and categorized them into central and wide. They found that the PIs that have an association with match outcome were different between wide and central defenders. For central defenders the most significant indicators were tackles lost, defensive errors and errors leading to goal, while for wide defenders the most significant PIs were successful take-ons, total shots and errors leading to goals. This shows that all players can not be considered the same and position must be taken into account. Hong (2010) suggested that there should not be common PIs for evaluation, but a different set of PIs for different positions for determining their association with match outcome. McHale, Scarf and Folker (2012) went further and noted that in the English Premier League the players' set of PIs will depend on the situations they face during the games. For example, a defender of a weaker team would defend far more in his own half and have less attacking PIs than a defender of a strong team. The variety of studies into positional defending analysis provide many different perspectives to analyse PIs and their association with match outcome. Although most PIs happen in open play, there is a separate aspect of football that provides a unique opportunity for different PIs to be performed.

Set plays, or set pieces, are the range of plays that restart a match after it has been halted due to an infringement of the rules or ball out of play (Castellano, 2009). Set plays can be viewed as a separate set of PIs or linked into the rest of the match. As the level of competitiveness in football increases, decisive moments such as set plays can be the difference between winning and losing a match especially as one in four goals is scored from a set play in European Leagues (Gonzalez-Rodenas et al., 2020) and even more important in the Qatar Stars League as one in three goals come from a set play (STATS, 2020). Because of this, set play analysis is considered an essential aspect in football (Casal, Maneiro, Arda, Losada, & Rial, 2015; Pulling, 2015; Pulling, Robins & Rixon, 2013) and there has been an increased focus on this in both research and applied settings.

An example of importance of set plays was that in the 2018 FIFA Football World Cup, 43% of all goals came from set plays (DW, 2018). Furthermore, when a goal was scored from a set play it was responsible for the winning or drawing of the match more than 66% of the time (Casal et al., 2015; Casal, Maneiro, Arda, Losada, & Rial, 2014). These studies looked at a large number of set plays from several different tournaments. This is a positive as set plays often change between major tournaments, but these studies

found that the effectiveness remained the same. Specific PIs in set plays include the type of delivery, or the area delivered to. A study of top-level football found that the area of delivery has more of an effect on match outcome than the type of delivery in attempting (Pulling, 2015). However this study was limited by the strict criteria the authors placed on the type of delivery that eliminated certain kinds of set plays, that did not meet any of the criteria the authors listed, but still may or may not have been scored from. The most common type of set play is a corner kick, which has had increased focus in the literature in recent years.

Corner kicks are one form of set play and are awarded when the whole of the ball passes over the goal line, having last touched a player of the defending team, and a goal is not scored (International Football Association Board, 2021). Recent studies have shown that winning teams have significantly higher number of corner kicks than losing teams (Kubayi & Larkin, 2020). Conversely, a study by Liu et al., (2016) found that corner kicks had a trivial effect on the likelihood of winning games. However, both studies were from World Cup tournaments and not leagues. Studies on league football have gone into more detail, with Del Coso et al., (2020) noting that shots from corners in the Spanish La Liga are important rather than just the number of corners, while Pulling (2015) focused on the area the ball was delivered from the corner. Despite numerous studies focused on corners in recent years, it is still not clear if having more or less corners has an association with match outcome.

The outcome of football can often be influenced by factors wider than just the two teams playing, particularly in high performance sport where teams are so evenly matched, and these factors are called situational variables. This term refers to the different situational conditions that may influence the different PIs performed during a game (Lago-Penas, 2012). Situational variables have a great importance on the outcome of professional team sports including football (Garcia-Rubio et al., 2015; Liu, Hopkins, & Gomez, 2015). Situational variables that have been studied include match location, quality of the opposition, scoring first, number of substitutions or the number of cards (Caballero, Garcia-Rubio & Ibanez, 2017). These situational variables have an impact on which KPIs teams can achieve during a match, so have an impact on match outcome. Scoring first has been shown to be the most situational variable factor that impacts match outcome (Garcia-Rubio et al., 2015). What is important however, is that teams change behaviour after scoring, often playing a more conservative game to limit the scoring opportunities of the

rival team (Lago, 2009). This will change the importance of different PIs as the strategy they are implementing have changed.

An advantage derived from performing at home has been proven to exist in most professional sports. Home advantage is due to several factors, including crowd noise and density, favourable referee decisions and familiarity of home venue (Staufenbiel, Reidl, & Strauss, 2018). Of particular interest to football practitioners, Jamieson (2010) found that home advantage has more effect in football than any other sport. This indicates that home teams will have a higher chance of performing the PIs needed to achieve a positive association with match outcome. In terms of specific tactical analysis, Mendes, Clemente, and Mauricio (2018) found that playing at home significantly increased the cohesiveness of teammate relationships during offensive plays, which led to an increase in attacking PIs such as shots and crosses. This has been proven across multiple leagues, countries and continents, with some variation but all were found to have at least some home advantage (Pollard & Gomez, 2014). This differs in Qatar as many teams share home stadiums, or only use certain air conditioned stadiums in summer so no team has home advantage (Soccerway - QSL Draw, 2020). However, as the quality of teams in one league can vastly differ, the ranking of the team needs to be taken into account.

There can be large differences in quality between the top and bottom teams in one league or even between the top and middle teams in a league. In general, the technical level of proficiency is better in higher ranked teams than in lower ranked teams (Sgro & Lipoma, 2016). For example, the 2019/2020 Premier League champions Liverpool finished with nearly five times the points total of bottom team Norwich, and nearly twice the points total of middle placed Burnley (Soccerway, 2020). Kim et al., (2019) found that different teams will create goal scoring situations differently, by focusing on different PIs. As goals are the most important PI that impacts on match outcome, this means that teams will have different PIs that lead to them creating opportunities to score a goal. Varley et al., (2016) found that top ranked teams have better defensive ratios in PIs than other teams, and also had a greater number of shots and shots on target. Higher ranked teams also lost the ball less than lower ranked teams (Casal, Losada, Barreira, & Maneiro, 2021). Liu, Gomez, Goncalves and Sampaio (2016) showed that players from the top three teams in the Spanish league achieved more assists, shots on target, ball touches, passes, through balls, successful dribbles, and higher pass accuracy, highlighting that top teams have greater attacking PIs that have an impact on match outcome. These studies provide valuable insight into the difference between higher and lower ranked teams in the same

league and need to be taken into account when considering which PIs are associated with match outcome.

2.7 Complex Statistical Approaches

While analyzing which PIs have the most impact on match outcome, being able to predict future matches has also been investigated. Models that represent the relationships between the value of technical PIs and the association with outcomes of matches, can reveal which PIs are most important (Young, Luo, Gastin, Tran, & Dwyer, 2019). Perl and Memmert (2017) created a model that measured effectiveness in football based on space and ball control and produced a KPI threshold for the team. However this approach was very complex and unlikely to be understood or accepted by most coaches, as they would need a dedicated statistician to prepare this each week. It was also only used on two matches as a concept rather than something that has been proven over a season or multiple seasons. A similar approach was introduced by Santos, Theron, Losada, Sampaio and Lago-Penas (2018) who used complex data analysis and geospatial data to improve on the current data presentation techniques available in football to produce more useful data visualisations of PIs and their relationship with match outcome. However, this has the same problem of needing an external expert to carry this out rather than the full time staff working with the football teams. Whilst predictive analysis has a part in football, it has yet to be established in a working environment or proven to be reliable across a season or different competitions.

2.8 Conclusion

Achieving a positive match outcome in football is determined by a large number of factors, with technical PIs being a key one of them. However, there has been multiple ways of looking at this considering physical and tactical factors, different types of PIs such as defending, attacking, goalkeeping and set plays and whether a team is a high performing team or not. Situational variables can also have an impact on these PIs and therefore the impact on the match outcome of the team. Predictive analysis takes PIs and tries to model them to predict match outcome in the future, but this remains to be proven in an applied setting. Coaches and team staff can take advantage of knowledge of PIs and how they affect the match outcomes of their team to affect team training and tactical focus.

It is clear from the number of studies conducted around the world that there is a place for a study investigating the association between indicators of football performance

and match outcome in Qatar to add to the current literature. As many studies currently draw conclusions relating to goal scoring and shots, this study aimed to see if these results are replicated and further investigate the PIs outside of goal scoring actions to find which has the greatest impact on match outcome. This study also involved a greater sample size than any previous study as there are over eight seasons of data and over 1,250 matches. The aim of this study was to gain a better understanding of the association between performance indicators and match outcome in football and to use this to improve the understanding of football in Qatar.

Chapter 3: Methodology

3.1 Introduction

For this study, the data of 1,256 matches of the Qatar Stars league from 2011-2018 was analysed to determine the relative association of 23 technical PIs with match outcome. These were selected in alignment with previous research (Lepschy, Wäsche, & Woll, 2020; Liu., et al, 2015; Liu, et al., 2016). Data was collected by the STATS technology company and accessed by the researcher from an online database. The aim of this chapter is to outline the methodology of this study, as well as the participants, data collection, reliability, and analysis.

3.2 Research Methodology

The methodology used for this retrospective study was a quantitative research design. Quantitative research methods are concerned with collecting and analysing data that is structured and can be represented numerically (Goertzen, 2017). This kind of research is rooted in the empiricist or positivist paradigm wherein philosophical underpinnings, assumptions, and values are not explicitly articulated (Duffy & Chenail, 2009). Since quantitative research focuses on data that can be measured, it is useful for answering the 'how' or the 'what'. This is relevant for this study as it focusses on the association between PIs and match outcome.

This study was a descriptive study exploring the association of technical PIs with match outcome in football matches. The method chosen was the Poisson regression model, which is the standard statistical method used for the analysis of count data (Ishigami, 2016). To study associations in football and other sports, slightly modified Poisson distributions have been widely used in studies and practice (Wunderlich & Memmert, 2016). Applying this type of regression model makes it possible to estimate simultaneously, instead of individually, the magnitude of the effects of several PIs influencing the match outcome.

3.3 Background of Researcher

I am a performance analyst, with involvement in high performance football at both the international and professional level. I worked as a performance analyst for New Zealand Football for 8 years with both the Men's and Women's Senior National Teams.

This involved many high profile international events such as FIFA World Cups and Olympic Games. My role was to support the coaching staff and players with video and data analysis. I particularly enjoyed working with statistics to distinguish the most valuable sources of information to help the team improve their performance. As the impact and amount of data grew over this period, I began to explore ways I could improve my knowledge in this area, which led me to want to undertake post graduate studies.

The focus of my post graduate studies was to gain a deeper understanding of how data can be used to impact best performance. During my studies, I moved from New Zealand to Qatar to work with their National Team and their professional league; the QSL. The amount of data readily available was far greater than in New Zealand, however the data was not being used effectively by performance analysts and coaching staff. These experiences in both countries helped me to understand the need to answer the research questions chosen for this study.

3.4 Sample

Participants were eligible for inclusion if they played in any match in the QSL from 2011 to 2019, a period which included eight full seasons. Every participant was a full-time professional football player and played at the highest level of football in Qatar. There were 12 teams in four seasons of the QSL and 14 teams in four seasons, and over the eight seasons of data collection, teams were promoted and relegated. This resulted in a total of 18 different teams playing in the QSL in this period, and therefore being eligible for inclusion in this study. Over the eight seasons, 905 players participated, the age ranged from 15 - 40 years old and the average age across all players was 26 years old. 597 were Qatari players, 63 were from Brazil, 35 from Morocco, 30 from Iran, 20 each from South Korea, Algeria and Iraq, and the other 120 professionals were from 67 different countries.

3.5 Sample Size

During the collection period (2011-2019), data was recorded from 1256 matches. The nature of this study, including league wide data, enabled a reliable estimation of differences in PIs related to match outcome.

3.6 Ethical and Cultural Considerations

The application for ethical approval to AUTECH, AUT University's ethics committee was completed in July 2020 and ethical approval was granted on 29 July 2020, Reference: 20/175 (Appendix 1). Additionally, the project was approved by the Aspire Research Committee on the 21st of January 2021 (Appendix 2).

3.7 Procedures

The data had been collected by the external company STATS over the eight seasons that the matches were played. STATS is a global sports technology company that works with over 2300 leagues worldwide, making it the largest collector and distributor of sports data in the world (STATS, 2020). They were contracted to perform analysis on all matches by the QSL. Data was collected for every match in the QSL using footage from specialist fixed cameras inside the stadium (see figure 1), as well as the broadcast footage of each match.

Figure 1

STATS Camera Set Up (STATS Perform, 2017)

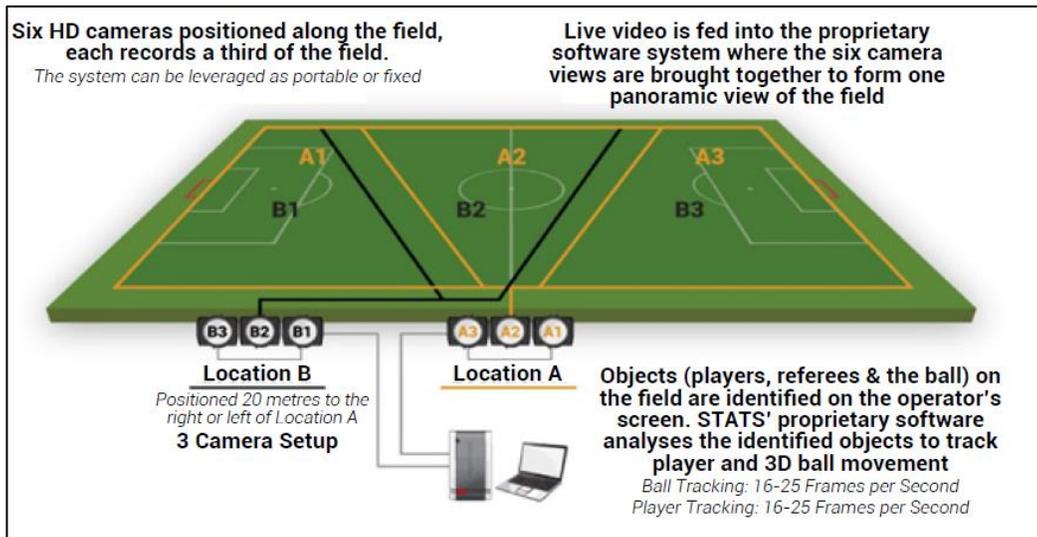


Camera Tracking Method

The STATS camera system installed in each stadium stitches the feed from elevated cameras to record the entire football field, which is then manually labelled with player positions and actions (Sharma, Bhat, Gandhi, & Jawahar, 2018). The camera's parameters: (position, orientation, zoom and field of vision) were determined and fixed when installed. The six cameras were positioned to produce a combined view of the entire pitch. Additionally, every area of the pitch is covered by at least 2 cameras for accuracy (see Figure 2).

Figure 2

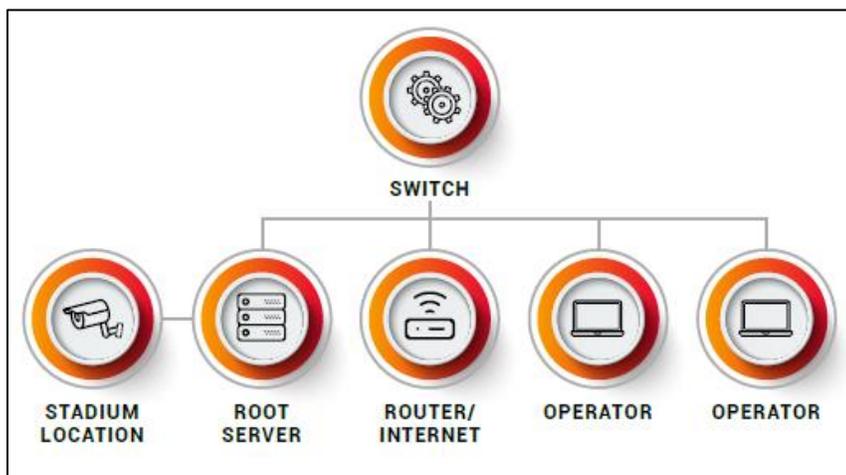
STATS Camera Stadium Set Up (STATS Perform, 2017)



All cameras are connected back to a central location and connected via a switch (see figure 3). The switch splits each video via 3 methods: to the stadium location, to the root server and via the internet to the operator. The root server runs STATS software which acquires the videos and converts them with minimal compression to preserve video quality. Backup capture equipment exists in case of signal interruption such as brief power loss in the stadium.

Figure 3

STATS Analysis System (STATS Perform, 2017)



The cameras were started and stopped electronically through the STATS servers and then transferred to their production center. When the video files are received, the

operator transfers the files onto dedicated servers. Each video is then tracked independently determining image coordinates and continuous paths for each player. Once this process is complete, the output from all 6 cameras is automatically combined to produce one single dataset. The final stage of the process is quality control where operators identify each player (by their starting position, and by checking with the broadcast footage) and verify that the actions identified for each player remain constant to that particular player (Di Salvo, Collins, McNeill, & Cardinale, 2006). Information is then output as a single match file including 2021 physical and technical PIs and uploaded to an online portal within 12 hours of the end of the match (Arriaza & Zuniga, 2016).

3.8 Data Reliability

Several studies have examined the validity and reliability of tracking software such as the STATS software (Castellano, Alvarez-Pastor, & Bradley, 2014; Di Salvo et al., 2006; Linke, Link, & Lames, 2018). Di Salvo et al., (2006) investigated the reliability of the tracking data and concluded that STATS provides specific and relative data of players. Linke, Link and Lames (2018) validated the STATS tracking systems in a stadium environment and checked for positional accuracy and realism. These studies have proven that the STATS system was valid for the use of this study.

3.9 Data Access

Match technical data was gathered for QSL matches at a team level using the above STATS capture process for 1,256 matches from 2011-2019. The data for this study was accessed and downloaded from the STATS secure online database using the licence registered to Aspire Academy. A custom export was created to download the 23 PIs (see table 1), team name, date, season, opponent and match outcome. Data was downloaded at a team level so two data sets for every match were created with 2,512 observations in total. All matches were downloaded as one comma separated values (CSV) file, before being transferred to Microsoft Excel. The team names were removed and instead given team IDs to preserve anonymity. Each data set therefore included the 23 technical PIs, as well as match date, team ID, scoreline and result.

3.10 Research Questions

1. What is the association between different PIs and match outcome in the Qatar Stars League?
2. Does the association between PIs and match outcome differ among teams of different ranking?

3.11 Data Analysis

Research Question 1

All statistical data analyses were completed using the IBM SPSS Statistics for Windows, Version 21.0. The data was transferred from the excel file to the SPSS software. The data was analysed using descriptive statistics and a mixed effects Poisson model. The PIs were the dependent variables (Table 1), match outcome (win, draw, loss) was the fixed effect, and team ID and match date were used as random effects to address the first research question (Gibbons, Hedeker, & DuToit, 2010). The threshold $\alpha = 0.05$ was used to designate statistical significance and results were presented as point estimate and 95% confidence intervals (Amrhein, Trafimow, & Greenland, 2018).

Research Question 2

Three groups were made based on the teams ranking at the end of each season. This is to distinguish if which PIs were significant differed between teams of different ranking. For the seasons with 12 teams in the QSL, each group included 4 teams. The top 4 ranked teams were placed in group 1 (G1), the middle 4 ranked teams were placed in group 2 (G2) and the bottom 4 ranked teams were placed in group 3 (G3). For the seasons with 14 teams the top 5 ranked teams were G1, the middle 4 teams were G2 and the bottom 5 teams were G3. The analysis for research question one was repeated with these three distinct groups (G1, G2 and G3) and results were presented as point estimate and 95% confidence intervals to determine if the same PIs that had an association with match outcome are impacted by the ranking of the team. The threshold $\alpha = 0.05$ was used to designate statistical significance and results were presented as point estimate and 95% confidence intervals (Amrhein, Trafimow, & Greenland, 2018).

Table 1*Operational Definitions*

No.	Performance Indicator	Type	Definition
1	Balls Lost	Offensive	The player and team lose control over the ball and lose it to the opponent, either in open play or by putting it out of play
2	Chances	Offensive	Number of clear opportunities to score a goal
3	Corners	Offensive	Number of Corners
4	Crosses	Offensive	A pass to a teammate that originates from the offensive flank aimed at the area in front of the goal.
5	Crosses – Successful	Offensive	A cross that is followed by a ball contact by a teammate.
6	Goals scored	Offensive	Number of goals scored for the team. Includes opponent own goals
7	Long passes (Successful)	Offensive	All successful passes that travelled more than 34 meters
8	Medium Passes (Successful)	Offensive	All successful passes that travelled between 17 and 34 meters.
9	Short passes (Successful)	Offensive	All successful passes that travelled less than 17 meters.
10	Opposition Third Entry	Offensive	Passes that were made from outside the third of the field containing the opponent's goal where the next ball event is inside that third.
11	Penalty Area Entry	Offensive	Passes that were made from outside the opposition's penalty area where the next ball event is inside the opposition penalty area
12	Shots	Offensive	An attempt to score a goal with any part of an attacking player's body.
13	Shots on target	Offensive	An attempt to score a goal with any part of an attacking player's body that would go in if nobody saved/blocked/deflected it.
14	Successful Passes	Offensive	Number of passes that are followed by a contact with a teammate.
15	Clearances	Defensive	Number of clearances made: An attempt to move the ball away from the current area, keeping possession is lower priority
16	Corners – Conceded	Defensive	All corner kicks taken by the opponent.
17	Crosses – Conceded	Defensive	Crosses by the opposing team.
18	Crosses Successful – Conceded	Defensive	An opposition cross that is followed by a ball contact by an opponent
19	Goals conceded	Defensive	Number of goals conceded including own goals
20	Opp Successful passes	Defensive	Number of opponent passes that are followed by a contact with a teammate
21	Shots Conceded	Defensive	Number of shots conceded
22	Shots on Target Conceded	Defensive	Number of shots on target conceded
23	Tackles Won	Defensive	All successful tackles as the tackler

Chapter 4: Results

The descriptive statistics of matches are presented in Table 2 with the results of the Poisson regression analysis to provide a comprehensive picture of the studied data. In order to answer the research questions, the results in the tables both in this section and the appendices, will present the means for each result, p value, standard error, lower and upper bound and minimum and maximum for each PI. The results in the following sections will report the findings as the significance of each PI (p value) as well as differences between the means for each result (+/-) as has been used before in similar studies (Lepschy, Wäsche, & Woll, 2020). All figures used are comparing the PI with the results.

4.1 Association between Offensive PIs and Match Outcome

Table 2

Offensive PIs and association with match outcome

Category	Mean Value			Performance Indicator	Standard Error		
	Loss	Draw	Win		Loss	Draw	Win
Scoring	0.7	1.1	2.6	Goals Scored*	0.1	0.1	0.2
	12.4	12.2	12.8	Shots	1.2	1.1	1.2
	4.9	5.2	6.2	Shots on Target*	0.6	0.7	0.8
	3.4	3	3.4	Chances*	0.6	0.5	0.6
Entries	31.9	31.9	31.7	Penalty Area Entry	2.8	2.8	2.8
	59.2	56.4	52.4	Opp Third Entry*	4.8	4.6	4.3
Crosses	22.3	20.6	16.9	Crosses*	2.5	2.3	1.9
	4.7	4.3	4.1	Crosses Successful*	0.7	0.6	0.6
	5.3	4.9	4.3	Corners*	0.8	0.7	0.6
Possession	385.8	354.1	343.2	Passes Successful*	24.8	22.8	22.1
	248.8	227.8	222.3	Passes Short*	17.2	15.7	15.4
	113.7	103.2	97.4	Passes Medium*	8.8	7.9	7.5
	22.7	22.6	23.1	Passes Long	1.7	1.7	1.7
	140.8	143.2	141.6	Balls Lost*	4.5	4.6	4.6

* Significant differences between loss, draw and win ($p < 0.05$)

4.1.1 Offensive Pls that Differentiated between a Win and a Loss

Figure 4 shows the comparison of goals scored/chances, and compared to losing teams, winning teams scored significantly more goals (+1.9, $p < .001$). Figure 5 shows that winning teams had more shots on target than losing teams (+1.3, $p < .001$).

Figure 4

Goals Scored/Chances



Figure 5

Shots/Shots on Target

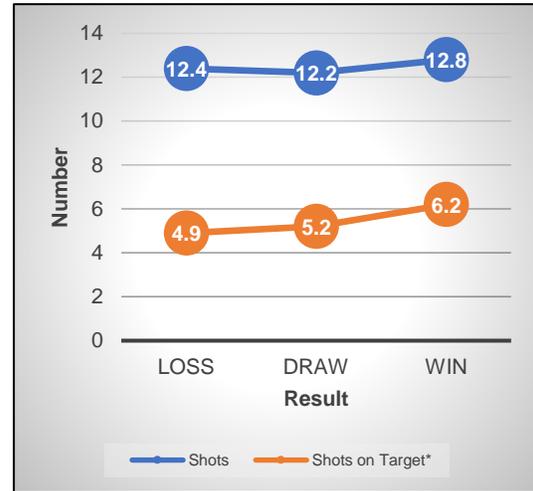


Figure 6 shows that winning teams also had significantly less crosses (-5.4, $p < .001$), table 2 shows they also have less opposition third entries (-6.8, $p < .001$, see table 2), corners (-1, $p < .001$), and figure 8 shows they have more successful crosses (-0.6, $p < .001$) than losing teams. Winning teams also had slightly more balls lost than losing teams (+0.8, $p < .001$, see table 2).

Figure 6

Crosses/Successful Crosses

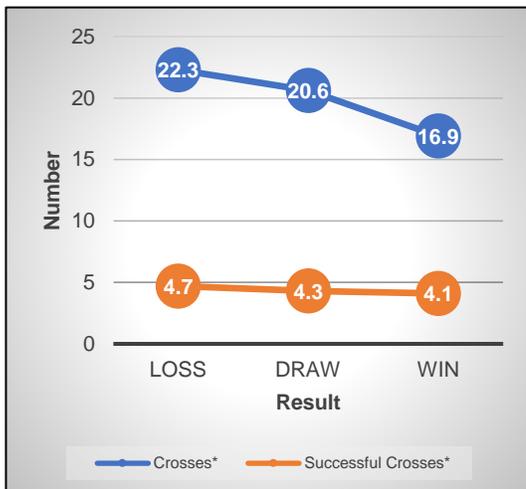


Figure 7

Successful Passes/ Short Passes



Figure 7 shows that conversely, winning teams also has significantly less successful passes (-42.6, $p < .001$), short passes (-26.5, $p < .001$) and medium passes (-16.3, $p < .001$, see table 2) compared to losing teams. The following PIs were not considered significant in distinguishing between a winning and a losing result; shots ($p = .18$), penalty area entries ($p = .91$) and long passes ($p = .60$).

4.1.2 Offensive PIs that Differentiated between a Win and a Draw

Compared to teams with the result of a draw, winning teams had significantly more goals (+1.5, $p < .001$, see figure 4), chances (+0.4, $p < .001$, see figure 4), shots (+0.6, $p < .001$, see figure 5,) and shots on target (+1, $p < .001$, see figure 5). Conversely compared to teams with the result of a draw, winning teams had significantly less opposition third entries (-4, $p < .001$, see table 2), corners (-0.6, $p = .02$, see table 2), crosses (-3.7, $p < .001$, see figure 6), successful passes (-10.9, $p < .001$, see figure 7), short passes (-5.5, $p < .001$, see figure 7) and medium passes (-5.8, $p < .001$, see table 2). The following PIs were not considered significant in distinguishing between winning and the result of a draw; penalty area entries ($p = .97$) and long passes ($p = .92$)

Table 3

Defensive PIs and association with match outcome

Category	Mean Value			Performance Indicator	Standard Error		
	Loss	Draw	Win		Loss	Draw	Win
Opposition Scoring	2.6	1.1	0.7	Goals Conceded*	0.3	0.1	0.1
	12.6	12	12.3	Shots Conceded*	1.2	1.1	1.2
	6.1	5.1	4.8	Shots Conceded on Target*	0.8	0.7	0.6
Opposition Attacks	16.9	20.1	21.7	Crosses Conceded*	1.9	2.3	2.5
	4.7	4.4	4.7	Successful Crosses Conceded*	0.7	0.7	0.7
	4.2	4.8	5.2	Corners Conceded*	0.6	0.7	0.8
	361.2	361.2	375.3	Successful Passes Conceded*	25.5	25.5	26.5
Defending Actions	41.8	49.9	51.7	Clearances*	3.9	4.7	4.8
	11.3	11.1	11.7	Tackles Won*	1.4	1.4	1.5

* Significant differences between loss, draw and win ($p < 0.05$)

4.1.3 Defensive PIs that Differentiated between a Win and a Loss

There were several PIs that differentiated between winning and losing. Figure 8 shows that winning teams had significantly less goals conceded (-1.9, $p < .001$) and shots conceded on target (-1.3, $p < .001$, see figure 9).

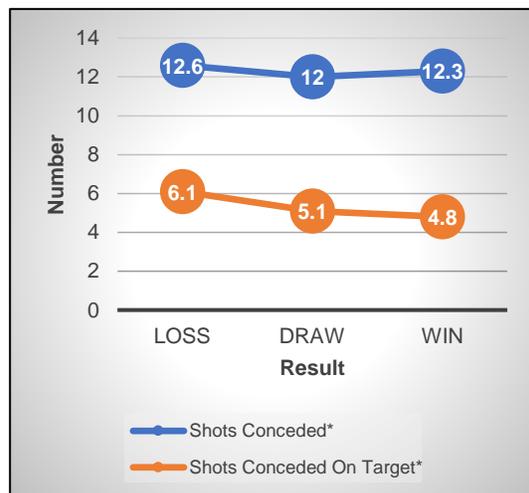
Figure 8

Goals Conceded



Figure 9

Shots/Shots on Target Conceded



As shown in Figure 11, winning teams had significantly more clearances (+9.9, $p < .001$) and tackles won (+0.4, $p < .001$, see table 3).

Figure 10

Crosses/Successful Crosses Conceded

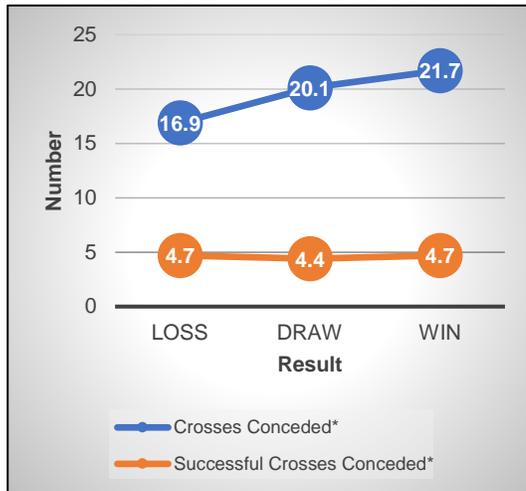


Figure 11

Clearances

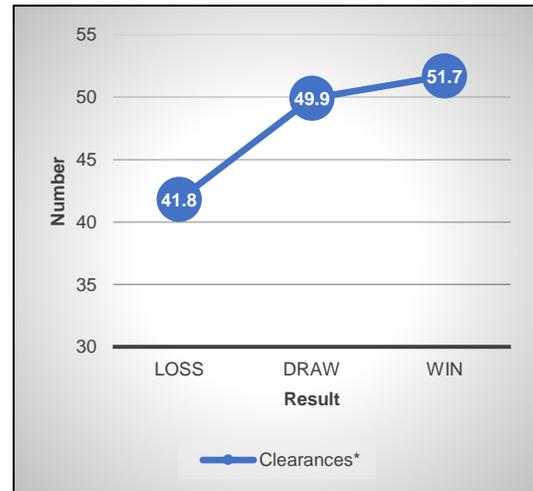


Figure 10 shows that winning teams also had significantly more crosses conceded (+4.8, $p < .001$), as well as successful passes conceded (+13.9, $p < .001$, see table 3) and corners conceded (+1, $p < .001$, see table 3) compared to losing teams. Neither shots conceded ($p = .14$) nor successful crosses conceded ($p = .49$) were considered significant between a win and a loss.

4.1.4 Defensive PIs that Differentiated between a Win and a Draw

There were less PIs that differentiated between a winning result and a draw. Winning teams had significantly less goals conceded (-0.4, $p < .001$, see figure 8) than teams that had a result of a draw. Conversely winning teams had more clearances (+1.8 $p < .001$, see figure 11) and tackles won (+0.6, $p < .004$, see table 3), but also crosses conceded (+1.6, $p < .001$, see figure 10) and corners conceded (+0.4, $p < .001$, see table 3) than teams that had the result of a draw. The following PIs were not considered significant between a winning result and a draw; shots conceded ($p = .14$), shots conceded on target ($p = .34$), successful crosses conceded ($p = .21$) and successful passes conceded ($p = .91$).

4.2 Impact of Ranking on the Association between PIs and Match Outcome

4.2.1 Offensive PIs that were Significant between Team Ranking

The following offensive PIs were considered to be significantly different between each group ranking for their association with match outcome; opposition third entries ($p < .001$), crosses ($p < .001$), corners ($p = .03$), short passes ($p < .001$), medium passes ($p < .001$), penalty area entries ($p = .014$), shots ($p = .035$) and chances ($p = .036$). These results showed that the trends for these PIs were different across each group ranking.

The following PIs were not considered to be significantly different between each group ranking for their association with match outcome; goals scored ($p = .82$), shots on target ($p = .39$), successful crosses ($p = .17$) and long passes ($p = .60$). These results showed that the trends for these PIs remained consistent across each group ranking.

4.2.2 Offensive PIs that Differentiated between a Win and a Loss

Table 4

Offensive PIs by Group Rank – Difference between a Win and a Loss

Category	Performance Indicator	Group 1	Group 2	Group 3
Scoring	Goals Scored	2.1	1.8	1.6
	Shots*	0.7*	0.2	0.6
	Shots on Target	1.4	1.1	1.4
	Chances*	0.2*	-0.3*	0.1
Entries	Penalty Area Entry*	-0.6	-0.1	-0.1
	Opp Third Entry*	-6.8*	-8.6*	-5.6*
Crosses	Crosses*	-4.6*	-6.5*	-4.8*
	Crosses Successful	-0.4	-0.9	-0.6
	Corners*	-0.6*	-1.2*	-1.1*
Possession	Passes Successful*	-15.1*	-51.9*	-58.7*
	Passes Short*	-6.9*	-31.5*	-40*
	Passes Medium*	-8.7*	-20.8*	-18.9*
	Passes Long	0.6	0.5	0.2
	Balls Lost*	-4.4*	3.3*	3.5*

All values are differences between the mean for a win and the mean for a loss

** Significant differences between a win and a loss ($p < 0.05$)*

Shots was the only PI where just one group had a significant factor (see table 4), as shots were significant for G1 (+0.7, $p = .019$, see figure 19) but not for G2 or G3. Furthermore, Figures 12 and 13 shows that chances and balls lost were the only PIs with significant differences were some mean differences being positive and some being negative. This shows a substantial difference between groups for this PI.

Figure 12

Shots and Chances by Group (Win/Loss)

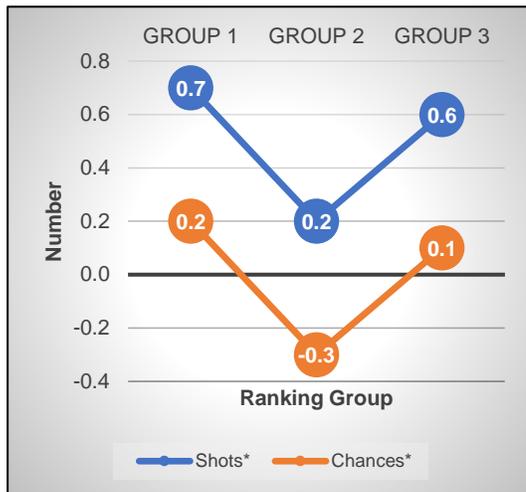
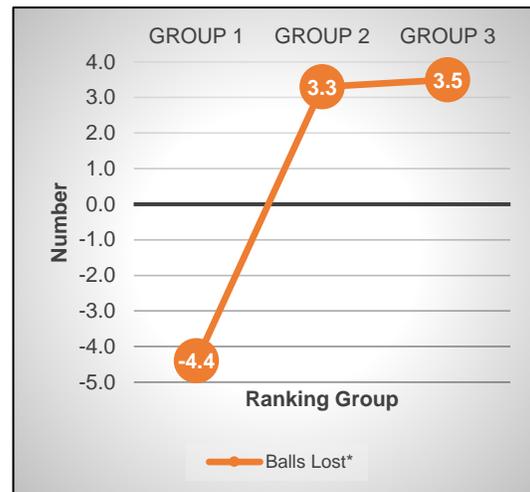


Figure 13

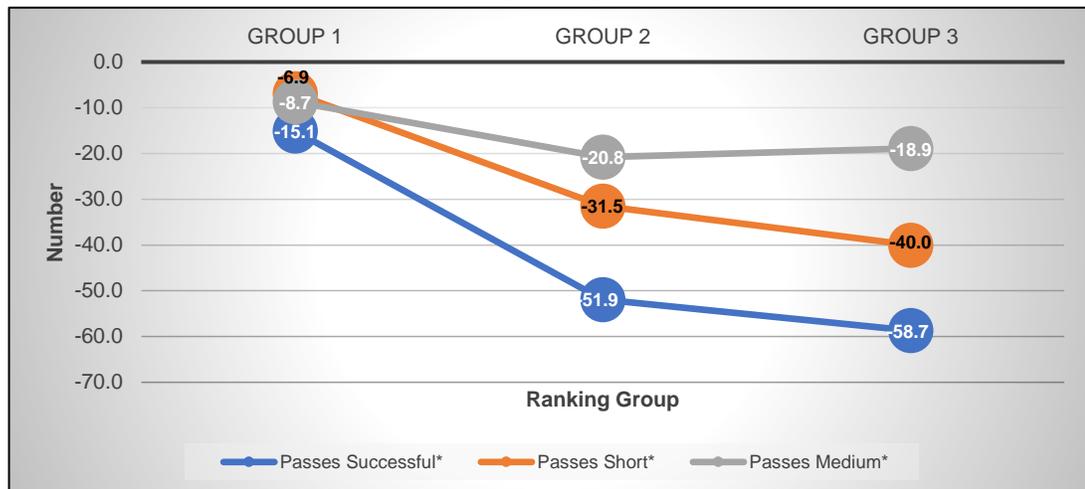
Balls Lost by Group (Win/Loss)



Opposition third entries, crosses and corners were significant across all groups (see table 4) with the key differences between them the differing values of mean differences. All the PIs related to passing were significant for all groups but figure 14 shows the large ranges in mean differences across the groups for all types of passes. G1 had the smallest mean difference, then G2, with G3 having the greatest differences.

Figure 14

Passes by Group (Win/Loss)



There were no significant differences between a loss and a win for any of the groups for penalty area entries. These results showed that the trends for this PI remained consistent across each group ranking.

4.2.3 Offensive PIs that Differentiated between a Win and a Draw

Table 5

Offensive PIs by Group Rank – Difference between a Win and a Draw

Category	Performance Indicator	Group 1	Group 2	Group 3
Scoring	Goals Scored	1.6	1.4	1.2
	Shots*	0.8*	-0.2	1*
	Shots on Target	1.2	0.6	1.1
	Chances*	0.6*	0	0.6*
Entries	Penalty Area Entry	0.7	-1.4	0
	Opp Third Entry*	-4.5*	-5.8*	-2.3*
Crosses	Crosses*	-3.3*	-4.7*	-3*
	Crosses Successful	-0.3	-0.4	0
	Corners*	-0.6*	-0.8*	-0.5*
Possession	Passes Successful*	8*	-14.5*	-23.3*
	Passes Short*	6.6*	-7.6*	-14.2*
	Passes Medium*	0.6	-8.2*	-9.1*
	Passes Long	1	0.4	0
	Balls Lost*	-5.2*	-0.6	1

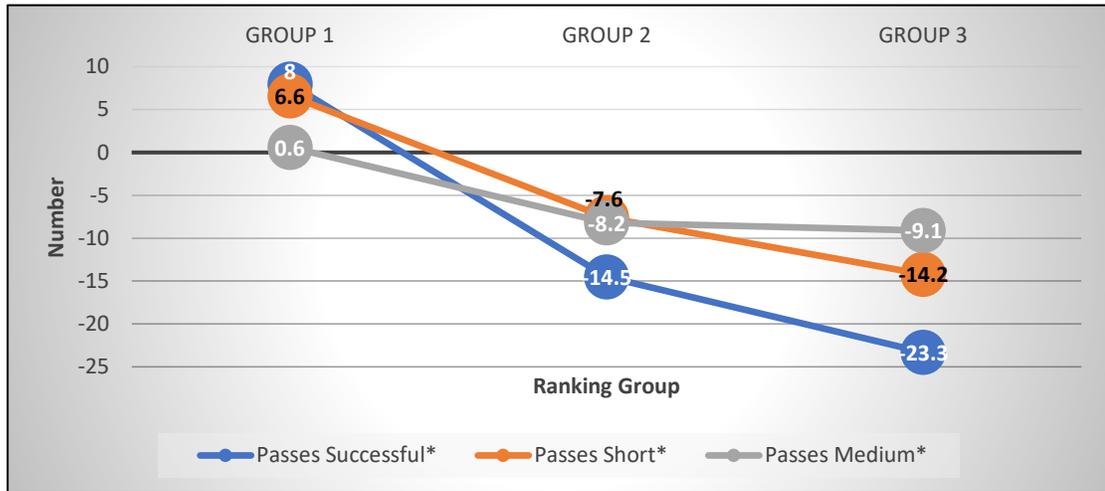
All values are differences between the mean for a win and the mean for a draw

** Significant differences between a win and a draw ($p < 0.05$)*

There were several PIs that were significant for some groups and not for others between a win and a draw result (See Table 5). Chances (see figure 16) was significant for G1 (+0.6, $p < .001$) and G3 (+0.6, $p < .001$) but not for G2 (0, $p = .659$). Additionally, shots (see figure 16) were significant for G1 (+0.8, $p = .006$) and G3 (+1, $p = .004$) but not for G2 (-0.2, $p = .452$). This shows that shots and chances are significantly more important for G1 and G3 than G2. Medium passes (see figure 15) were significant for G2 (-8.2, $p < .001$) and G3 (-9.1 $p < .001$) but not for G1 (+0.6, $p = .47$).

Figure 15

Passes by Group (Win/Draw)



There were several factors that were significant across all groups (see table 5); opposition third entries, crosses and corners (see figure 17), successful passes and short passes (see figure 15). Although these were statistically significant for all groups, the large range for the means across ranking groups shows the differences. Balls lost (see table 5) was the only factor that was significant for one group and not others. It was found to be significant for G1 (-5.2, $p < .001$) but for G2 (-0.6, $p = .62$) or G3 (+1, $p = .38$).

Figure 16

Shots and Chances by Group (Win/Draw)

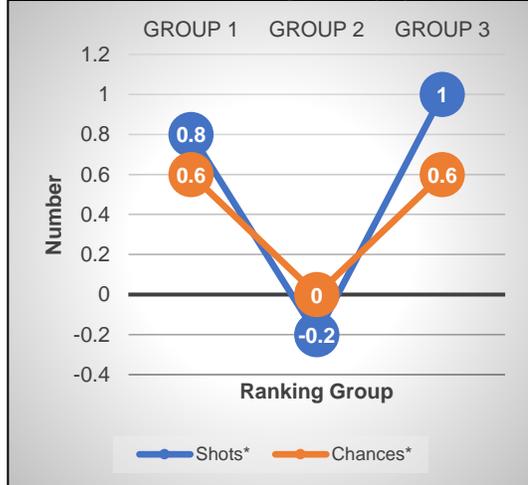
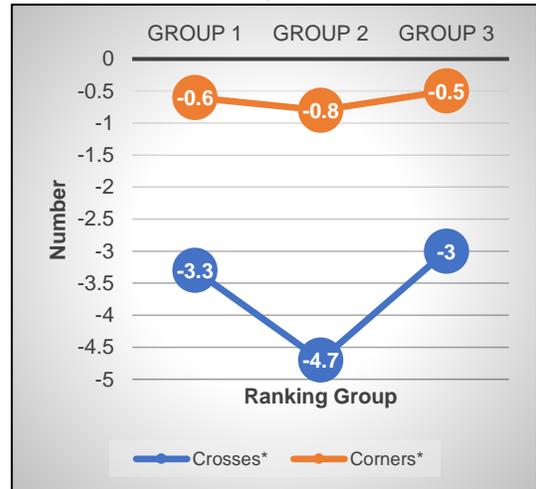


Figure 17

Crosses/Corners by Group (Win/Draw)



Penalty area entries, shots on target, long passes and successful crosses were found to have no significant differences across the groups (see table 5). These results showed that the trends for these PIs remained consistent across each group ranking.

4.2.4 Defensive PIs that were Significant between Team Ranking

The following defensive PIs were considered to be significantly different between each group ranking for their association with match outcome; goals conceded ($p = .033$), corners conceded ($p = .03$) successful passes conceded ($p < .001$), and clearances ($p = .001$). These results showed that the trends for these PIs were different across each group ranking. The following PIs were not considered to be significantly different between each group ranking for their association with match outcome; shots conceded ($p = 0.59$), shots conceded on target ($p = 0.86$), crosses conceded ($p = 0.23$), successful crosses conceded ($p = 0.18$) and tackles won ($p = 0.05$). These results showed that the trends for these PIs remained consistent across each group ranking.

4.2.5 Defensive PIs that Differentiated between a Win and a Loss

Table 6

Defensive PIs by Group Rank – Difference between a Win and a Loss

Category	Performance Indicator	Group 1	Group 2	Group 3
Opposition Scoring	Goals Conceded*	-1.6*	-1.6*	-2.1*
	Shots Conceded	-0.5	-0.1	-0.4
	Shots Conceded on Target	-1.4	-1.1	-1.4
Opposition Attacks	Crosses Conceded	4.3	4.9	5.2
	Successful Crosses Conceded	-0.2	-3	0.1
	Corners Conceded*	0.7*	1*	1.1*
	Successful Passes Conceded*	29.4*	6.9*	6.2*
Defensive Actions	Clearances*	4.6	11.7	14.5
	Tackles Won	-0.1	0.5	1.1

All values are differences between the mean for a win and the mean for a loss

** Significant differences between a win and a loss ($p < 0.05$)*

All defensive PIs that were deemed significant were also significant across all groups, with the key variances being the mean differences between the groups (see table 6). All mean differences maintained a positive trend across all groups such as corners conceded (see table 6) or a negative trend across all groups such as goals conceded (see table 6). However, Figures 18 and 19 show there was some large differences in the value of the mean differences such as successful passes conceded or clearances.

Figure 18

Successful Passes Conceded by Group (Win/Loss)

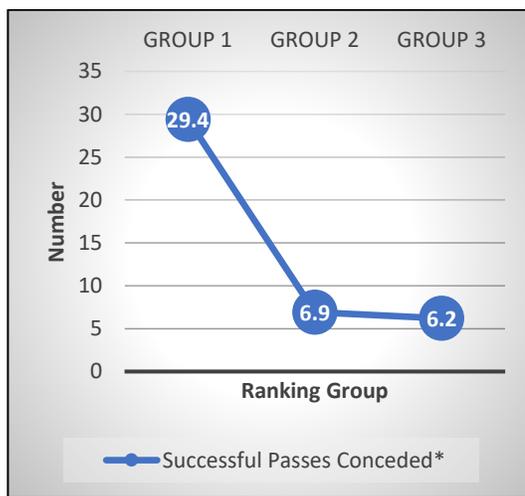
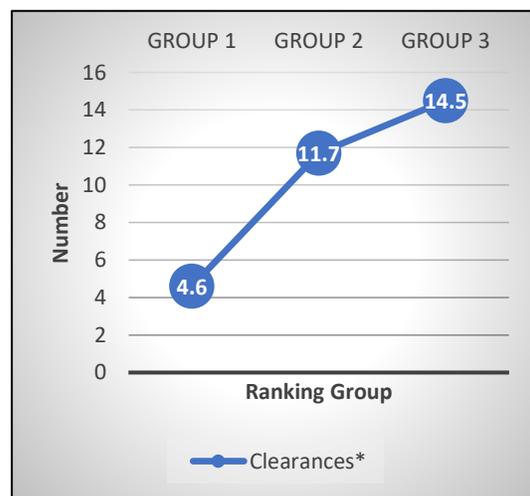


Figure 19

Clearances by Group (Win/Loss)



4.2.6 Defensive PIs that Differentiated between a Win and a Draw

Table 7

Defensive PIs by Group rank – Difference between a Win and a Draw

Category	Performance Indicator	Group 1	Group 2	Group 3
Opposition Scoring	Goals Conceded*	-0.5*	-0.2*	-0.5*
	Shots Conceded	-0.2	-0.2	-0.5
	Shots Conceded on Target	-0.5	-1.1	-1.4
Opposition Attacks	Crosses Conceded	0.9	1.9	2.1
	Successful Crosses Conceded	0.5	0.3	0.2
	Corners Conceded*	0.1	0.2	0.9*
	Successful Passes Conceded*	11*	21*	0.3
Defensive Actions	Clearances*	-0.8	3.7*	2.5*
	Tackles Won	0.5	0.5	1

All values are differences between the mean for a win and the mean for a draw

* Significant differences between a win and a draw ($p < 0.05$)

The only factor that was significant across all groups was goals conceded (see table 7), with G1 and G3 having the same mean difference (-0.5) but a greater range than G2 (-0.2). Successful passes conceded was relevant for both G1 and G2 (see table 7) but not for G3 who also had a much smaller mean difference to the other groups as shown in figure 20. Conversely, corners conceded was only relevant for G3 (+0.9, $p < .001$) as G3 had a much larger mean difference than the other groups (see table 6). Clearances was significant for both G2 and G3 (see table 7) with both having positive mean differences, however G1 had a negative mean difference and was not deemed significant as shown in figure 21.

Figure 20

Successful Passes Conceded by Group (Win/Draw)

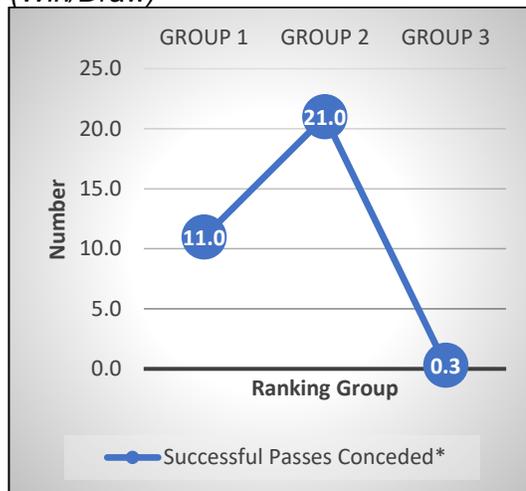
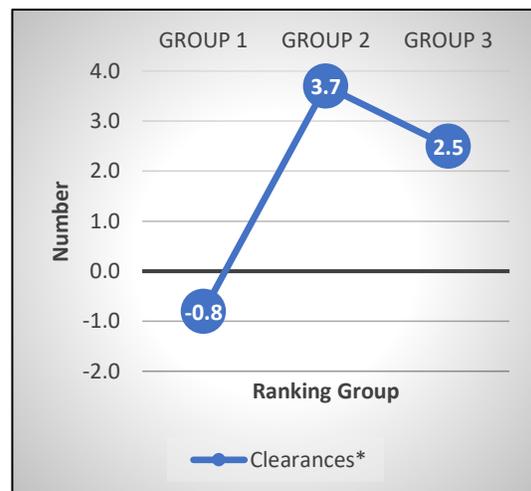


Figure 21

Clearances by Group (Win/Draw)



Chapter 5: Discussion

5.1 PIs with an Association with Match Outcome

The aim of this study was to investigate the teams in the Qatar Stars League and determine the association between PIs and the match outcome, and whether this differs between teams of different league rank. The main findings in terms of offensive PIs were that winning teams had more goals scored and shots on target, but less crosses and successful crosses than losing teams. In terms of defensive KPIs, winning teams had less goals conceded, and shots conceded but had more clearances and tackles than losing teams.

There were several PIs that differentiated between winning and losing, with the most significant being that winning teams had more goals as well as shots on target. These results are comparable to previous literature that found these two PIs have the greatest impact on match outcome between winning and losing teams (Lepschy, Wäsche, & Woll, 2020; Mao, Peng, Liu, & Gomez, 2016). Goals will always be a KPI in football as scoring a goal is directly related to the match outcome and as football is such a low scoring game, just one goal can decide the match outcome. However, there was a large difference in the QSL compared to other leagues in the amount of goals scored when winning. QSL teams had an average winning margin of 1.9 goals, more than both the German Bundesliga (1.3 more goals) and Spanish La Liga (1.1 more goals). Shots on target was found to be a significant indicator which relates to previous research (Castellano, Casamichana & Lago, 2012) but what is different from some previous studies is that total shots is not considered significant. This suggests that the quality of shots is more important than quantity in the QSL which was only relevant in the German Bundesliga and not other leagues (Lepschy, Wäsche, & Woll, 2020). Teams in Qatar should focus more on ensuring shots will be on target by shooting from more advantageous positions, rather than just having a large number of shots. This rationale of quality over quantity also applies to crosses.

Although usually considered positive attacking PIs in football by the wider football public, winning teams had less crosses and less successful crosses. This is similar to previous studies which found that more crosses were associated with a decrease in the probability of winning (Lago et al., 2010; Lepschy, Wäsche, & Woll, 2020; Liu et al., 2015). The operational definition of a cross is “A pass to a teammate that originates from the offensive flank aimed at the area in front of the goal” (STATS, 2020). Accuracy is not

considered, so just sending the ball into the opposition's goal area does not say anything about the quality of the cross. This shows that just any cross will not cause a perturbation and only a successful cross will cause instability, as a cross that was intercepted or did not have any chance of being met by an attacker will not create any problems for the defending team (Kim et al., 2019). QSL teams that are strong at defending crosses may allow crosses to be executed as they are confident in defending these effectively, which is shown in this study as losing teams have on average 5.4 more total crosses than winning teams. However, there is less of an impact of successful crosses with losing teams only having 0.6 more crosses than winning teams. This shows that in the QSL the quality of the cross is essential, and just having a large number of crosses actually makes the team less likely to win.

Previous studies have indicated that higher numbers of opposition entries have been associated with positive match outcomes (Lepschy, Wäsche, & Woll, Ruiz-Ruiz et al., 2013; 2018; Yang, Leitch, Lago, & Gomez, 2018). However, winning teams in the QSL were found to have less opposition third entries, averaging 6.8 less entries per match than losing teams. Ruiz-Ruiz et al., (2013) suggest that the greater the difference between entries into the opponent's penalty area and entries into their own penalty area is what links to a successful match outcome, which is a potential explanation for this. This finding links to the other results in this study, that in the QSL the result is about the quality of the actions performed and not necessarily the quantity of the action. Successful teams have more effective opposition third entries, and not just simply a greater number, as a successful defending team can stop a team creating scoring opportunities even in their own third. This finding suggests that for opposition third entry to be deemed a successful one in the QSL, it would be immediately followed by an action leading to a shot on target with the ideal outcome of scoring a goal before the defending team has regained their tactical set up.

Winning teams had less corners than losing teams in the QSL, averaging one less corner per match. This is contradictory to recent findings which found that winning teams had a significantly higher number of corner kicks than losing teams (Del Coso, de Souza, Campo, Blanco-Pita, & Resta, 2020; Kubayi & Larkin, 2020). One important aspect to note is a corner is usually won after successful defending by the team conceding it. So it is possible that winning teams in the QSL concede more corners because they are more successful at blocking shots and crosses by the opposition and therefore conceding corners. Another aspect to note is this study was limited as it only included the total

number of corners and not successful corners, which would have provided greater insight as it did with other PIs. This is particularly important in the QSL as one in three goals come from a corner (STATS, 2020), indicating that it is potentially the quality of the corner that is the key to a successful match outcome and not just the number of corners won.

There has been debate recently about whether it is more effective to attack with longer or shorter possessions, or more or fewer passes, in order to achieve success (Rodenas et al., 2020). In this study, winning teams had significantly fewer total passes, short passes and medium passes. Both Zhou, Calvo, Robertson and Gomez (2021) and Bezzera and Anon (2020) found that higher number of passes affects the match outcome positively in the Chinese Super League and English Premier Leagues. However, Lago (2009) and Lago-Penas (2012) found that in the Spanish League when teams had higher possession they lost. These contradicting studies show that different leagues may have different trends, or tactical trends change over time. However, what is significant about the results of this study is the big difference in the number of passes between a winning and losing team. Winning teams had on average 42.6 less total passes than losing teams, 26.5 less short passes and 16.3 less medium passes. This suggests that simply having high ball possession in the QSL does not have an association with positive match outcome and adds to the point that it is arguable whether number of passes is a KPI in determining match outcome (Collet, 2013; Kempe, Vogelbein, Memmert, & Nopp, 2014). This finding in the QSL suggests that successful teams use possession of the ball to attack while unsuccessful teams tend to use it to avoid losing the ball (Casal, Anguera, Maneiro, & Losada, 2019). What is clear from this finding in the QSL is that passes need to lead to more attacking PIs such as shots and shots on target for the possession to be effective.

There were several defensive PIs that differentiated between winning and losing teams. However, as defensive PIs have had less attention in the literature there is less comparisons available than offensive PIs. Winning teams had significantly less goals conceded than teams that lost which is what was reflected in previous research (Evangelos et al., 2013; Lepschy, Wäsche, & Woll, 2018). However, this factor was not investigated in detail in many previous studies because of its obvious link with match outcome. While it is not surprising for goals conceded to be a significant factor as a team must concede less goals than the opposition to lose, the number of fewer goals conceded is. There is a large difference in goals conceded with winning teams conceding on average 1.9 less goals than losing teams. Teams generally change their tactics when losing in a match, which increases their chances of scoring but also increases the chance of the

opposition scoring as they are focusing more on attacking. This reason may be why the difference is so high as losing teams concede additional goals when they are trying to score a goal themselves. A specific reason for this finding in the QSL, is that the best teams are far better than the other teams and will often score more than one goal when winning matches. This gulf in quality is much larger than other leagues such as the English Premier League or Spanish La Liga. For example, in the Premier League the average difference in goals conceded between the teams in G1 and G3 is 0.49, La Liga is 0.44 but in the QSL it is 0.72 (Soccerway, 2020).

Shots conceded was a significant factor in the QSL in distinguishing between successful and unsuccessful teams, but there was only a small difference with winning teams having only 0.3 shots conceded less than losing teams. This contrasts from the difference of 3.31 shots in the Greek Super League (Evangelos et al., 2013) or 2.04 in the Spanish La Liga (Del Coso, de Souza, Campo, Blanco-Pita, & Resta, 2020). However, what is more significant is the shots conceded on target with winning teams having 1.3 less shots conceded on target than losing teams, with shots on target conceded not being a PI studied widely in previous studies. Evangelos et al., (2013) stated that the best football teams concede fewer clear shots, meaning those that are more likely to be on target. This may suggest that the defensive strategies of successful teams in the QSL is to allow opposition teams fewer clear shots. This means that defensive strategy will be to allow opponents to shoot from areas less likely to score (further away from the goal or from tight angles) and limit the number of shots where they are in good positions to score. This strategy is added by effective clearances, removing the opportunity for the opposition to shoot quickly when they regain possession.

Previous research has identified clearances as a key defensive PI (Lepschy, Wäsche, & Woll, 2020; Modric, Versic, Sekulic, & Liposek, 2019; Adambekov, 2013) and this was also the case in this study with winning teams having on average 9.9 more clearances than losing teams in the QSL. What is different from previous studies is this finding was significantly higher than other leagues, suggesting that clearances are more important in the QSL than in other leagues. Winning teams had 9.9 more clearances in the QSL which was far more than the German Bundesliga with only 3.2 (Lepschy, Wäsche, & Woll, 2020) and the Kazakhstan Premier League, with a difference of 2.8-4.6 (Adambekov, 2013). Clearances are an important defensive KPI as by definition a clearance “Moves the ball away from the danger area with low focus on keeping possession” (STATS, 2020), meaning there is less chance of the opponent scoring a goal. This combined with the fact

that winning teams have fewer passes show that successful teams in the QSL value limiting danger higher than keeping possession. The large difference in clearances between winning and losing shows that winning teams perform much more effective clearances and limit the danger to their own goal. To perform a clearance, the team needs to regain the ball first which is often done by a successful tackle.

Tackles have been identified as a PI associated with match outcome in previous studies in different leagues PIs (Varley et al., 2016, Yang, Leitch, Lago, & Gomez, 2018). In the QSL the difference was very small with winning teams having only 0.4 more tackles than losing teams on average, which is minimal in context of the whole match. Varley et al., (2016) found similar findings with winning teams having 0.44-0.7 more tackles than losing teams. Conversely, Lepschy, Wäsche and Woll, (2020) and Liu, Hopkins and Gomez, (2016) found that more successful tackles were actually linked to a negative outcome. They found that defensive actions such as tackles led to a loss because the team is forced to defend more, even if the amount of successful tackles is high. Another possible reason to explain this is that the best defenders do not make many tackles. Defenders prefer to delay an opponent to allow teammates to recover, or to cut down angles to force an opponent to go backwards. To attempt to tackle allows the opponent a chance to dribble past and potentially create a goal scoring action. Paolo Maldini, considered one of the best defenders ever, said that "If I have to tackle then I have already made a mistake" (Football 365, 2017). This is also noted in the literature because performing tackles are generally a behaviour of unsuccessful teams (Delgado-Bordonau, Domenech-Monforte, Guzman, & Mendez-Villanueva, 2013). This shows that the number of tackles won can not be considered a KPI as it is dependent on how much the opposition has the ball, and the defensive capabilities of individual players.

There were many similarities between the PIs that had an impact on winning compared to a draw, as those that had an impact on winning compared to a loss. One key difference was winning teams produced more 0.6 more chances than teams that drew. Although this seems like a small amount, winning teams only produced 3.6 chances in total, which makes chances a rare occurrence in a match. Chances are a very important PI as this is a clear opportunity to score a goal. Brechot and Flepp (2020) note that as scoring chances are intrinsically related to scoring goals, it can be presumed that they will suggest how a match will progress even if they do not result in a goal for every chance created. Interestingly, teams that lose have more chances than teams that draw. This may be this way in the QSL because there is a big difference in skill between the best and worst

teams, so lower teams that have the tactic of playing for a result of a draw are not trying to score and just trying to limit the chances of the opponent, and therefore not creating as many chances for themselves.

5.2 PIs that Differ between League Ranking

There is a difference in quality between the top teams and the bottom teams in all football leagues, and this is especially true in the QSL. The top teams have more of the Qatar National Team players, and higher budgets so they can bring in better foreign players. As an example, the difference in points per match in the QSL between G1 and G3 is 1.13 while in the Premier League and La Liga it is 0.92 and 0.97 respectively (Soccerway, 2020). This is reflected in the way that teams of different rankings win matches. In terms of passes, there were vast differences between G1, and G2 and G3. When G1 won matches, they had 15.1 less passes than when they lost but for G2 it was 51.9 less and for G3 it was 58.7 less. This trend was also repeated with both short passes and medium passes. A reason for this may be that in the QSL, when G2 and G3 score a goal, they are focused on defending their lead, rather than scoring more, so will allow the opposition to have ball possession and therefore make less passes themselves. However, the teams in G1 are the highest scoring teams, so once they have scored one goal they will still try and score more goals. Their game plan is more focused on a possession style of play and will attempt to control the match, instead of giving the opposition the opportunity to dictate. This is similar to the findings in the Greek, Spanish and English Leagues (Araya & Larkin, 2013; Castellano & Casamichana, 2015; Gomez, Mitrotasios, Armatas, & Lago-Penas, 2018) where top-placed teams will adopt more of a possession style of play than lower ranked teams.

Previous studies have shown that higher ranked teams have more shots than lower ranked teams (Araya & Larkin, 2013; Sgro & Lipoma, 2016). However, in the QSL, G1 and G3 have more shots than G2 when winning matches compared to losing. G1 and G3 have 0.7 and 0.6 more while G2 has 0.2 more shots. This is potentially because G2 are the middle-ranked teams and will likely have more close matches than G1 and G3 as they are closer in level to more teams. They will not often be playing in matches when one team is one or more goals in front and both teams are trying to score, so more shots will be available to take. This will lead to G2 having almost the same number of shots in losses as wins. However, one of the key findings of this study was that shots on target was more important than just shots, which did not vary between groups, so this further emphasizes

that it is the quality of shot that is more important than the number of shots, regardless of the ranking of the group.

In terms of balls lost (or loss of possession), G1 had 4.4 less balls lost per match when they won compared to when they lost but G2 and G3 lost the ball more when they won, showing how much more important ball possession is to G1 compared to G2 and G3. This is supported by previous research that shows that higher ranked teams lose the ball less than lower ranked teams (Casal, Losada, Barreira, & Maneiro, 2021). In the QSL, this suggests that teams in G1 want to retain the ball even when they are in the lead as they are looking to score again and dominate the match, but for G2 and G3 they are worried of conceding an equalizing goal and are not willing to take risk by trying to keep the ball, which leads to them losing the ball more. In general, the technical level of proficiency is worse in lower ranked teams (Sgro & Lipoma, 2016) and these findings suggest this is true in QSL as well. The overall lower skill level of the players in G2 and G3 would mean that their general ball control would not be as effective as those in G1 which leads to them losing the ball more.

There were large differences in clearances between the groups when winning a match compared to losing. G1 had 4.6 more clearances, G2 had 11.7 and G3 had 14.5 more clearances. This finding is similar to a previous study that finds higher ranked teams perform less clearances than lower ranked teams (Zembaba, 2018). A reason for the lower ranked teams having far more clearances is due to their lower ability to retain possession than G1. This means that in a position where G1 can keep possession and pass the ball to a teammate, G2 and G3 will clear the ball instead of attempting to keep possession. They do not want to take any risk to their winning position and give the opposition an opportunity to counter-attack. This further links to the gulf in quality of players between the higher and lower ranked teams, which leads to differences to tactics and decision making when trying to protect a lead. One of these factors is dictating where the opposition can win possession and not allowing them to win the ball close to their own goal.

There were several offensive PIs that differentiated between groups when winning compared to a draw, with one of them being chances. Both G1 and G3 have 0.6 more chances on average more match when they win compared to when they draw but G2 has the same amount. Additionally, G1 has 0.8 more shots and G3 has 1 more shot on average where G2 has 0.2 less. This links to the number of close matches that G2 will play compared to G1 and G3. Teams in G2 can have close matches against teams in all

groups, so their tactics may not change unless they are playing teams right at the top or bottom of the table. Chances occur more often than goals and therefore are less prone to the influence of randomness inherent in single moments of the game, so can be used as a KPI when analysing football (Brecht & Flepp, 2020). This shows that chances can be a useful PI for identifying consistency in the QSL, as is the case with G2. Furthermore, these results suggest they may also be playing for draws just as much as wins, so their tactics would be the same whether they are in a win or draw scenario during the match.

Another factor that differed among groups was balls lost. G1 lost 5.2 less balls when they won, G2 lost 0.6 and G3 lost 1 more per match on average compared to when they drew. Better teams tend to make more passes and their deliveries into the penalty area come from a series of passes, thus creating goal scoring positions (Li et al., 2020). This links to the difference in strategies among groups in the QSL, with G1 looking to dominate possession more than G2 and G3. When G1 lose the ball more, they are less likely to win matches. However, for G2 and G3 losing the ball does not have as much of an impact as their tactics will involve strategies for when they lose the ball, while G1 are expected to retain possession and begin to build attacks leading to more offensive PIs.

Chapter 6: Conclusion

In terms of the association between different PIs and match outcome in the QSL, winning teams had several offensive KPIs that differ from losing teams. They had more goals scored and shots on target, but less crosses, successful crosses, opposition third entries, corners, total passes, short passes and medium passes. These results showed that it is the quality of the PI that is important in the QSL, rather than simply quantity. Having many PIs such as passes, opposition third entries or corners is only successful when it leads to an attacking PI such as a shot or shot on target. In terms of defensive KPIs, winning teams had less goals conceded, and shots conceded but had more clearances and tackles than losing teams. The results were similar for a win instead of a draw, but a key difference was winning teams had more chances than teams that had draws.

There were several PIs that varied between teams of different ranking between a win and a loss. These PIs showed that G1 had much more of a focus on possession, meaning they had more passes when they won than teams of G2 and G3, and also lost the ball less than these two groups. Teams in G1 are the highest scorers so would continue trying to score and therefore have more shots, while teams in G2 and G3 would be focusing on their defence once they are winning a match rather than trying to score again. Regarding defensive PIs when they won, teams in G2 and G3 had more clearances than teams in G1. This relates to the strategy of G1 trying to retain possession of the ball, and G2 and G3 not taking risks around potentially losing the ball. When teams won instead of drew there was a difference in chances, with G1 and G3 having more chances but G2 having the same amount. This shows how competitive the teams in G2 are against all teams, and therefore had more close matches than G1 and G3.

6.1 Implications and Recommendations

This study has showed that a Poisson regression method can be used to determine which technical PIs have an association with match outcome in a league wide study across several seasons. The practical implications are that it can be used in other leagues to determine if there are differences between leagues, or at a team level in any league to assist coaching staff in their decision making around tactics and training planning. This study has shown a basic yet promising approach to make use of the large amount of data readily available in football, and to better understand the impact PIs have

on the match outcome of teams. This model of Poisson regression can be used with different situational variables rather than just match ranking, such as match location. One novel finding of this study would be the importance of clearances. Although this was shown in previous studies, it was found to be much more important in the QSL. Team staff may wish to address this in training and conduct exercises which show players when the correct time is to attempt a clearance as well as the technique of completing a successful clearance.

6.2 Limitations and Future Research

Despite the usefulness of this research there were several limitations to the results. There were several variables that just had total numbers, such as corners, that did not distinguish between successful and unsuccessful outcomes. This would have added further context to these PIs. Furthermore, the PIs were considered as total numbers and did not take into account the time of the game they were performed, or the score at the time they were executed. As Tsilimigkras (2019) suggests, the PIs that have just occurred can have an impact which PIs are likely to occur next, which may lead to a change in the trend of PIs throughout a match. Analysing the data using this dynamic approach would provide a foundation for a better understanding of the game process and supply information on how the match outcome changes over time (Prieto, Gomez, & Sampaio, 2015). Additionally, the location on the pitch was not taken into consideration as PIs may be more valuable depending on where they are on the pitch and how close they are to each goal. Finally, contextual or situational variables could have been analysed such as match status, match location or match period (Caballero, Garcio-Rubio & Ibanez, 2017).

This study has highlighted which PIs have an association with match outcome at a team level, but further research may wish to look at PIs by position. Different PIs are more important to each position, and additionally each position is more important depending on the tactical formation being played by the team (Kim et al., 2020). Adding this level of detail could add depth and quality to the results and provide further recommendations to coaching staff. Additionally, team tactics change based on goals scored in a match so future research may investigate which PIs have a greater impact when a team is winning, drawing or losing a match. Additionally, being able to combine this type of research with physical PIs would be able to provide the most comprehensive study of association with PIs and match outcome. It is hoped that these approaches may help to bridge the research-practice gap that currently exists in performance analysis.

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Appendices

Appendix 1: AUTEK Approval for Study



Auckland University of Technology Ethics Committee (AUTEK)

Auckland University of Technology
 D-88, Private Bag 92006, Auckland 1142, NZ
 T: +64 9 921 9999 ext. 8316
 E: ethics@aut.ac.nz
www.aut.ac.nz/researchethics

29 July 2020

Kirsten Spencer
 Faculty of Health and Environmental Sciences

Dear Kirsten

Re Ethics Application: **20/175 Exploring the association between performance indicators of football performance and match outcome**

Thank you for providing evidence as requested, which satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEK).

Your ethics application has been approved for three years until 28 July 2023.

Standard Conditions of Approval

1. The research is to be undertaken in accordance with the [Auckland University of Technology Code of Conduct for Research](#) and as approved by AUTEK in this application.
2. A progress report is due annually on the anniversary of the approval date, using the EA2 form.
3. A final report is due at the expiration of the approval period, or, upon completion of project, using the EA3 form.
4. Any amendments to the project must be approved by AUTEK prior to being implemented. Amendments can be requested using the EA2 form.
5. Any serious or unexpected adverse events must be reported to AUTEK Secretariat as a matter of priority.
6. Any unforeseen events that might affect continued ethical acceptability of the project should also be reported to the AUTEK Secretariat as a matter of priority.
7. It is your responsibility to ensure that the spelling and grammar of documents being provided to participants or external organisations is of a high standard and that all the dates on the documents are updated.

AUTEK grants ethical approval only. You are responsible for obtaining management approval for access for your research from any institution or organisation at which your research is being conducted and you need to meet all ethical, legal, public health, and locality obligations or requirements for the jurisdictions in which the research is being undertaken.

Please quote the application number and title on all future correspondence related to this project.

For any enquiries please contact ethics@aut.ac.nz. The forms mentioned above are available online through <http://www.aut.ac.nz/research/researchethics>

(This is a computer-generated letter for which no signature is required)

The AUTEK Secretariat
Auckland University of Technology Ethics Committee

Cc: Garyconnell1@gmail.com

Appendix 2: Permission to Access Data

inspired by aspire®



To: Mr Gary Connell
From: Prof Warren Gregson
Date: 21st January 2021
Re: Exploring the association between technical indicators of football performance and match outcome - Gary Connell

Presentation Time: 5 minutes

Project Brief: to examine the relationship between match technical actions that precede goal scoring actions and match outcome in professional football teams competing in the Qatar Stars League (QSL).

Comments:

- External collaborators need to complete CITI training in case the project is submitted for peer-reviewed publication

Outcome: The committee outcome was **Approved.**

Yours sincerely,

Prof Warren Gregson
 Chair of the Aspire Academy Scientific Committee
 Head of Physiology and R&D
 Aspire Academy

Appendix 3: Offensive Performance Indicators

N=1,256	Result	Mean	Std. Error	95% Confidence Interval for Mean		Min	Max
				Lower Bound	Upper Bound		
Goals Scored*	Loss	0.7	0.1	0.6	0.9	0	4
	Draw	1.1	0.1	0.9	1.4	0	4
	Win	2.6	0.2	2.1	3.1	1	10
Chances*	Loss	3.4	0.6	2.4	4.8	0	21
	Draw	3.0	0.5	2.1	4.2	0	14
	Win	3.4	0.6	2.4	4.8	0	28
Shots	Loss	12.4	1.2	10.4	14.9	2	29
	Draw	12.2	1.1	10.2	14.7	2	29
	Win	12.8	1.2	10.6	15.3	3	38
Shots on Target*	Loss	4.9	0.6	3.8	6.3	0	18
	Draw	5.2	0.7	4.0	6.7	0	15
	Win	6.2	0.8	4.8	8.0	1	18
Penalty Area Entry	Loss	31.9	2.8	26.8	38.0	0	70
	Draw	31.9	2.8	26.8	38.0	0	71
	Win	31.7	2.8	26.6	37.7	0	72
Opp Third Entry*	Loss	59.2	4.8	50.4	69.5	2	108
	Draw	56.4	4.6	48.0	66.2	0	93
	Win	52.4	4.3	44.6	61.5	1	96
Crosses*	Loss	22.3	2.5	17.8	27.8	0	49
	Draw	20.6	2.3	16.5	25.8	0	58
	Win	16.9	1.9	13.6	21.1	0	64
Crosses Successful*	Loss	4.7	0.7	3.5	6.3	0	16
	Draw	4.3	0.6	3.2	5.7	0	18
	Win	4.1	0.6	3.1	5.4	0	18
Corners*	Loss	5.3	0.8	4.0	7.0	0	18
	Draw	4.9	0.7	3.7	6.5	0	17
	Win	4.3	0.6	3.2	5.7	0	18
Passes Successful*	Loss	385.8	24.8	340.1	437.7	75	727
	Draw	354.1	22.8	312.1	401.7	143	1038
	Win	343.2	22.1	302.5	389.4	66	744
Passes Short*	Loss	248.8	17.2	217.3	284.9	44	491
	Draw	227.8	15.7	198.9	260.8	82	769
	Win	222.3	15.4	194.1	254.5	35	505
Passes Medium*	Loss	113.7	8.8	97.8	132.3	0	208
	Draw	103.2	7.9	88.7	120.0	0	259
	Win	97.4	7.5	83.7	113.2	0	242
Passes Long	Loss	22.7	1.7	19.7	26.2	0	116
	Draw	22.6	1.7	19.6	26.1	2	46
	Win	23.1	1.7	20.0	26.7	0	119
Balls Lost*	Loss	140.8	4.5	132.2	150.0	74	250
	Draw	143.2	4.6	134.4	152.6	41	211
	Win	141.6	4.6	132.9	150.9	74	250

* Significant differences between loss, draw and win ($p < 0.05$)

Appendix 4: Defensive Performance Indicators

N=1,256	Result	Mean	Std. Error	95% Confidence Interval for Mean		Min	Max
				Lower Bound	Upper Bound		
Goals Conceded*	Loss	2.6	0.3	2.1	3.1	1	10
	Draw	1.1	0.1	0.9	1.4	0	4
	Win	0.7	0.1	0.6	0.9	0	4
Shots Conceded*	Loss	12.6	1.2	10.5	15.2	3	38
	Draw	12.0	1.1	10.0	14.5	2	29
	Win	12.3	1.2	10.2	14.8	2	29
Shots Conceded On Target*	Loss	6.1	0.8	4.7	7.9	1	18
	Draw	5.1	0.7	4.0	6.6	0	15
	Win	4.8	0.6	3.7	6.3	0	18
Crosses Conceded*	Loss	16.9	1.9	13.5	21.2	0	64
	Draw	20.1	2.3	16.0	25.2	0	58
	Win	21.7	2.5	17.3	27.2	0	49
Crosses Successful - Conceded*	Loss	4.7	0.7	3.5	6.3	0	18
	Draw	4.4	0.7	3.3	5.9	0	15
	Win	4.7	0.7	3.5	6.4	0	18
Passes Successful - Conceded*	Loss	361.2	25.5	314.6	414.8	66	1038
	Draw	361.2	25.5	314.5	414.7	139	636
	Win	375.3	26.5	326.8	430.9	66	737
Corners Conceded*	Loss	4.2	0.6	3.2	5.6	0	18
	Draw	4.8	0.7	3.6	6.4	0	17
	Win	5.2	0.8	3.9	6.9	0	18
Clearances*	Loss	41.8	3.9	34.8	50.2	10	98
	Draw	49.9	4.7	41.6	59.9	12	105
	Win	51.7	4.8	43.0	62.0	8	136
Tackles Won*	Loss	11.3	1.4	8.8	14.4	0	46
	Draw	11.1	1.4	8.7	14.2	0	35
	Win	11.7	1.5	9.2	15.0	0	45

* Significant differences between loss, draw and win ($p < 0.05$)