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ANALYSIS OF SITUATIONAL EFFICIENCY PARAMETERS OF BIH PREMIER LEAGUE CLUBS IN THE 2023/24 SEASON

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Original research

ABSTRACT

The main goal of this paper is to show and analyze the differences in the parameters of the situational efficiency of home and guest matches of the Premier League of BiH clubs in the 2023/24 season. The paper is based on research into current trends of the analysis of situational efficiency parameters in football. The purpose of the paper is to bring the trends closer to all those who love football and statistics. It is to be believed that the paper will contribute to football theory and practice and that it will have its benefits. The paper used statistical indicators collected by notational analysis of 12 clubs in the 2023/24 season, as well as data from the COMET system and the "SofaScore" application. The analysis will contain certain variables with which the parameters of the situational efficiency of the clubs will be compared. These are: ball possession, total shots, shots on goal, shots off goal, corners, goalkeeper saves, yellow cards, red cards, number of spectators (home matches), number of substitutions, number of goals scored per match as a whole set of performance indicators for players and teams. The percentage of ball possession success ranged from 53.45% in home matches to 46.56% in away matches, the number of shots on goal averaged 4.75% in home matches and 3.41% in guest matches. Total shots on goal were 11.71% in home games and 8.45% in away games. The number of corners on average was 5.42% for the home team, while guest teams took 3.79% of corners per game. Goalkeepers had 2.32% of saves in home games, and 3.06% of saves in guest games. Regarding the variable yellow cards, on average teams received 2.07% of cards as home players, and 2.42% of yellow cards in guest games. Also, the variable red cards and the average of red cards is higher in guest games where teams received an average of 0.11%, and as home players 0.07%. Coaches made an average of 4.48% of substitutions per game as home players, and 4.44% of substitutions in guest games out of a possible 5%. The most important variable for which football is played is the number of goals scored, where teams as hosts scored 1.7% of goals per game and 1.1% of goals in guest games. A total of 33 matches were analyzed for each team. Statistically significant differences ($p<0.05$) in favor of home matches were determined for the parameters ball possession, total shots, number of shots on goal, number of shots off goal, corners and number of goals scored in the match. Teams in guest matches had statistically significantly higher ($p<0.05$) values in the variables goalkeeper defense and number of yellow cards. Knowledge of the analysis of situational efficiency parameters will enable football coaches to design football tactics more precisely.

Keywords: football, performance, efficiency, statistics

INTRODUCTION

Football player/club statistics have been popularizing the sport for several years now, regardless of whether we look at it from the perspective of the number of spectators or the number of active athletes. Over the past period, football has continuously developed, primarily in the direction of increasing the physical demands

and loads that football players are exposed to during training and matches. For example, it can be said that today players cover greater distances at a faster pace than was the case ten or more years ago. The number of matches that players play in a half-season or season is also increasing, as is the number of training sessions during a week and month, and thus the risk of injury increases (Marković, Bradić, 2008). "Football could be defined as a complex kinesiological activity that belongs to the group of polystructural acyclic movements, and it is characterized by the variability of motor actions by which the game is realized and through which players achieve the basic goals of the game: scoring goals and winning. These same motor actions develop the characteristics of the players, and the game improves in quality. Football is characterized by a dynamic contact-type game in which two teams oppose each other with the intention of conquering the main channel of the communication network, which realizes the flow of the ball and the goal as the final meaning of the game" (Barišić, 2007). Observing the game of football, it can be concluded that there is a large number of complex and unpredictable situations, so it is impossible to absolutely predict the development of events, including the final result of the match itself. On the one hand, during the game, there is construction and cooperation in the organization and implementation of the attack, while the other side (the opponent) tries to destruct the opponent's action or play in attack, with its own play in defense. This means trying to take the ball away, thus protecting its goal from being scored (Barišić, 2007). In order to successfully cope with all the physical demands of the game of football and to be able to carry out all phases of the game in a better way, it is necessary to strengthen the performance of motor skills and technical and tactical knowledge. During their playing career, football players need to devote a large amount of attention to the implementation of quality training of physical abilities - fitness preparation and the development of technical and tactical knowledge. "During the last years, the number of research for the improvement of the football game has increased significantly" (Marković, Bradić 2008). One of the ways to develop the football game is through the analysis of parameters of situational efficiency, which allows us to see all the positive and negative sides of the players and the entire team, in one football match. "In football, every coach's goal is to improve the sports results of his athletes and club. In order to succeed in this, he must regularly win and provide athletes with feedback about their success on the field. Coaches need the help of objective researchers who record the results of their observations manually or by computer. A manual or computer notation system allows the collection of information about events on the field during the game, which can be used for various purposes, e.g. to analyze player movements, evaluate their tactical efficiency/success, evaluate their technical efficiency/success or simply to collect statistical data about the game. The process of coaching in football plays a key role in sports performance, i.e. efficiency. The goal of the data collection process is to stimulate observable changes in the competitive behavior of athletes. To improve performance and provide quality feedback, real, objective and measurable information is essential“(Sporiš et al., 2014). Therefore, the statistical parameters obtained by collecting manually or by computer are very important in the development of the football game, i.e. team and the football player himself, because their expert analysis can provide quality feedback for the further progress of the player and the team as a whole. In this paper, a special focus will be on the analysis of the collected parameters of the situational efficiency of the clubs of the Premier League of Bosnia and Herzegovina in the 2023/24 season. year, and interpret all variables in detail. With the help of the data collected by the notation system and data from the COMET system and the "SofaScore" application, a picture will be created about which team significantly dominated in certain segments of the game, in which one team was better than the other and how they can be used in the future. for the development of training processes of our teams and the individuals in them. The aim of the research is to determine the differences in the parameters of situational efficiency between matches played on the home and away field. Human memory is limited and it is difficult to remember all the events that occurred during a football match and during the entire competition. Coaches can only concentrate on one part, namely the key part of the match or the field (with the ball), which is why a lot of information about the game and movements on other parts of the field is lost. Thus, only coaches can give partial feedback to the players and the team. Such feedback is most often inadequate, which causes a missed opportunity to optimize an individual or the entire team through objective feedback. It could be said that one of the main tasks of a coach is to accurately analyze and evaluate the performance of a football player or the entire team. Therefore, it could be concluded from the above that it is almost impossible to provide objective information. (Talović et al., 2011). "In order for coaches to base their decisions on objectively determined indicators of player and team performance, it is necessary to record as much data as possible about important, relevant events in football matches, i.e. indicators of the competitive activity of players and teams. This is precisely the purpose of applying notational analysis "(Bašić et al., 2015). "So far, the notation method is most often applied in the following areas:" (Sporiš et al., 2014).

METHODS

Participants

The sample of this research consists of 12 clubs of the Premier League of BIH. in the 2023/24 season. Clubs where this research was conducted: Gošk, Zvijezda 09, Igman, Sloga Doboj, Velež, Posušje, Zrinjski, Borac, Široki Brijeg, Tuzla City, Sarajevo, Željezničar. The research was conducted on 198 matches of the BiH Premier League of the 2023/24 season, which was played in two rounds in two half-seasons. Data on Premier League matches were collected from the Comet system and from the "SofaScore" application.

Procedure

Notation analysis and systems for notation analysis

Notational analysis is an objective way of recording performance and success indicators, which enables consistent and reliable quantification of key events, and then, consequently, quantitative and qualitative feedback that is accurate and objective. Let us not forget that there is no change in performance or success without adequate feedback. Only a verifiable analysis of matches and training can provide such feedback" (Sporiš et al., 2014). "Notational analysis is a method for marking (recording, notating) events at a sports competition and their statistical analysis. It is used in the process of sports preparation to improve sports performance. Based on the noted events in the game, performance indicators are obtained through statistical analysis that indicate technical - tactical activity, that is, the quality of the performance of individual players and the entire team "(Bašić et al., 2015). "Notational analysis is an objective way of recording a performance, so that key parts of a performance can be evaluated in a consistent and reliable manner. This enables feedback that is accurate and objective. No change in performance will occur without adequate feedback. The role of feedback is crucial in the process of improving performance, thus the need for precision and accuracy of such feedback. A set of accurate and precise feedback is only possible if the performance and training is exposed to adequate analysis" (Talović et al., 2011). "After the match, the coach will analyze and evaluate the performance of individual players and football players, and based on that, create a training plan and preparation for the next match. After the next match is played, the process is repeated. So, obviously, the quality and success in training planning and preparation for the next match will largely depend on the results of the analysis of the previous match." (Bašić et al., 2015).
All data were taken from the COMET system and the SofaScore application. This system (COMET) is popular among professional sports associations, analysts and coaches, because it enables the collection, monitoring and visualization of data that help in making better strategic decisions. The ball possession data is taken from the SofaScore app, which offers real-time sports scores. Sofascore is one of the most useful tools for sports and statistics fans, as it offers up-to-date match information and the very latest statistics. All obtained data on variables were recorded in Excel, which were later processed. The software program SPSS 21.0 was used for data processing. The level of statistical significance was set at $p<0.05$. Objectivity is ensured through the use of video recordings, biomechanical systems for detailed analysis or notational analysis. The introduction of computerized (computer) notation systems made it possible to solve the mentioned problems, along with detailed data processing. Used in time-dependent analyzes (during the activity itself), or as a video analysis after the competition, it enables the immediate acquisition of information and its presentation through graphs or other graphical forms of presentation, comprehensible to coaches and players. In order to reduce the mentioned problems, a careful check of the validity of the computerized (computer) notation systems must be carried out. The results of the computerized and manual notation systems must be compared to evaluate effectiveness. A reliability test must be performed, both for manual and computer data processing systems, in order to assess the effectiveness and consistency of the obtained data" (Talović et al., 2011). Manual notational analyses, although they can be very reliable, have a number of serious drawbacks, first and foremost the large expenditure of time for collecting, organizing and statistical processing of the collected data. Today, many specialized computer tools for notational analysis have been developed (some of them are: Amisco, Dratfish, Prozone, ONCE, CurtEye, Focus X2 and many others) that enable real-time match analysis or subsequent match video analysis. The aforementioned tools enable the collection of a large amount of data describing the performance of players in one or more matches, which opens up numerous opportunities for optimizing the system of sports preparation, aimed at improving the real quality of players and teams (Bašić et al., 2015). Marking systems work on the principle of integrating a standard performance video.

Statistical analysis

All data are presented as measures of mean values and standard deviations. For all variables, the normality of data distribution was assessed using the Kolmogorov Smirnov test. To assess the differences between the situational efficiency parameters between home and

away matches, the T test for dependent samples was used. The SPSS 21.0 software program was used for data processing. The statistical significance level was set at $p<0.05$.

RESULTS

Table 1 shows the observed differences for the official statistics between home and guest games played. Significantly higher ball possession clubs had during the home games ($t = 7.663$, $p < 0.001$). Total attempts, total attempts on target and total attempts outside of target was significantly higher than in guest games played ($t = 7.228$, $p < 0.001$, $t = 5.643$, $p < 0.001$ and $t = 5.348$, $p < 0.001$), respectively. Number of corner kicks during home games was significantly higher ($t = 5.941$, $p < 0.001$) as well as the number of goals scored ($t = 4.700$, $p < 0.001$). Goalkeeper saves were significantly higher during guest games ($t = -3.919$, $p < 0.001$) along with higher rate of yellow cards received ($t = -2.029$, $p = 0.043$).

Table 1. Observed differences for the official statistics variables between home and guest games in PLBiH Premier league teams observed in 33 matches

				95% CI of the MD			
	Home	Away	MD	Lower	Upper	t	p
Ball possession	53.45 ± 8.96	46.56 ± 8.95	6.89	5.125	8.663	7.663	<0.001**
Total attempts	11.71 ± 4.95	8.45 ± 3.96	3.26	2.372	4.144	7.228	<0.001**
On target	4.75 ± 2.47	3.41 ± 2.26	1.34	0.875	1.811	5.643	<0.001**
Off target	7.29 ± 5.2	5.04 ± 2.82	2.25	1.421	3.074	5.348	<0.001**
Corner kicks	5.42 ± 3.07	3.79 ± 2.35	1.63	1.091	2.171	5.941	<0.001**
Goalkeeper saves	2.32 ± 1.72	3.06 ± 2.01	-0.74	-1.107	-0.368	-3.919	<0.001**
Yellow card	2.07 ± 1.62	2.41 ± 1.75	-0.34	-0.676	-0.011	-2.029	0.043*
Red card	0.07 ± 0.29	0.11 ± 0.32	-0.04	-0.101	0.02	-1.313	0.190
N0 of substitutes	4.48 ± 0.8	4.44 ± 0.79	0.04	-0.122	0.192	0.443	0.658
Goals scored	1.7 ± 1.28	1.1 ± 1.28	0.61	0.353	0.86	4.700	<0.001**

*MD -Mean difference; 95% CI – 95% Confidence interval; t – T test value; p – level of statistical significance; ** $p < 0.001$; * $p < 0.05$*

DISCUSSION

The influence of science in sports is increasing, and the most effective programs are being sought that will facilitate the work of coaches and enable players to achieve a higher level of performance. Coaches and football players should be in line with the times and development, recognize these approaches and programs in time and thus react better. Overall, looking at all the clubs that were analyzed and from which all the important statistical parameters of the phase were taken (possession of the ball, total shots, shots on goal, shots outside the goal, corners, goalkeeper defenses, yellow cards, red cards, number of spectators, number of substitutions , the number of goals scored in the match), it can be concluded that a lot of clubs in the championship had a high-quality passing game with a lot of passes and also successful passes where the percentage of success ranged from 46.56% to 53.45%. If the middle value of all results was taken, it would turn out to be 46% successful, which is a very good result. It is also possible to single out a few clubs that proved to be the best in the parameters of accurate passing, namely the clubs Velež with 50%, Posušje with 48% and Zrinjski with 53% successful passing. In the Premier League of the 2023/24 season, 198 games were played in which 551 goals were scored, which is an average of 2.78 goals per game. The team "HŠK Zrinjski" had the longest winning streak (11) in the 2023/24 season. The team "FK Borac Banja Luka" had the longest unbeaten streak of 22 games in total, and that streak was ended by HŠK Zrijski with a 1:2 victory in Banja Luka. The team "FK Tuzla City" and "FK Igman Konjic" had the longest losing streak. FK Zvijezda 09 had an infamous streak without a win (10), and they ended it with a victory in Ugljevik against HŠK Zrinjski. The league's best scorer in the 2023/24 season is Nemanja Bilbija "HŠK Zrinjski" who scored 24 goals, while the league's best assistant is Jakov Blagaić "FK Borac". The goalkeeper with the most saves is Vedad Muftić "FK Željezničar", the goalkeeper "FK Željezničar" had 91 saves in 33 games. The goalkeeper of "FK Željezničar" is the only player in the Premier League of Bosnia and Herzegovina this season who collected all the minutes on the field. The goalkeeper of Železničar kept a clean sheet in 12 games without conceding a goal. "FK Velež" goalkeeper Osman Hadžikić kept a clean sheet in 12 games without conceding a goal.

When analyzing the effectiveness of total shots on goal and attacking corner kicks, it can be concluded that the clubs had a very large number of shots and center shots. Most of all, the poor efficiency in the final phase of the attack should be singled out, which is scoring goals, which was quite bad for a large number of clubs.

Therefore, in order to improve the efficiency, i.e. the success of shots on goal and even reaching the final phase of the attack (and not only in these parameters, looking at the statistically worse ranked teams and their indicators) it is necessary to plan and program (integrate) fitness and technical-tactical preparation during the qualification phase itself and before the start of the competition itself, so that the weak points of players and teams (shots on goal, passes, play from breaks, possession of the ball, etc.) are improved and brought to a higher level. The differences between home and gueast matches in football, especially in the

BiH Premier League, are manifested in the tactical approach, psychological factors, travel fatigue, as well as the influence of fans. Home teams have the advantage of familiar surroundings and psychological support, while guest teams have to make an extra effort to adapt to different challenges, including a hostile atmosphere and travel fatigue.

Given these factors, different teams develop different strategies and tactics to achieve success at home and guest field. Teams like Željezničar and Sarajevo are known for playing successfully at home, while guest games often pose a problem for them. FK Borac is the most successful club as a home team in ball possession with an average of 59.23%, while with home games this average was 48.18%. FK Borac is also the team that had the most shots on goal as a home team, as many as 16.47 shots per game, while with guest games this number was 9.18 shots on goal. FK Velež is the team that took the most corners as a home team, 6.76 corners per game, while with guest games they had an average of 3.6 corners per game. In the analysis of football matches, the goalkeeper's defense is a key variable that is used to assess the effectiveness and influence of the goalkeeper on the final outcome of the match.

The goalkeeper of FK Tuzla City had an average of 3.12 saves in home matches, which directly saved a goal, while the goalkeeper of FK Zvijezde 09 was the most successful in guest matches, with an average of 3.64 saves, which directly influenced the result. An important aspect of the football game are the cards that are used to regulate the discipline and behavior of the players during the game. The received cards variable is used in almost every research when talking about match analyses.

The team that played the "roughest" football as a host team is FK Igman, which received an average of 3.18 yellow cards per game, and the host team with the most red cards is FK Sloga Doboj, which collected 3 red cards in the season at home matches. The team that played the "roughest" football as a guest was the NK Gošk team, while the team with the most red cards in guest matches was the HŠK Zrinjski team.

The number of substitutions is an important variable in the analysis of football matches and seasons, which is used to evaluate the coach's tactical approach as well as the influence of the players' physical fitness. The variable number of changes made can mean refreshing the team as well as the coach's reaction to specific moments of the match.

The coach who played an average of 4.44% of changes as host and guest is the coach of HŠK Zrinjski. It is certain that in this way the coach tried to change the formation, style of play and adaptation to the opponent, just improving to react to the situation on the field.

CONCLUSION

The aim of this paper was to present and analyse the situational efficiency parameters of Premier League footballers and clubs in the 2023/24 season, based on which the quality and success, weaknesses and shortcomings of individual clubs in the championship can be concluded, and how these weaknesses should be improved and improved. Statistical data was taken throughout the season. Likewise, the quality of players and teams needs to be honed so that bad indicators do not occur in the competition and the matches themselves, and so that the goal of the competition can be achieved, which is winning the championship title or surviving in the league, depending on the club's general goal. When writing this paper, a broad picture of variables was taken into account in order to offer as much information as possible in short space. This paper has gathered in one place and summarized the previous knowledge and research on situational coaching in football as well as on the effects of situational coaching, which can provide readers with significant professional and scientific information, and this issue has not been dealt with by a large number of people based on the principle of theoretical analysis, and for these reasons it has great theoretical value. In addition to the theoretical value, the work also has a great impact on practical value, given the number of studies that were analyzed and the analyzed effects of these studies. Coaches and all those who are interested in this work can reduce research time in a very simple and high-quality way and thus use this work in practice. Analysis of situational efficiency parameters in the Premier League of Bosnia and Herzegovina indicates the importance of several key factors: tactical flexibility, efficiency in defense and attack, ability to react in crisis situations, as well as physical and mental toughness. Clubs that best use their chances in attack, organize defensive play and use breakaways usually achieve better results. In addition, the efficiency of substitute players and the ability to adapt to different styles of play often decide the outcome of a football match.

Finally, the analysis of the situational efficiency parameters of the BiH Premier League clubs in the 2023/24 season provides a deep insight into the development of the league, highlighting the dominance of a few teams, competition in the fight for survival and the dynamism of the teams through tactics and discipline. Teams such as Sarajevo, Željezničar, Zrinjski and Borac have been leading the league for years, but even smaller clubs provide uncertainty with unexpected results. Statistics are key to analyzing every segment of the game, from attack to defense, and provide important data for coaches to analyze players and predict match outcomes in their favor.

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Conflict of Interest

The authors do not have any conflicts of interest to disclose. All co-authors have reviewed and concurred with the manuscript's content, and no financial interests need to be reported.