

# Analysis on Technical Statistic of Basketball Based on Correlation Coefficient

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**Abstract.** As a competitive sport, basketball is a remarkable important project of the world's major international sports competitions. The record of technology statistical indicators which is commonly used in the basketball match made the measure of various key factors in basketball match from the qualitative to the quantitative. This paper selected the more comprehensive technical statistical indexes, and discussed theoretical basis of the statistical analysis of basketball technology. What's more, this paper also analyzed the relationship between the statistic indexes from the general law of basketball game at the same time. This research provide certain theoretical reference for our country basketball training and competition.

## 1. Introduction

Nowadays, sports has become culture symbol of the world's civilization and progress, and basketball is definitely one of the important part. Modern basketball movement has tended to use rules to compete the body, technical and tactical, physical ability and the attitude, awareness and wisdom, and psychological quality. Only grasping the dialectical relationship between each other and achieving an organic unity can win the game. These are showed by statistic indicators of basketball match specific. The record of technology statistical indicators which is commonly used in the basketball match made the measure of various key factors in basketball match from the qualitative to the quantitative. Data is one of the important basis for scientific decision-making, and let data speak is the right way to scientific decision-making. Correlation analysis is an analysis method to analyze the correlation between objective things. Using the method of correlation analysis on technical statistics indicators in the basketball game and the result of correlation analysis is an effective means to find a match winner factor, interpret competitive characteristics of team, and explore the law of motion of the basketball [1, 2].

In this kind of literatures which use the theory of correlation analysis of statistic index and the result of the match in the basketball match always to analyze and research the final scores of teams in a tournament league, and select the technique statistics data of each teams after the team against different opponents. The fundamental principles of basketball game is confrontational. There are many factors to decide the result of basketball game. But because of the competitive level of different rival, statistic data of each game is not necessarily the only confrontational standard. Pay attention to study the team's technical statistics but ignored the different competitive level of the opponent team, ignored the discrepancy of technical statistics of the opponent team. To restore the true nature of data through the surface of simple technical statistical indexes, we should use the method of system theory and comprehensive, system, and contact point of view to study the basketball match. Only in this way can we find right winning factors of basketball game, and draw a conclusion of the basketball movement development objective law. Based on this, in this study, we selected the more comprehensive technical statistical indexes and discussed the theoretical basis of statistical analysis of the basketball technology. At the same time, we discussed the relationship between technical statistical indicators set off the general law of basketball game.

## 2. The Theoretical Basis of Basketball Technology Statistical Analysis

People's understanding and summary for basketball competition phenomena can be called for a basic understanding of this phenomenon or idea, but for the people who is work on basketball sports scientific research, different understanding, different concepts will cause the select of the method in dealing with basketball game is different. Therefore, the establishment of the scientific system view has methodology guidance significance on the study of basketball competitions, which has important theoretical significance and practical significance in promoting scientific basketball sports competition [3].

The so-called system, is an organic whole has a specific structure and function which is composed of a number of interrelated and interacting parts (elements). The basketball athletic competition system view in this topic research is named by the methods which we study of this objective phenomenon of basketball competitive game. This system is a method that treating basketball athletic competition as system for exploration, understanding and management.

The purpose of the basketball competition is win the game, at the same time there are a variety of factors that affect the result of the match, but on the whole, the factors are divided into their own and the opponents' factors. This study concluded basketball competition system basic structure through the study of basketball competition system which is shown in figure 1. The basic structure of Basketball competition system is made up of participating object of the subject and object, through the contact information of the contradictory unity of opposites. Any one of the main body to achieve the goal must be according to the information system within and without the object to make timely response and adjustment. And when the object receive the feedback information of the subject, it will adjust accordingly. This system is a contradictory unity that adjustment - response - again adjustment - again response between subject and object. Basketball competition is a principal in such process of adjustment - response - again adjustment - again response in the seeking of breakthrough and victory.

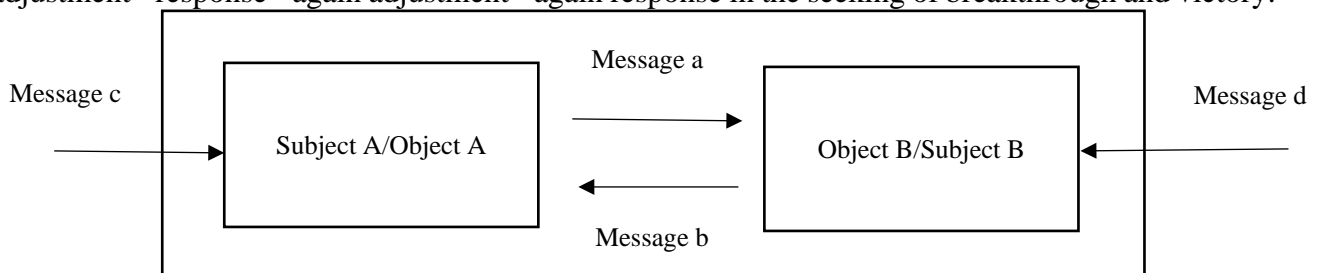


Fig. 1 The basic structure of the basketball competition system

## 3. Qualitative Analysis of the Relationship Between Technical Statistical Indicators According to the Basketball Movement Regularity

In statistics, the correlation coefficient is a statistic to describe the power degree and the direction of linear relationship between two variables, so the premise of using the correlation analysis is that there is a certain linear relationship between variables [4]. As a system, technical statistical indexes of basketball competitions is the observation object of system changes. As the research object of this study, the basketball game technical statistical indicators should have a certain correlation. From the practice of basketball sports competition, there was a correlation between the various technical statistical indexes. But the degrees and the direction correlation between the indexes are different. This research to make qualitative analysis of correlation of some technical statistical indexes according to the basketball movement rules of basketball game.

### 3.1 Shots and Scoring

The relevance of the two technical statistical indicators is the most obvious, to a large extent, shooting rate directly affect the scores. On the defensive intensity bigger game, the player's shooting rate was affected, so often the game score is very low. On the contrary, in the two attacking team game, because the two sides are emphasis on offensive, but ignore defensive, so high shooting directly lead to the high score.

### **3.2 Assists and Shooting Rate**

Because the assists is offensive player by passing basketball to companion to make partner layup directly or immediately shots and scoring. This kind of technology combination don't need score players to make aggressive action, and the difficulty to complete scoring technology is small, and the success rate is bigger. An assists is equal to a successful shooting. In all scores the more score due to assists, the higher the proportion of the shooting will be. Therefore, to a certain extent, assists affects the shooting rate.

### **3.3 Assists and Scoring**

In the basketball match the time of the assists directly reflects the ability of a player attacks, reflects the coordination ability to attack of overall team. In the specification of basketball technical statistics, the produce of assists is on the premise of scoring. The player who is good on Assists r can help teammates scored easily, the team with better assists ability can easily score with the cooperation of the team.

### **3.4 Offensive Rebound and Shots Times**

In the basketball match, the two teams within the prescribed time of rotating the offensive or defensive orderly, administering a guard, and the process continues. Who can win more offensive opportunities and scoring in this transition, the more chance who can win the game? The shots time technology indicators directly reflect there are how many chances to attack. In order to get more shots chance, the most direct the most efficient way is to grab offensive rebound undoubtedly. This is the second chance which is stressed by many coaches. It saves time and energy consumption in the process of transition, even if the first attack is failed, the sportsman can get offensive opportunities again, which increase the shots time for the team, and enhance the players' confidence.

### **3.5 Foul and Penalty Shot Times**

Basketball rules that the offensive player was foul when he was shooting, if the ball find the basket, then the score in the count and give one times additional penalty, but if the ball not find the basket, then give two or three times additional penalty. If the opponent was affirmed technical foul, the punishment was two penalty and one roll. If the foul time of whole team was add up to four with single quarter, every foul (except for an offensive foul) means two times penalty. If the Rival was unethical sports foul, it will be impose two penalty one rolls, but if the unethical sports foul was on the shooter, the punishment was, depending on the situation, one penalty one roll, two penalty one roll and three penalty one roll. It is not hard to see from this, a foul is necessary for penalty. The more fouls, the more times of penalty.

### **3.6 Turnovers and Steals**

Turnover means the situation that at the control of the ball, shooting is not formed and losing the chance to attack. Steal is turn the ball under their thumb from the control of opponent successfully without violations and fouls in robing, hitting, and stealing the ball. Defensive player will cause the opponent's mistake. In many cases of mistake, the mistakes caused by steal occupies a certain proportion. The more steals their own, the more mistakes the opponents make. The more their own mistakes, the more steals the other side make.

## **4. The Construction of the Basketball Match Technology Statistical Data Based on Correlation Analysis**

Based on the principle that statistical analysis of basketball technology need to combine the basic law of basketball basic rule. Statistical analysis technology should base on technology statistical data of the research object, and combine with technology statistical data of rival for analysis. The classification of this statistic study belongs to team stats in the playoffs. The main problem is how to turn the two groups of statistic data from both sides into a set of data, so that to analyze the correlation analysis of statistical data. Due to the basketball rules that the score are as the only evaluation standard, the author here try to use two teams score ratio to determine the value of competition. Assume that A team score against B team in the first game is 87:76, it is concluded is that the data ratio is  $87/76 = 1.1$ , that's to team A is victory. In the third game the score team A against B is 96:101, it is concluded that the data ratio is  $96/101 = 0.95$ , that's to say A team is lose. Basketball game is

different from the football game that the later has a draw, so we know that the scoring ratio can't be 1. Thus we can conclude that: take the team technology statistical data as the dividend, the opponent team technology statistical data as the divisor, if the ratio greater than 1, the team wins, but if the ratio is less than 1, the team lost. And the ratio of the value cannot be 1. On other technical statistical indexes, we can also use this method to draw the ratio of the technical statistics of two teams directly, to show the advantage or disadvantage of a team's statistic.

Therefore, Set the technology statistics in a match of object of study team as a collection  $A_i$ , the technology for statistical data on the serial number  $k$  is  $a_i(k)$ ,  $k=1, 2, 3, \dots, n$ . So

$$A_i = [a_i(1), a_i(2), a_i(3) \dots, a_i(n)] \quad (1)$$

Set the technology statistics in a match of the opponent team as a collection  $B_i$ , the technology for statistical data on the serial number  $k$  is  $b_i(k)$ ,  $k=1, 2, 3, \dots, n$ . So

$$B_i = [b_i(1), b_i(2), b_i(3) \dots, b_i(n)] \quad (2)$$

Set the ratio statistic data for collection  $C_i$ , So

$$C_i = [c_i(1), c_i(2), c_i(3) \dots, c_i(n)] = \left[ \frac{a_i(1)}{b_i(1)}, \frac{a_i(2)}{b_i(2)}, \frac{a_i(3)}{b_i(3)} \dots, \frac{a_i(n)}{b_i(n)} \right] \quad (3)$$

So, we can use the certain ratio statistic data of both sides to collection  $C_i = [c_i(1), c_i(2), c_i(3) \dots, c_i(n)]$  (the scoring index  $c_i(n) \neq 1$ ), to carry out correlation analysis.

## 5. Conclusion

This paper selected the comprehensive technical statistical indicators, discussed the theoretical basis of the statistical analysis of basketball technology and analyzed the relationship between technical statistical indicators starting from the general law of basketball game. This study lied the foundation for further studies of the basketball match statistic index, and provided certain theoretical reference for our country basketball training and competition.

The theory and method of Statistical analysis of the technology of basketball in our country is relatively backward, and related research is less. China's sports scientific research personnel should strengthen the research, and make valuable data of basketball game play its proper role. And this study strength contrast research, technique features and restraining factors of the basketball team. Thereby it can guide the basketball practice better.

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