

# Research on Human Capital Depreciation and Investment Compensation of Chinese Elite Athletes

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## ABSTRACT

This study takes the depreciation of human capital of athletes as the starting point, extends the human capital theory, and explores the depreciation of human capital of China's elite athletes and the subjective and objective factors triggering the depreciation from three dimensions: natural depreciation, market depreciation, and social depreciation, respectively, establishes the investment compensation path for the depreciation of human capital of China's elite athletes, and proposes the compensation strategy to deal with the depreciation of human capital of athletes.

**Keywords:** Athlete, Human capital, Depreciation, Compensation.

## 1. INTRODUCTION

For a long time, China's athlete career development environment is too closed, basic education is not solid enough, the contradiction between learning and training is prominent, the gap between the comprehensive quality of athletes and the needs of society is widening, the sense of professional efficacy and employment expectations of the athlete group has declined, which has led to the athlete career crisis, resulting in the depreciation of the human capital stock of China's outstanding athletes to varying degrees. At present, China is implementing the development strategy of moving from a large sports country to a strong sports country, and a large number of retired outstanding athletes in China are valuable human resources for practicing the strategic goal of a strong sports country. This study takes the depreciation of human capital of athletes as the entry point to study the depreciation of human capital of China's outstanding athletes and the compensation of investment, so as to avoid the waste and idleness of a large number of professional human resources in sports and make them play an active role in the strategy of building a strong sports nation, and the study has important

practical significance and theoretical value for the development of human resources of China's athlete group and the sustainable development of athletes' career.

## 2. ATHLETE HUMAN CAPITAL AND ITS DEVALUATION

### 2.1 Human Capital of Athletes

Athlete human capital is the stock of value of health, skills, knowledge, psychology, reputation and other factors that coalesce in an athlete and bring future benefits through the investment of a specific actor in the athlete's sporting talent.[1] The core value element of athlete human capital is the special competitive ability formed by investing in the training of human sports talent, and athlete human capital belongs to the category of skill-based human capital. The main connotation of athlete human capital is the production capacity with economic value condensed in athletes, and its essence is the labor capacity of athletes engaged in sports production activities, which is transformed from athletes' labor force, and its direct expression is athletes' competitive ability in competition, and its connotation relationship is shown in "Figure 1".

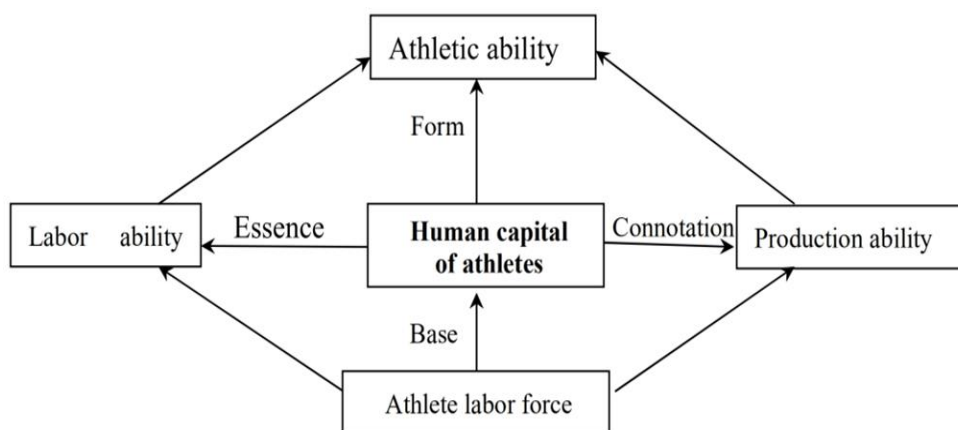


Figure 1 Connotation structure of athlete human capital.

## 2.2 Concept and Connotation of Devaluation of Athlete Human Capital

The diversity of athletes' human capital investment subject, the heterogeneity of investment objects, the instability of athletes' competitive ability and performance, the unpredictability of risk factors such as accidents and injuries, and the uncertainty of individual's subjective efforts and objective conditions in the formation process make athletes' human capital unstable, and its value stock fluctuates with the changes of athletes' physical health, professional age, training level, social popularity and influence. The value of human capital fluctuates with the changes of internal and external factors such as athletes' physical health, professional age, years of training, competitive level, social popularity and influence. As a special form of capital in the market, athletes' human capital is bound to depreciate in value. Athlete human capital devaluation refers to the decrease in the value stock of athletes' special competitive ability, knowledge, ability, health, reputation, etc. during their sports career and life cycle caused by changes in various internal and external factors, which leads to the decrease and loss of Human capital value or use value of athletes' human capital. Athlete human capital is always at risk of triple devaluation during the athlete's career cycle and throughout the life cycle, namely natural depreciation, market depreciation and social depreciation, which include the decrease of market value of athletes' human capital and the decrease of athletes' use value, and are ultimately reflected in the decrease of athletes' income, the decrease of their ability to obtain income and the weakening of their ability to expand income space. In addition to the basic characteristics of general human capital

devaluation, the human capital devaluation of athletes also has its own unique characteristics, specifically, the process of human capital devaluation of athletes is short and the characteristics of instantaneous devaluation are obvious; the human capital devaluation of athletes is larger when they retire, and the devaluation has a greater impact on the post-professional period of athletes, and some athletes have temporary human capital failure in the transition period of career change. Some athletes experience temporary human capital failure during career transition.

The change of human capital value of athletes is different from the change of general human capital value, most of the athletes' human capital value fluctuates obviously when they retire, and the performance of their human capital is often restricted to a certain extent, resulting in inefficiency. It can be seen that the effective migration or smooth continuation of the human capital value of retired athletes has a very important impact on the life of athletes in the post-professional period. The two curves in "Figure 2" show the trends of changes in the stock of athlete human capital and general human capital values over the life cycle, where the solid line indicates changes in athlete human capital values and the dashed line indicates changes in general human capital values. The athlete human capital value curve has a steeper slope, its human capital investment formation period is shorter and declines faster, and most athletes' human capital value stock tends to reach its highest value after age 20. In contrast, the slope of the general human capital value curve is gentle, and the process of accumulation and decline of human capital stock is relatively smooth, and the value stock tends to reach the highest value in the age of 30-40.

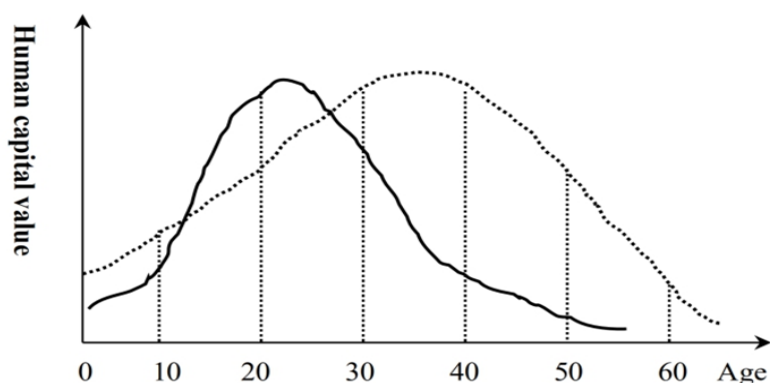


Figure 2 The pattern of change in the value of human capital of athletes and general human capital.

### 3. ANALYSIS OF HUMAN CAPITAL DEPRECIATION OF ELITE ATHLETES IN CHINA

For a long time, China's elite athletes have not had a strong sense of competition in the market, serious thoughts of "waiting, relying, and asking" for employments, and weak awareness of career planning, which have lowered the sense of career efficacy and employment expectations of the whole group of athletes and led to a decline in the comprehensive evaluation of athletes' careers by the society, and triggered a career crisis of athletes, the reason for which is The reason is that the human capital of athletes in China has depreciated to different degrees, and the depreciation of athletes' human capital after retirement is even more serious. The plurality of investment subjects, the heterogeneity of investment objects, the uncertainty of athletes' competitive ability, the unpredictability of risk factors such as accidental injuries, and the limitations of individual's subjective efforts and objective conditions in the process of forming athletes' human capital all affect the value stock of athletes' human capital to different degrees, which makes China's athletes' human capital always face natural depreciation and market depreciation. The human capital of Chinese athletes is always facing the risk of natural depreciation, market depreciation and social depreciation.

#### 3.1 Natural Devaluation of Human Capital of Chinese Elite Athletes

In order for human capital to function and create value in market production and transactions, its bearer must first be a physically and mentally healthy and qualified workforce. However, during the career cycle and life cycle of an athlete, the human capital of an athlete is inevitably depreciated

due to the deterioration of the athlete's health, ageing, and physical energy, and such depreciation is the natural depreciation of the human capital of an athlete, which is closely related to the professional characteristics of an athlete. The natural depreciation of human capital of athletes due to sports injuries and diseases during training and competition is relatively common in the field of competitive sports in China. In order to continuously improve the level of competition and explore the potential of sports, athletes have to endure long-term heavy and high-intensity training, and sometimes the amount and intensity of training and competition often exceed the limit of human body's ability to withstand, which to a certain extent are harmful to the athletes' body, many athletes retired with a full set of injuries, and those athletes who are seriously injured, their human capital will not only depreciate, but also be scrapped. A survey by the State General Administration of Sports shows that injuries and illnesses are more common among China's best athletes, including ligament strains, fractures, osteophytes, Achilles tendon ruptures and other common injuries among athletes. The survey of the National Committee of the Chinese People's Political Consultative Conference medical subject group shows that: among 6340 athletes, the number of injuries reached 3832, accounting for 59.6%. The higher the level of the sports team, the more serious the athletes' injuries and illnesses. The injury rate of Chinese badminton team members is 100%, and in 2001, 42 youth badminton training team members identified 83 injuries.[2] In Shandong Province, for example, 56.3% of the total number of track and field players under the age of 60 died of heart disease, 62.5% for volleyball, 67.2% for weightlifting, and 100% of retired soccer players between the ages of 40 and 60 had heart disorders; these alarming figures are significantly higher than the percentage of the

general population.[3] In 2000, the Chinese Sports Foundation started to carry out mutual disability insurance for athletes in the national outstanding sports teams, and as of 2007, a total of 111,942 athletes were insured in 8 years, and 10,149 athletes' applications for compensation were accepted, with a disability rate of 9.1%. This is only the statistical data of athletes who have reached the application criteria for disability, there are still a large number of athletes who have not reached the benefit standard and cannot be counted.[4] This shows that the athlete profession has a high risk of injury and disability. Although it is difficult to count the specific data of athletes' injuries and disabilities caused by training and competition, it is an indisputable fact that injuries caused by sports injuries trigger the natural depreciation of human capital of outstanding athletes. In addition, as athletes age, their physical ability declines and their athletic ability declines, athletes are bound to face retirement. Once an athlete retires, his or her special athletic ability is bound to decline, resulting in a decrease in the value of the athlete's human capital stock and a natural depreciation of the athlete's human capital in general.

### ***3.2 Market Devaluation of Human Capital of Chinese Elite Athletes***

The market-oriented characteristics of human capital depreciation gradually emerge along with the development of social production. After human society enters the era of commodity economy, human capital as a factor of production gradually reveals its important market value. At the same time, the market risk of depreciation of human capital is increasing as the bearers of human capital encounter increasingly fierce market risks and competition. As a special kind of human capital, the comprehensive value of human capital of athletes in China has been low for a long time, and the imbalance between supply and demand in the market, coupled with the low marketization degree of competitive sports and inadequate human capital market for athletes in China, have led to the decline of the market value of human capital of athletes, and the resulting devaluation is the market devaluation of human capital of athletes.

First of all, the market depreciation of human capital of China's elite athletes is mainly manifested in the aspects of low comprehensive value of human capital of athletes, low market competitiveness, slow updating of athletes' knowledge and difficulties in retirement transition

due to lack of career planning. In the process of human capital formation of athletes in China, most of the investments are focused on improving athletes' special competitive ability, and cultural education is seriously lacking, which affects the balanced accumulation of human capital value of athletes. Professor Tian Maijiu's research shows that in 1989, the percentage of elite athletes in China who received cultural education was 8.53% in elementary school, 37.32% in secondary school, 33.59% in high school and junior college, 18.54% in junior college and 1.72% in undergraduate college.[5] The survey of the State General Administration of Sports shows that as of 2005, the proportion of retired athletes to be resettled in China who have obtained bachelor's degree or above is less than 10%, while only 2 athletes to be resettled have obtained postgraduate degree, which is less than 0.1%.[6] Although China has strengthened the cultural education of elite athletes in recent years, for a long time, The serious lack and insufficiency of cultural knowledge education leads to the low comprehensive quality and market competitiveness of Chinese athletes, which not only affects the improvement of the level of human capital stock of athletes, but also increases the market risk of depreciation of human capital of athletes. In addition, there is a serious phenomenon of oversupply in the employment market of retired athletes in China, coupled with the fact that many retired athletes are often unable to smoothly transition to post-athlete careers due to the lack of advance career planning in the market competition in their efforts to realize career transition, resulting in a large amount of idle and wasted athlete human capital and causing the depreciation of human capital of outstanding athletes.

Secondly, athletes' human capital has its own trading market like other factors of production, and the market operates according to the same market laws of supply and demand. The stronger the specialization of human capital, the higher the elimination rate of human capital and the higher the degree of human capital depreciation. Once an athlete retires, his or her original human capital can hardly be used in other professional fields, resulting in the depreciation of the original human capital of the athlete. As is known to all, athletes have a high elimination rate in the process of growth. Once athletes do not have good results in their 20s, they will definitely face the risk of being eliminated, and the chances of being eliminated by the society are even higher after they leave the sports team, and the risk of depreciation of athletes' human capital

further increases after they exit the competitive sports market and enter the capital market. According to statistics, about 15% of retired athletes in China stay in sports teams every year, which not only affects the metabolism of sports teams and the development of individual athletes, but also causes the waste of a large number of originally scarce human capital of excellent athletes in China.

Finally, the low degree of socialization and marketization of athletics in China and the inadequate human capital market for athletes invariably reduce the market value of athletes' human capital. The low degree of socialization and marketization of competitive sports makes the market allocation of athletes' human capital less efficient, which in turn affects the production efficiency of athletes' human capital, and the market value of athletes' human capital cannot be fully reflected in transactions, which in effect reduces the market value of athletes' human capital. In addition, the human capital market is a direct means and way to allocate human resources, which promotes the reasonable flow of human capital and realizes the dynamic balance of human resource allocation through the interaction of supply and demand mechanism of human capital, competition mechanism, wage mechanism, dynamic diversion mechanism, etc.[7] However, China has not formed a sound human capital market for athletes, and the unbalanced development of sports and the differences in the training of athletes have caused the horizontal flow of athletes to be obstructed, while the flow of athletes is mainly based on the vertical flow of the "three-tier training network" athlete training system. Without reasonable flow of good athletes, the reasonable and effective allocation of human capital of athletes cannot be realized, so that good athletes are excessively concentrated in certain regions or sports teams, which often results in partial shortage and partial surplus of human capital of athletes in different regions, causing waste or low productivity of human capital of athletes and eventually leading to depreciation of human capital of athletes.

### ***3.3 Social Devaluation of Human Capital of Elite Athletes in China***

The formation, transaction and value realization process of athletes' human capital are all in the social and economic life, and the effectiveness of athletes' human capital is inevitably influenced and restricted by the political, economic, cultural and

other social environments in which athletes live. In addition to the natural and market depreciation of athletes' human capital, political, institutional and policy factors also lead to the depreciation of athletes' human capital, which is the social depreciation of athletes' human capital, and the social depreciation of athletes' human capital often has more profound and extensive negative effects than the natural and market depreciation.

First of all, from the social system and competitive sports management system, China's athlete training system has laid the hidden danger of devaluation for the human capital of outstanding athletes. In this relatively closed system of training professional athletes, the focus of sports teams at all levels always revolves around the goals of "Olympic strategy" and "National Games strategy". In this relatively closed system of professional athlete training, the focus of sports teams at all levels always revolves around the goals of "Olympic strategy" and "National Games strategy", and the growth process of athletes is all centered on training and competition, neglecting the improvement of cultural knowledge, social survival skills and other comprehensive qualities. The long-term semi-closed specialized training has led to the disadvantage of athletes' cultural knowledge and livelihood skills compared with their peers who normally receive school education, except for their special athletic skills, and this training system has caused the value elements of human capital of outstanding athletes to be too single and unstable, and the risk of depreciation of their human capital is much higher than that of general human capital, which undoubtedly has laid the foundation for the depreciation of athletes' human capital. This has undoubtedly laid a hidden danger for the depreciation of human capital of athletes. The success rate of athletes in China's professional training system is too low, the growth process of athletes lacks the concept of "people-oriented" comprehensive development, and the relatively closed living environment leads to a lower social integration of athletes, while the low level of education, lack of relevant vocational skills, low comprehensive quality and low social competitiveness eventually lead to a large number of excellent athletes who retire from the sport and have to work for a second time. The low level of education, lack of relevant vocational skills, comprehensive quality and low social competitiveness eventually lead to a large number of excellent athletes' difficulties in secondary employment and career change after retirement,

resulting in their human capital being idle and wasted.[8]

Secondly, premature specialized training as well as utilitarian and short-sighted behavior in the field of competitive sports increase the risk of depreciating the human capital of outstanding athletes. Under the Olympic strategy of the national system, many competitive sports select players from very young children and teenagers, and then prematurely integrate these children into the professional training system for training. Premature specialization, however, affects the overall healthy development of the children. In the training of youth athletes, coaches often impose a sports load that exceeds the physical and mental capacity of the youth during their physical growth and development, and the high volume and intensity of training can lead to an overdraft of the athlete's body, causing great harm to the youth's physical development. "The phenomenon of "dry flowers" is widespread in the group of young athletes in China, and some young athletes show signs of premature aging, all of which are related to premature specialized training. In addition, the existence of utilitarianism in competitive sports is not only the need for the survival and development of athletes, but also a phenomenon that is difficult to avoid in social and economic life. However, since the implementation of the market economy system in China, there has been an excessive pursuit of utilitarianism in the field of competitive sports, and many misconducts have arisen in competitive sports, which has seriously affected the healthy development of competitive sports. Once athletic sports are overly pursued for utilitarianism, they will be alienated and degenerated, and the chaos in the field of competitive sports in China, such as "pulling up seedlings", "false age declaration", "abuse of prohibited drugs", etc., are all related to the short-sightedness of quick success and quick profit. The short-sighted behavior is related to the quick success. The premature specialization of athletes and the excessive pursuit of utilitarianism affect the healthy accumulation of human capital value of athletes and increase the risk of depreciation of athletes' human capital.

Finally, the difficulty of employment placement after athletes' retirement has led to the idleness and waste of a large amount of human capital of excellent athletes in China. Athletes' human capital is skill-based human capital, and the components of athletic ability of athletes engaged in different sports differ greatly, and the differences in sports, individual athletes and their components of athletic

ability make athletes' human capital have typical heterogeneous characteristics. The heterogeneous human capital employment is aimed at the special labor market, which has little circulation with the general labor market. The heterogeneous characteristics of athletes' human capital and the special nature of athletes' occupation lead to the natural structural employment and unemployment problems of athletes. In addition, there are real problems such as closed career development environment, insufficient cultural education, weak awareness of career development and employment competition, which make the employment placement of athletes after retirement relatively difficult. The problem of athletes' retirement and employment has always been a thorny issue in the field of competitive sports in China, and every year many retired athletes cannot be employed in time and stay in sports teams. Especially since the marketization of China's athlete retirement placement system, the autonomy of employers has been expanding, coupled with the quality of talent required by society as a whole has further improved, the problem of difficult placement of retired athletes in China has become more prominent, a large number of retired athletes can not be successfully employed, resulting in the idleness, waste and depreciation of athletes' human capital. It is because of the limitations of athletes' own comprehensive quality and the unsoundness of the national retirement placement and guarantee mechanism for athletes, a large number of retired athletes in China cannot successfully realize employment every year, and the human capital of athletes who quit the competitive sports market cannot effectively enter the capital market to play a role, which is not only a great waste of human resources of competitive sports, but also brings to the sustainable development of China's competitive sports career. This is not only a great waste of human resources in competitive sports, but also brings negative impact on the sustainable development of China's competitive sports.

#### **4. INVESTMENT COMPENSATION FOR DEPRECIATION OF HUMAN CAPITAL OF CHINESE ELITE ATHLETES**

Based on the high risk of devaluation of human capital of elite athletes, athletes and all equity holders should actively take measures to prevent the devaluation of human capital of elite athletes in the process of formation and use of human capital of athletes, and actively make additional

investments to improve and enhance the structure and stock level of human capital value elements of athletes, so as to avoid and eliminate the risk of devaluation of human capital of elite athletes and effectively cope with and compensate for the devaluation of human capital of elite athletes.

#### 4.1 Investment Compensation Path of Human Capital Depreciation of China's Elite Athletes

Along with the in-depth development of socialization and marketization of competitive sports in China, the society's demand for athletics sports talents has become higher and higher, and the risk of depreciation of human capital of elite athletes has further increased. At present, China is implementing the development strategy of moving from a large sports country to a strong sports country, and a large number of elite athletes and retired athletes in China are valuable talent resources for practicing the strategic goal of a

strong sports country, so it is especially important to establish a sound investment compensation path to deal with the depreciation of human capital of outstanding athletes in China. The investment compensation path for the depreciation of human capital of China's outstanding athletes is a huge system project, which requires not only the athletes themselves to actively cope with it, but also the state, society, enterprises and institutions and other employers to take various measures to cope with it together. According to the special characteristics of human capital depreciation of elite athletes and the general compensation path for human capital depreciation, the investment compensation path for human capital depreciation of elite athletes should include the internal self-compensation path of athletes and the external compensation path of the state, society, enterprises and institutions and other employers. The investment compensation path system of human capital depreciation of outstanding athletes is shown in "Figure 3".

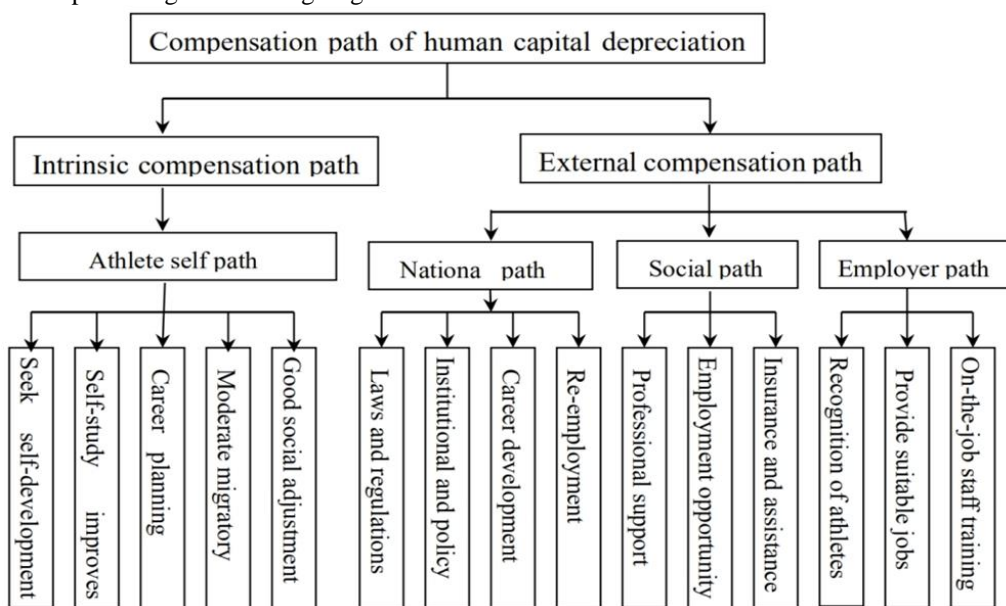


Figure 3 The investment compensation path system of human capital devaluation of outstanding athletes in China.

In the investment compensation system of human capital devaluation of elite athletes in China, athletes' self-compensation path mainly includes athletes' awareness of self-development, learning and improvement ability, career planning and management, migration mobility and social adaptation ability, etc. These initiatives of elite athletes often play a leading role in coping with their human capital devaluation process because of their strong initiative, which can effectively reduce the risk of human capital devaluation of athletes.

The external compensation path for the depreciation of human capital of excellent athletes in China mainly consists of relevant regulations, systems and protection mechanisms for athletes introduced by the state, social support for athletes' career, creation of employment opportunities and social insurance and relief mechanisms for retired athletes, recognition of athletes by enterprises and institutions and other employers, suitable employment positions for athletes and strengthening on-the-job training for employees, etc.



The human capital of athletes is depreciating. The external compensation path for the depreciation of human capital of elite athletes is jointly established and organized by the state, society, enterprises and institutions, which is more efficient in coping with the depreciation of human capital of athletes and can effectively mobilize the strength of all parties to jointly cope with the depreciation of human capital of elite athletes.

#### ***4.2 Investment Compensation Strategy To Cope With the Depreciation of Human Capital of Elite Athletes***

The depreciation of athletes' human capital stock during service is often caused by limited knowledge of culture, sports injuries during training and competition, and neglect of career development planning, etc. Athletes face a high risk of depreciation of their human capital during their growth process. To deal with the possibility of human capital depreciation during the athletes' service, the athletes themselves should actively open the path of internal "self-compensation", while focusing on improving their special athletic ability, consciously learning cultural knowledge and related social life skills, improving their comprehensive quality and ability, and making scientific plans for their career development. Efforts should be made to try to avoid accidents and injuries in training and competition, and eliminate the factors that induce the decline of human capital stock of athletes, so as to prevent the occurrence of depreciation of human capital of athletes. At the same time, other rights and interests of athletes' human capital should also open the external compensation path for the depreciation of athletes' human capital in time, actively take measures to create good training, learning and living environment and conditions for athletes' growth, improve venues, equipment and training methods, reduce the probability of sports injury accidents, continuously improve and optimize athletes' training and guarantee mechanism, and reduce the depreciation of athletes' human capital. In general, it is important for the human capital of athletes to be preserved and increased. In general, for the possibility of depreciation of human capital of serving athletes, the response strategy is mainly to take effective measures to prevent the occurrence of depreciation and to compensate for the additional investment in human capital elements such as cultural knowledge and social life skills of athletes that are relatively lacking.

After an athlete retires, the core value element of his or her human capital, the specialized athletic ability, begins to fade and decline rapidly, resulting in an unavoidable depreciation of the athlete's human capital. Once an athlete retires, his or her human capital will rarely be useful in other occupational fields due to the difference in professional knowledge and skills, which will lead to the idleness and waste of the athlete's human capital.[9] In view of the commonness of human capital depreciation of retired athletes, government management, society and individual athletes need to take effective measures to deal with it actively. The retired athletes themselves should actively learn and master relevant vocational knowledge and skills through their own internal "self-compensation" path, and actively make career transition to meet the needs of diversified career development in society. The government, society and enterprises should fully expand the external compensation path for the depreciation of human capital of excellent athletes, provide necessary vocational skills training opportunities for retired athletes, create a good employment environment, and guide retired athletes to realize employment in sports-related occupations as much as possible, so that athletes' human capital can play the most productive efficiency and the best social effectiveness, and avoid the waste of originally scarce sports The human resources are not wasted. It can be seen that additional investment or secondary investment in retired athletes can improve or enhance the structure of the value elements of athletes' human capital and its stock level, which is the main strategy to cope with the depreciation of human capital of retired athletes.

## **5. CONCLUSION**

In view of the depreciation of human capital of outstanding athletes in China, the state should improve the mode of athlete training, improve the "combination of sports and education" of athlete training, take the path of institutionalized development, effectively strengthen the education of athletes' cultural knowledge, and strive to enhance the comprehensive value of athletes' human capital. Establish a new sports team training and competition management mechanism that integrates "training, learning, medicine, science and management" to promote the overall healthy development of athletes. Establish a sound retirement protection system for athletes, expand diversified vocational skills training for athletes, strengthen the construction of the athletes'



insurance system, and establish a relief mechanism for athletes' disability and retirement unemployment insurance, etc. All sectors of society should improve the recognition and tolerance of athletes and their careers, mobilize the whole society to provide employment opportunities and jobs for retired athletes, broaden employment channels for retired athletes, and rely on social forces to improve and expand the construction of athletes' public welfare fund and establish a mechanism to help and rescue retired athletes who are in difficult life situations. Athletes should take the initiative to identify and assess the risk of depreciation of their human capital, and open the internal "self-compensation" path in time, and carry out career planning and design in time during their service period, and actively participate in career transition skills training after retirement, so as to make positive migration and effective continuation of their human capital value, and finally realize the value preservation and appreciation of athletes' human capital. The athletes should carry out career planning and design during the service period, and actively participate in career transition skills training after retirement, so as to make positive transfer and effective continuation of their human capital value, and finally realize the value preservation and appreciation of athletes' human capital.

## **AUTHORS' CONTRIBUTIONS**

Wunian Wang designed and wrote the manuscript; Yuan Jiang contributed to revising and editing.

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