



## Study on the Attributes and Correlations of Production Factors

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### Abstract

With the advancement of the society and the development of the economy, human cognitions about the production factors are more and more deepened. However, as viewed from the attribute structure of production factor, the production factor only contains two attributes such as hard factor and soft factor, and the soft factor is composed by knowledge soft factor and society soft factor, which form three capital forms, i.e. material capital, human capital and social capital, and these three sorts of capital drive the increase of the economy and the development of the society. In the background of modern economy, the human capital is in the center position and its advance could enhance the energy and efficiency of other factors.

**Keywords:** Production factors, Attributes, Correlation, Research

As the material base and drive dependence, the production factor has been concerned by the academe all along. The product factors mean various economic resources and conditions which are necessary for human material production, and they are necessary conditions for people to engage in production or economic activities. Without the existence of production factors, people can not engage in production or economic activities. From relative research histories, the production factors are dynamic, and in different economic development stages, human cognitions about production factors are developing and changing, and with the advance of social civilization and the enhancement of economic level and the change of the production pattern, the cognitions are continually fulfilled. So under the present economic background, it possesses theoretical and practical meanings to study the attributes and correlations of production factors from the drive dependence of Chinese economic development.

### 1. Human cognitions about the development of production factors and the researches in recent years

According to traditional western economics, since Say's Law, the production factors were divided into three basic forms including land, capital and labor, which occurred in the classic book, "Economic", by Samuelson (Samuelson, 1999, P.9). With the advance of human civilization, especially after WW II, the world economy entered into the stage of quick development, and in the middle of 1960s, Solow R., Swan T., Denison E. and other western economists found the "increasing residual" in the research about the economic growth mechanism, and as an independent production faction, the technology has gradually been realized by people.

The function of system to the economic growth firstly occurred in some economists' (such as Veblen, T.B) research and analysis about the system from the end of 1800s and the 1930s-1940s. But at that time, they only emphasized the importance of the system, and they didn't confirm the connotation of the system, and they only said "demand and desire, result and objective, method and measure, the change and tendency of individual behaviors all are the function of the variable of the system, but the system possesses highly complexity and total instability (Thorstein, 1993, P.166)". So the opinion didn't enter into the traditional economic theory and until the new system school where Coase R, Williamson O and North D were main representative economists who studied the problems including the property of the enterprise, the trade cost and asset specificity, the function of the system to the economic growth begun to be accepted by people. The occurrence of the system factor further developed the human view for studying the production factors. The research about the economic growth was not only limited in the investment of the production factors, and the economists also begun to study the environment of the production factors, especially they could more scientifically explain many macro-economic problems such as the difference of economic development in different countries where labor, capital, land and human resource were basically same. Just as North said, "the system offers a sort of economic stimulation

structure, and with the evolvement of the structure, it plans the direction of the economy toward growth, stagnancy or decay (North, 1991, P.235)". Thus, the system had been normally brought into the study of production factors.

As one of production factors, the human capital also occurred in certain stage of economic development through continual cognition deepening. In the beginning of 1900s, in Marshall's *Politics Principle*, he regarded the entrepreneurships as the production factor. And he thought that with the development of productivity and the extension of production scale, the entrepreneurships became into the new production factor. In 1960s, Theodore W. Scholtz put forward the theory of human capital after he studied the economic developments of undeveloped countries such as India. And in 1980s, when Romer P. and Lucas R. studied the micro layers such as knowledge overflow and externality of human capital of economic development, the human capital had been emphasized as an independent production factor. At present, Marshall's "entrepreneurships" should belong to the range of human capital because the "entrepreneurships" is formed when the human capitals are accumulated in "entrepreneur", and it is one of representation form of human capitals. So as an independent production factor, the "entrepreneurships" is just one part of the human capital.

In recent years, about the research of production factor, some scholars put forward new opinion. Chinese Academy of Social Sciences researcher, Xue Yongying comprehensively studied the composing of production factors from various aspects such as factor, combination, operation and optimization of productivity in his book of "Productivity Economics" (Zhejiang People's Press, 1986), and he thought except for three basic factors, energy, information, education, management and scientific technology all should be regarded as production factors. After 1990, with the rise of information economy and network economy, domestic scholar Wu Jiawei deeply studied the relation between information and economy in his book of "Information and Economy (1993)", and he put ward the opinion that "information is the most important soft factor of productivity" (Wu, 1993, P.27-30). Yu Rengang though the complexity degree of the labor process decided the connotation of production factor, and in the simple labor, the production factor only included human and material, and with the continual development of social production, the production process would become more and more complex, so many new production factors would continually enter into the production process. In the modern large production condition, the basic production factor includes four sorts, i.e. natural resources (including land), labor (mainly including simple labor), capital and knowledge (mainly including management knowledge, technical knowledge and information). At the same time, Yu Rengang thought that in different economic terms, each production factor possessed different function in the combination of various factors, so the correlation existed among production factors, and this sort of relation was decided by the status and function of production factor in the production. The research about the connotation of the production factor doesn't stop, and with the advance of social civilization, new production factor will certainly occur (Xu, 2006, P.15-18).

About the theoretical research of production factor, Xu Bin et al put forward the concepts of generalized production factor and special production factor, and put forward the hierarchy theory of production factor based on the generalized concept, i.e. the generalized production factor system was composed by four hierarchies including basic production factor, unit production factor, industrial production factor and department production factor (Xu, 2006, P.15-18).

From the human research history and actuality about the production factor, we can see that there are not deep researches about the attributes and correlation of production factors, and the relative research can not only promote the theory of production factors, but can improve the practice for the dependence of production factors in modern economic development.

## **2. Attributes of production factors**

About the research of production factors, when people study the dependence factors of economic growth from different domains of economics, they will continually find new production factor, which will be inconvenient for studying and cognizing the essential of production factor. First, when some scholars study the relationship between economic growth and production factors and find some factors influence the economic growth, they will regard them as the production factors, so the quantity of production factors will become more and more and it become very complex to establish the production function model through taking various factors as the independent variables and taking the output as the attributive variables, and it goes against to look for the key factor influencing the output level. Second, confusions and "repetition" will occur when people cognize the production factors from different views, for example, for "energy", some economists describe it as an independent production factor, and it should be contained in the factor of "land" in fact. So it is very necessary to describe the essential attribute of production factor by the clustering method through getting rid of the concrete form of production factors. It not only embodies the scientific research opinion of "induction and deduction", but possesses meanings to study the property of the production factor and the relationship between production factor and economic growth, and simplify the production function.

Based on above analysis, after rescanning the set of production factors, the author thinks that the production factors only can be divided into two sorts from attributes, i.e. hard factors and soft factors. The so-called hard factors mean the factors which can be materialized, and they have concrete or actual images, and they are objective, such as traditional land, capital and the labors with material form. In the process of economic growth, their function can be measured. The

soft factors mean the factors which can not be materialized, and they are abstract and they have not concrete material forms, and they are not easy to be measured, and they are “created” by human through the accumulation of knowledge and the advance of socialization, and they are subjective on consciousness. The soft factors include knowledge soft factor and social soft factor, and the knowledge soft factors mean the human capitals such as technology, talent, knowledge and intelligence of people, and the social factors mean the social capitals such as system and regulation formed by the social power guaranteeing the economic activity order. Thus, we have the total cognition to the property, composing and the relation with economic development of production factors (seen in Figure 1).

Convenient for studying the relationship between production factors and economic growth, we analyze and classify the production factors, which can avoid the blur and superposition of the connotations among factors. At the same time, we also definitely confirm the natural labor and human capital. Through the attribute analysis of production factors, the connotation and the extension of the expression of production function would be further abundant and extensive. According to the Cobb-Douglas Production function, the production function containing soft factors and hard factors can be denoted as

$$Q=f(H, S)$$

Where, Q denotes the output, H denotes the investment of hard factors and S denotes the investment of soft factors.

Thus, we can understand the production function as the social total output which is the function of the hard factors and soft factors investments. If denoting the hard factors and soft factors by the capital forms in the economic activity process, the social total output is the function about material capital, human capital and social capital investments.

$$Q=f(M, H, S)$$

Where, Q denotes the output, M denotes the material capital, H denotes the human capital and S denotes the social capital.

The hard factors and soft factors are contrary uniform entity in the process of economic growth. And they are different and associated. As viewed from the form, the hard factors are concrete, and they have material forms and they can be measured. And the acquisition of hard factors is easy because most of them exist in the nature and society. The process of acquisition is simple only by the mode of trade. The acquisition of soft factors is complex and needs more costs, and they can be acquired through education, training and long-term “studying from working”, and the process of the acquisition is long. Some soft factors also are related with human culture and social development level, so the acquisition of soft factors is much difficult than the acquisition of hard factors. Though both have large difference, but they are closed related in the economic activities. The soft factors can exert the function through the hard factors in the economic growth process, and the existence of hard factors is only the necessary condition of economic growth, and it is not the sufficient condition. If the hard factors can development the original economic activities in the original economic stage, but in the modern society, without the supports of soft factors, it is not feasible to develop the economic activities only depending on the hard factors. The hard factors and soft factors supplement each other.

### 3. Correlations among production factors

The production factor is the base to develop the economic activity, and different production factors play different roles in the economic activities, and they have different function mechanisms to economic growth and economic development in the process of economic activity. It can better allocate the production factors and promote the economic growth and development to study the relationship between different factors with economic growth and development.

As above analysis, according to the attributes, the production factors can be divided into two clusters, i.e. hard factors and soft factors, and the soft factors are composed by knowledge soft factors and social soft factors. In the process of human economic activity, the hard factors composed by land, labor and capital offer material capitals in the economic activities, and the knowledge soft factors composed by knowledge, technology and intelligence offer human capitals in the economic activities. The social soft factors composed by system, regulation and law offer social capitals in the economic activities. Material capital, human capital and social capital are necessary capital factor set for the economic growth and development in the economic activities. But their functions are different and the hierarchies exist among them.

Through the analysis of production factors in economic activities, we find that the hard factors composed by land, labor and capital are the direct participators in the economic activities, and they directly act on the objects of economic activities and complete the attention of economic activities, and their values are coagulated in the new material products in the economic activities to complete the value conversion and realize the economic growth. Because of the direct property that they participate in the economic activity, we call them as the direct production factors. For the knowledge soft factors composed by knowledge, technology and intelligence, they don't directly act on the objects of economic activity in the economic activity, and they influence the economic growth through enhancing the allocation benefits of land and capital and enhance the efficiency cost of labor. So we can see that human capital is the headspring of land,

labor and capital to the economic growth, and the land, labor and capital can be enhanced their economic activity because of the existence of human capitals. Therefore, we call human resources as the source production factors. The social soft factors composed by system, law and regulations are the set of behavior rules between people and people and between human and materials, and their existence regulate the rules that the economic bodies should follow in the economic activities, and these rules not only make each economic body know its behavior rule in the economic activity, but make each economic body know other economic bodies, so the social honest sources are extended and the trade costs are reduced. In nature, the system is the guarantee that the economic activities run in high efficiency, so we call it as the guarantee factor. The direct production factor, source production factor and guarantee factor act on each other and perform their own responsibility in economic activities, and they make the economic activity go along orderly and complete the cycle, and make the economic activity develop from low level to high level and realize the continual growth and development of economy. The hierarchy and correlation among production factors in the economic activities are seen in Figure 2.

From Figure 2, in human economic activity, labor, capital and land directly participate in the economic activity and complete the conversion of value form, and they are the basic dependence of economic growth. The human capital doesn't directly act on the economic activity, but it is directly associated with labor, capital and land, and it connects with the economic activities through them, and it forms the relationships of condition guarantee and information feedback with the factor of system, and it is in the central position in all production factors. Through the functions to land, labor and capital, human capital can enhance the economic activity and increase the contribution degree in the economic growth. The correlation of human capital and system forms a positive feedback function, i.e. the function of human capital to the system will make the system more adapt to the accumulation and development of human capitals, and the function of system to human capital will make the human capital form larger productivity in the frame of system. The factor of system ensures the condition in the economic activity, and it acts on the economic activity to make labor, capital and land to be allocated optimally, and it also acts on the human capital to make human capital be released to the largest extent.

The study about the hierarchy and correlation of production factors can explain why the human capital is the core factor in modern economic development.

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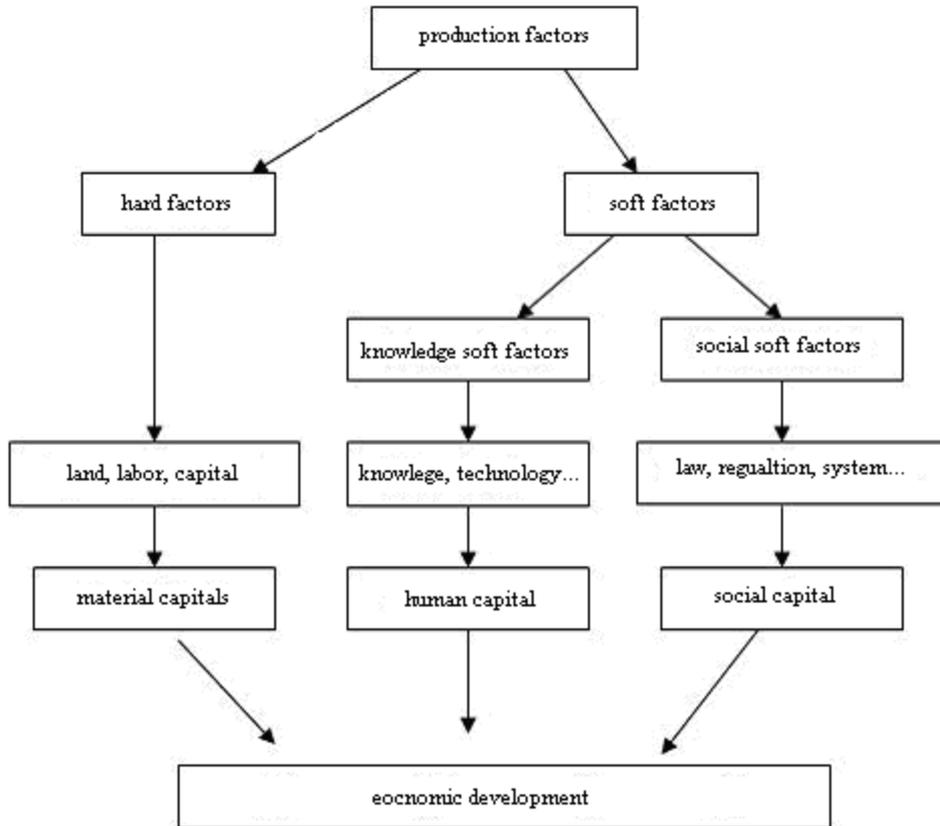


Figure 1. Attributes and Capital Forms of Production Factors

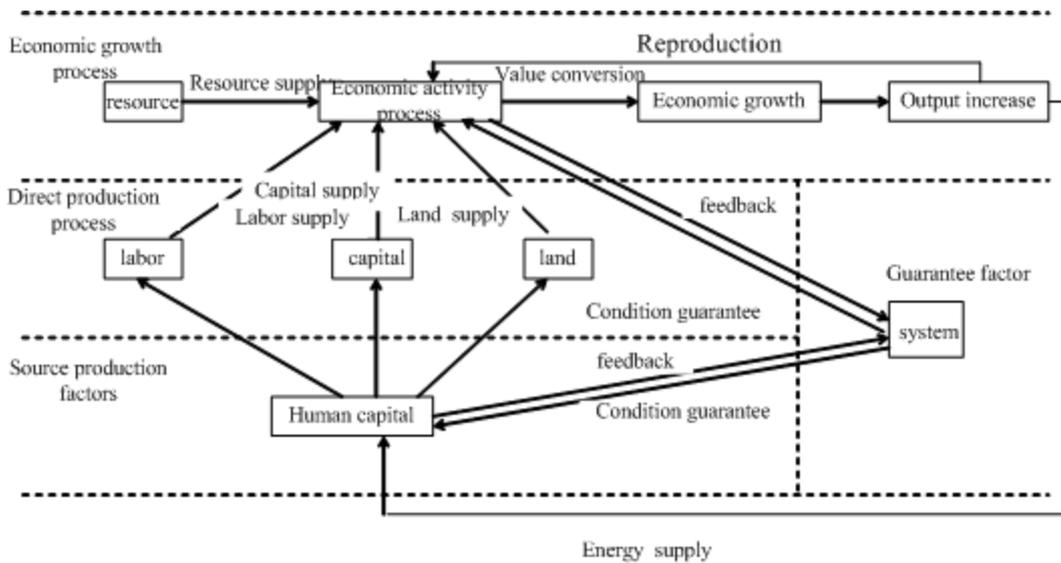


Figure 2. Hierarchy and Correlation of Production Factors in the Economic Growth Process