



Indicators of competitive activity of the handball club Motor in the conditions of the German Bundesliga

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Abstract. The indicators of the competitive activity of handball clubs affect their preparation for responsible competitions to achieve the desired sports result. The analysis of competitive activity allows to improve the training process and increase the efficiency of players in the future; therefore, the purpose of the study was to analyse and evaluate the components of the competitive activity of the handball club Motor, which participated in the German championship of the 2. Bundesliga. Using the methods of analysis and comparison, the game of the handball club Motor and its opponents in the 2. Bundesliga 2022/2023 was studied. Methods of mathematical statistics were used to calculate the quantitative and average values of indicators and their effectiveness. The results of the study show that the most productive (72 goals) and less productive (47 goals) games of the handball club Motor were observed with the clubs that took 20th and 12th places in the standings; the most productive (35 goals) and less productive (21 goals) matches were with the clubs in 20th and 2nd places; handball club Motor scored 7 and 2 goals against opponents per match in a row; during the winning matches, the maximum goal difference was +10 goals, the minimum +1 goal; the opponents' advantage was +13 goals. The analysis of the competitive activity of the handball club Motor shows athletic competition, integration of the play style, and preservation of membership in the 2. Bundesliga. The results of handball players are

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characterised as unstable. A low level of technical and tactical actions components is observed in 60.5% of matches of the 2. Bundesliga championship. The results of the study can be used in practice to improve individual and team play and to compare the relationship with the team rating of opponents

Keywords: handball; opponents; effective game; effective team; throws; motor activity

Introduction

Team sports games are popular in many countries around the world. Handball, as a representative of the sport of higher achievements, has gone through a long period of historical development. It achieved a high degree of perfection in terms of the movement content of the game and the informational and methodological support of the process of training highly qualified handball players. Modern training of athletes depends on the effective use of indicators of the competitive performance of players and teams of the highest sportsmanship and participants in competitions on Ukrainian and international arenas. Leading scientists pay great attention to the study of indicators of the competitive activity of teams in sports games and in handball in particular.

Such scientists as V. Kostiukevych (2017) and O. Mitova (2020) have focused their research on improving the control of competitive activity and various aspects of the training of highly qualified athletes in team sports games. In their works, the authors R. Sushko & E. Doroshenko (2019) and O. Solovey *et al.* (2022) emphasise that the indicators of the competitive activity of the leading handball clubs (HCs) in Europe constantly influence the formation and development of other HCs. The coaching staff must have information about the quantitative and qualitative indicators of the players who will participate in the training and competitive processes before starting the preparation plan for new competitions. The dynamics of indicators for determining the level of physical, general, and special fitness of highly qualified handball players have a stable upward trend and indicate variable dynamics of indicators during the annual macrocycle. All this affects the indicators of competitive activity.

Foreign scientists M. Oytun *et al.* (2020) and M.Q.H.K. Anwar *et al.* (2022) note that competitive performance indicators in various game sports are of great importance for coaches, as they use relevant information to plan the training process, offensive play, and defence, as it directly affects the results of matches. Scientists and specialists distinguish various characteristics of competitive activity: individual and team technical and tactical actions, their scope, and their effectiveness. The study of H. Lisenchuk & V. Tyshchenko (2019) confirms the usefulness of using various indicators of technical and tactical skill of highly qualified football players in the general system of complex control of their special training and readiness for teams in general. The authors have created criteria that allow for evaluating the effectiveness of individual technical and tactical actions.

According to V. Tsyhanok (2021), using the information support system, which includes the computer programs InfoHandball and StatsHBall, significant data was collected on the technical and tactical aspects of the game of qualified handball players of various positions during the competitive process (in matches, series of matches or

tournaments) with their subsequent integration into the training process. A number of authors emphasise that the study of the competitive activity of handball players allows: to identify factors that affect the outcome of the match; to develop game models for athletes of various roles and to determine game development trends and technical and tactical features of the game of individual teams, as written by J.C. Zapardiel *et al.* (2019) and J.C. Lane *et al.* (2020). Scientists focus attention on the fact that versatile training of players is necessary to maximise productivity and minimise exhaustion, when performing in long tournaments, and also recommend correcting the training process considering the analysis of game activity.

The use of new, more effective training methods is reflected in the improvement of sports results, which becomes the main goal of any changes in training methods. Sports results are an integral indicator of athletes' preparedness. Hungarian scientists L. Petridis *et al.* (2021) note that in strength training, it is recommended to use various loads with resistance, which act on the entire range of the speed-force spectrum, thus optimising the development of forces and, ultimately, improving sports results. At the level of higher sportsmanship, a number of authors, including V. Lochman *et al.* (2021) consider competitive activity as the most important form of complex control, and the achievement of sports results as one of the leading criteria for the success and effectiveness of the training process. The effectiveness of control provides current information about the course of competitive activity of almost every match and season. All of this determined the relevance of this study. The purpose of the work was to analyse and evaluate the components of the competitive activity of handball players of the HC Motor, who participated in the German championship of the 2. Bundesliga.

Materials and Methods

During the research, a set of theoretical scientific research methods was used, which made it possible to fully and objectively show the results and achieve the goal of the work. Using the analysis method, 38 matches were analysed with the participation of the leading Ukrainian HC Motor (Zaporizhia, Ukraine), a participant in the foreign championship of the German 2. Bundesliga for the 2022/2023 season. Accordingly, the materials selected for the study cover the years 2022–2023. The materials for the competition results were used from the official protocols of the 2. Bundesliga handball championship among men's teams. The studied results are available on the websites of the Handball Federation of Ukraine (n.d.) and HC Motor (All news: Handball club Motor, n.d.). The following indicators of competitive activity were analysed: the high and low performance of HC Motor and their opponents in the championship, as well as the performance of matches, the largest and smallest victories, consecutive goals scored, and

the difference in goals scored in a match. This analysis provided an opportunity to gain a deep understanding of the performance of the team during the season.

The method of analysis and generalisation was used for detailed data analysis of scientific and methodical literature, which was necessary for understanding the research problem in a broad context. The processing of scientific sources made it possible to qualitatively present the experiences of other countries in the context of the researched topic. Documentary materials contributed to the analysis of the protocols of competitive activity: the number of matches, victories, goals scored, productive matches and teams, and indicators characterising the course of matches. The method of system analysis turned out to be very useful for organising and structuring the obtained data. In addition, the chronological method was used to systematise data and study sources that reflected the essence of the study from the beginning to the end of the competition.

In this study, the comparison method proved to be a useful tool used to achieve two goals. It was used to compare the indicators of the competitive activity of HC Motor with the indicators of their opponents. This made it possible to draw conclusions about the difference in the performances of the teams during the matches. The analysis of comparative data became an important stage in understanding and evaluating the effectiveness of the game of the HC Motor team. The comparison method was also used to analyse the results of the study in comparison with the knowledge obtained from other scientific works. This made it possible to expand the context of the study and draw more reasonable conclusions.

The use of methods of induction and deduction in combination with comparative analysis enabled the author to draw his own conclusions regarding the competitive activity of HC Motor within the framework of the 2. Bundesliga. The methods of mathematical statistics are aimed at calculating the total and average values of the indicators, their effectiveness, and the percentage presentation of the obtained results. For the mathematical analysis of the research results, standard statistical methods and calculations of quantitative and qualitative indicators of the competitive activity of handball players – participants of the 2. Bundesliga of the German championship were used using the Excel 2007 application programme package.

Results

Handball players of HC Motor do not have serious rivals in the domestic arena and high-quality competitive practice during the martial law in Ukraine. The management of the club considered the possibility of participating in the championships of countries such as Poland, Hungary, and Slovakia. Negotiations with representatives of German handball turned out to be the most effective, after which HC Motor was included in the 2. Bundesliga. This league is considered the strongest national championship in Europe; it covers a significant number of HCs, and its second division, in terms of power and potential, can surpass most European championships. Zaporizhzhia HC Motor became the first in the history of Ukrainian clubs to play in the elite foreign division. In the 2. Bundesliga of the German championship, 20 clubs took part, which, according to the round-robin system, played matches on their own

ground and on the ground of their opponents – 38 rounds from August 2022 to June 2023. Dusseldorf was the home city of HC Motor. The game of the opening round for the Zaporizhzhia team was a return to the court after the beginning of the large-scale invasion of Russian troops into Ukraine (Handball Federation of Ukraine, n.d.; All news: Handball club Motor, n.d.).

According to the evaluation system specified in the methodology and based on the materials used, the following results were established: HC Motor played 38 matches with its opponents and took 17th place in the final tournament table. At the same time, they won 11 matches (28.9%), drew 4 matches (10.6%), and lost 23 matches (60.5%). Thrown and missed balls were 1,087:1,143, the difference being 56 balls. On average, during the match, the handball players of HC Motor had the indicators of thrown balls at 28.6:30.1 and a difference of 1.5 goals. The final results of the matches directly depended on the high execution of shots in the final stage of the attack throughout the match, as well as the game activity of the players in the attack. In the matches of the 2. Bundesliga in all HCs, the indicators were distinguished by a large number of effective attacks. The most effective match between the handball players of the HC Motor and the HC Velfe, which took 20th place in the tournament table, was marked by a total of 72 goals; the score was 35:37. Among the less productive matches, 47 goals were scored; the score of 25:22 was noted in the game between HC Motor and HC Lübeck-Schwartau, which took 12th place in the tournament table.

At the next stage of the research, the results of the quick and positional attack of the handball players and the high efficiency of the Ukrainian handball players (they threw 35 balls into the opponents' goal) were noted. The overall result of the match between HC Motor and HC Velfe is 35:37. At that time, the handball players had a low performance, only 21 goals. In a match with HC Eisenach, which took 2nd place, the score was 21:27. The positive final result depended on the effective interactions of the opponents' handball players and their combination play at the final stage of the attacks. A successful game and high efficiency of competitive activity in team interactions testify to the high number of balls thrown by the opponents into the goal of HC Motor. 37 goals were scored in the championship matches between HC Motor and HC Tusem (27:37) and HC Bietigheim (25:37), which took 8th and 4th places in the final table, respectively. Analysis of the results with the lowest number of goals conceded by the opponents' handball players, 22 goals each, was registered in the championship games of HC Motor and HC Bayer (28:22) and HC Lübeck-Schwartau (25:22). These HCs took 15th and 12th places, respectively.

The maximum difference between the goals scored and missed by the handball players of HC Motor confirmed the attacking style of play in the attack. A large margin of victory (+10 goals) was established in the match between HC Motor and HC Ludwigshafen; the score was 34:24, 9th place. The smallest difference (+1) was in the winning match between HC Motor and HC Rostok, with a score of 31:30 and 19th place in the table. Indicators of attacking actions in the attack of opponents of Ukrainian handball players differed from the identical generalised indicators of HC Motor by a large number of combined attacks. This attacking style in

the attack was confirmed by the maximum difference between thrown and missed balls. The big difference in the victory of the opponent (+12) was noted in the match between HC Motor and HC Bietigheim (25:37), which took 4th place. The minimum victories (+1 goal) over HC Motor opponents received in 13.2% of matches at the initial stage of the championship in the most productive (71 goals) match with HC Lübeck-Schwartau (35:36), which is in 12th place, and in less productive (55 goals each) matches with HC Guttenberg and HC Konstanz (27:28), they took 13th and 18th places in the final table, respectively.

Due to the high level of preparation in matches with their opponents, the handball players of HC Motor consecutively threw balls into the goal 140 times against 142 opponents, which is a high result. On average, the indicators were 3.68 and 3.7 goals per match, respectively. The most goals in a row, 7 goals each, were scored in the winning matches by HC Motor against HC Welfe (32:28) and HC Lübeck-Schwartau (25:22), respectively; they are in 20th and 12th places in the tournament table. The lowest figures, 2 goals each, were scored consecutively into the goal of their opponents in 15.8% of the matches; in these matches, the handball players of HC Motor were defeated. Accordingly, the opponents of the Zaporizhian handball players in 21.1% of the matches, in which 4 wins, 1 draw, and 3 defeats of the HC Motor were recorded, had the highest figures, 5 balls thrown in a row into the goal of the Ukrainian handball players, the smallest 2 balls each, in the match between the HC Motor and HC Ludwigshafen (34:24), which took 9th place.

The analysis of the maximum advantage of thrown balls during the offensive actions of highly qualified teams during the championship shows that they make +116 in HC Motor and +182 of their opponents, on average per match, respectively +3.1 and +4.8 goals. The biggest difference, by +10 goals scored, was made by HC Motor over its opponents during winning matches with HC Ludwigshafen (34:24), HC Coburg 2000 (30:23), and HC Bayer (28:22), which are, respectively, in the 9th, 11th, and 15th places of the tournament table. The smallest difference, by +1 goal, is in 23.7% of matches of the 2. Bundesliga championship in which HC Motor was defeated. Opponents of HC Motor had an advantage in the score difference (+13 goals) during the match between HC Motor and HC Bietigheim (25:37), 4th place in the table, minimum, +1 goal each, in 15.8% of championship matches. From the above, it can be stated that the defining characteristic of handball players' attacking play is the effectiveness of their attacking actions.

An in-depth analysis of the matches between HC Motor and their opponents in the German 2. Bundesliga handball championship gives an idea of how handball players of different teams tactically competently implement throws during the game from different distances and playing positions, use different options for throws at the final stage of attacks, and individual game ranges of matches. The difference between the indicators of the competitive activity of HC Motor and the opponents in the framework of the German championship of the 2. Bundesliga indicates the level of preparation of both teams and players, the tournament position, and the rating of the teams. Handball, as a professional sport, is constantly developing and improving. If at least one year is missed in the preparation of the

HC and its competitive activities, it can take many years to recover. Therefore, the Ukrainian national team should continue training and playing in order to perform decently at competitions of various ranks.

Discussion

The purpose of the study was to analyse and evaluate the components of the competitive activity of the HC Motor players who participated in the German championship. The general statistics of HC Motor in the foreign championship were considered, and an assessment of their results was provided. The observations of the components of competitive activity and the results achieved confirm the opinion of scientists and handball specialists, such as O. Mitova (2019) and J.N. Prudente *et al.* (2019), that individual and team deficiencies lead to missed goals and, as a result, do not produce results. During the championship, HC Motor won 28.9% of the matches and lost 60.5% of the matches. The matches used different means of conducting the game and team interactions, which differed in their effectiveness. These components of competitive activity are becoming more and more relevant and agree with the results obtained by C. Manchado *et al.* (2021), who also showed a significant difference between offence and defence, with higher values of defensive efficiency. Coaches should take this fact into account when planning their programme.

As noted by scientists J.N. Prudente *et al.* (2019), studying the opinion of the coaching staff of the HC on improving the preparedness of their teams, firstly, correction of tactical preparation is necessary, secondly, correction of technical and psychological preparation, and then the shortcomings of functional, physical, and integral preparation of handball players. According to specialists B. Giovanini *et al.* (2021) and M.Q.H.K. Anwar *et al.* (2022), the main factor that determines the effectiveness of a team's competitive performance is its ability to "score goals in soccer" and "shoot balls in the basket in basketball". Teams with a high rating and a place in the tournament table have a high rate of attacking actions, score more goals, and win a large number of matches. These data provide relevant information for the development of new approaches to planning the training process.

The combination play in the attack testifies to the effective attacks of the handball players, both Ukrainian and German. Teams effectively threw the ball into the goal at the final stage of attacks in 52.6% of the matches of the German 2. Bundesliga with the participation of Ukrainian handball players. As noted by Spanish scientists G. Daza *et al.* (2017) and Portuguese colleagues W. Ferrari *et al.* (2019; 2020), handball experts, match wins, player activity, and its relationship with team results can be good tools for evaluating different features of the game. The analysis of the differences between the winning and losing teams shows the quantitative relationship between the goals scored and, therefore, with the final result of the team. The physical, technical, and tactical readiness of players can be monitored considering these indicators, and performances in long tournaments can be considered.

The highest and lowest indicators of thrown and missed balls in matches with opponents indicate that the handball players of HC Motor had advantages over teams of different ratings in the final table. The obtained results are supported

and confirmed in the works of other authors in team sports, such as H. Vila & C. Ferragut (2019) and C. Manchado *et al.* (2021), who note the absence of significant differences between teams with better and lower ratings. Modern handball requires high game activity from players and their level of development of the leading physical components, regardless of the game role. Tactically prepared players follow a designed game plan to be able to win their matches, including goals scored and missed attempts on goal.

A. Maulana *et al.* (2019) and P. Francisco *et al.* (2020) suggest that the number of shots per game can be an adequate indicator of team performance, with the speed of shots being one of the most important actions during a handball match. In the German championship, high demands are placed on each playing position of the players, and the individual tactical actions of the attack differ from each other for the players of the first and second lines of attack. As stated by V. Tsyhanok (2021), the analysis and expert interpretation of indicators of technical and tactical actions in handball by highly qualified players during competitions show that the highest level of efficiency in competitive activity is possessed by players in the “right half-middle” role, while according to the number of goals scored, “left half-middle”. The analysis of the competitive activity of HC Motor shows that the Ukrainian handball players were not inferior to their opponents in any match, but their individual skill was insufficient, and the handball players’ different contribution to the final result was observed. For the entire Ukrainian handball, the main result is the balls thrown into the goal of their opponents by the players of HC Motor (1,087:1,143, on average per match 28.6:30.1 and consecutive balls thrown during the match 140:142, 3.68:3.7 per match). The difference (–56, –1.5 per match) indicates that most of the matches were of an attacking, intense nature, and the court was an even, bright, but less stable struggle.

Foreign handball specialists aim their players at improving the tactical principles and strategy of the game in attack against disorganised defence, at meeting the special technical requirements of fast play, and at providing various options for passing the ball with one hand. Considering the indicators of the competitive activity of the leader of Ukrainian handball, the coaching staff of the team needs to adjust the individual and team programmes of the training process, both after each match and the season played. Matches with German teams in the 2. Bundesliga left different impressions: speed, sharpness, throws, and thrown balls – all of this was reflected in the competitive activity of the handball players. The final result (17th place) turned

out to be rather ambiguous, considering the short period of preparation and the status of the opponent. There are positive points, and in general, the coaching staff should figure out what needs to be changed in the game of the Ukrainian HC. Coaches’ attention must be focused on the game-related statistics that have the greatest impact on future match results in order to effectively plan training and competition strategies.

Conclusions

The main goal of the participation of the HC Motor players in the competitions of the German 2. Bundesliga was adaptation to the foreign championship and maintenance of high-quality competitive practice. German handball has a special status in the international arena because of its style of play, wide geographical coverage of HCs and tournaments held in the country, their popularity, and the large number of foreign handball players and coaches who work in teams of various levels. The analysis of the indicators of the competitive activity of the handball players of the HC Motor and their opponents shows that the level of preparation and the style of play affect their positive dynamics: a productive match – 72 goals; the effective team of the HC Motor – 35 goals, and the opponent’s HC – 37 of goals; the biggest victory – +10 goals; and their opponents – +12 goals. In a row, they scored an average of 3.9 goals per game against 3.7 of their opponents.

It can be noted that the final place in the tournament table and the acquired experience of HC Motor are not a coincidence: a low level of component technical and tactical actions was observed in 60.5% of the championship matches, and they were characterised as unstable. The results of competitive activities testify to the nature of sports fighting during the championship and the integration of the style of play of the new championship into the training and competitive processes. The obtained results can be useful for coaches in planning and building strategies for training and competition processes, paying special attention to game-related statistics that will have a greater impact on future game results. Further research involves the analysis of sportsmen’s performances in competitions at the level of European and Ukrainian handball championships and cups.

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Conflict of Interest

None.

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Показники змагальної діяльності гандбольного клубу «Мотор» в умовах німецької Бундесліги

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Анотація. Показники змагальної діяльності гандбольних клубів впливають на їх підготовку до відповідальних змагань задля досягнення бажаного спортивного результату. Аналіз змагальної діяльності дає змогу удосконалити тренувальний процес та підвищити ефективність гравців у подальшому, тому метою роботи було проаналізувати й оцінити складові змагальної діяльності гандбольного клубу «Мотор», який брав участь у німецькому чемпіонаті Другої Бундесліги. За допомогою методів аналізу та порівняння досліджено гру гандбольного клубу «Мотор» та його опонентів у Другій Бундеслізі 2022/2023. Методи математичної статистики застосовувалися для підрахунку кількісних і середніх значень показників та їх ефективності. Результати дослідження свідчать: результативна (72 м'ячі) і менш результативна (47 м'ячів) ігри гандбольного клубу «Мотор» помічено з клубами, які посіли 20 та 12 місця у турнірній таблиці; результативний (35 м'ячів) і менш результативний (21 м'яч) матчі були з клубами на 20 та 2 місцях; гандбольний клуб «Мотор» поспіль закидав опонентам за матч 7 та 2 м'ячі; під час переможних матчів максимальна різниця закинутих м'ячів склала +10 м'ячів, мінімальна +1 м'яч; перевага опонентів склала +13 м'ячів. Аналіз змагальної діяльності гандбольного клубу «Мотор» засвідчує спортивну боротьбу, інтеграцію стилю гри та збереження прописки в Другій Бундеслізі. Результати гандболістів охарактеризовано як нестабільні. Низький рівень складових техніко-тактичних дій спостерігається у 60,5 % матчів чемпіонату Другої Бундесліги. Результати дослідження можна використовувати на практиці для удосконалення індивідуальної і командної гри, для порівняння зв'язку з командним рейтингом опонентів

Ключові слова: гандбол; опоненти; результативна гра; результативна команда; кидки; рухова активність