

RELATIVITY AND SUSTAINABLE DEVELOPMENT

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ABSTRACT: From the realism of science, and taking the guide of EINSTEIN's Relativity as guide, this article called in question the present theory of the sustainable development by the rational thinking of philosophy and a close logic inference. It is found that there are many paradoxes to the theory. Through more deepening and meticulous inference, we arrived at philosophic language of science about the sustainable development. The sustainable development is "non-sustainable development", and the non-sustainable development is "the best sustainable development". While carrying out philosophical principle thinking and repeating science demonstration for the sustainable development, this article got further confirmation that the existence of human being at the minimum environment cost may help them obtain motive power of the sustainable development. In fact, this foundation motive power exists in the flow of development in different organization levels, meanwhile it exists in strategy of intuition living of the ancient people. Only in relative lower environment cost to live can we get the support system of science for the sustainable development, and be able really to achieve the basic goal of the sustainable development.

KEY WORDS: the Relativity; sustainable development; existence at minimum environment cost; relative development surface

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1 SUSTAINABLE DEVELOPMENT AND ITS DEVELOPMENT SURFACE

In 1995, MEADOWS D L, the spokesman of the Rome Club in the earlier period, had raised doubt to the sustainable development. He said: "It is too late to achieve sustainable development, now let us strive for survivable development!" (MEADOWS, 1995). At the present world, the voice to practice the strategy of the sustainable development are getting louder and louder, but scientific research has comprehended differently to the theory's connotation of the sustainable development with environmental research (ZHAO and WANG, 1996; ZHANG, 1997; ZHOU and NIU, 2000), which forces us to start from geographical objects logically, to renew the knowing of nature and science of the philosophical theory of the sustainable development base. Indeed, the sustainable development is only a wish with human concern in mankind society, and it is uncertain whether it will succeed or fail, that is to say, the successful sustainable development is the other thing. When ZHOU Guang-zhao, the academician of the Chinese Academy of Sciences, dis-

cussed the strategy of sustainable development of China, he pointed out that " as a super-complex huge system, the sustainable development is no exceptions when the philosophical language takes place natural language in it; ...when changing from passive follow to active participation in the action, it is the time that the operation of the strategy begins its course... "

As a super-complex huge system, the sustainable development should have no boundary of space and time in logic deduction. But for mankind, a "limited matter", the boundary of system of the sustainable development has to be delimited by himself. NIU Wen-yuan, the chief scientist of the Chinese Academy of Sciences, is engaged in dealing with the sustainable development in the long-term. He cooperated over a long period with HARRIS W. M., the famous environmental scientist of U.S.A. In the cooperatively published thesis, system's boundary was regulated as "a development surface to be thrown into enormous shadow of mankind activities " (ZHOU and NIU, 2000). The authors thought firmly that it is a relative development surface (Fig.1). With the raising of the technology of mankind society, the spatial scope of the devel-

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opment surface should expand continuously. In another word, the property of development surface should extend boundless!

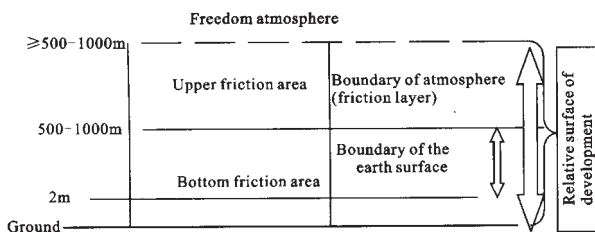


Fig.1 Relative surface of development and the boundary of system of sustainable development

Here and now, as a "limited matter", human's thoughts and behavior extend eternally to boundlessness, and this is to be provided with the base of reality supporting system! Now the problem is posed whether this kind of real earth's surface layer supporting system can eternally satisfy the request of human society's development or not? This is a very important problem to be researched and deeply thought. The essential of the problem must be understood and investigated by scientists duty-boundly.

2 CONCEPT OF RELATIVITY AND DEVELOPMENT DEGREE

Now take the train of thought return to the boundary of system of sustainable development—the development surface, which is a concept of the boundless space and time based on the above inference, at least, to the knowledge structure and technology level of human society at the present stage. However, does the development surface tend genuinely to boundlessness? This is an extraordinary problem worth testing. For this, the answer can be sought from Albert EINSTEIN (1879–1955) who was regarded as the greatest physicist, earth physicist and geographer. He had pointed out clearly in his general theory of Relativity that the space and time is relative, and development of objects has the limit. All objects' movement have a limited speed, and nothing's speed is more than the light's ($300 \times 10^3 \text{ km/s}$) in the universe, maximum speeds exist and deposit in any objects' essence (LANDAU and RUMER, 1985). It is inspiring that, the two famous physicists who are respectively working in the Oxford University and Cambridge University, Roger PENROSE and Stephen HAWKING have developed recently EINSTEIN's general theory of Relativity by the theory of Quantum Fields (PENROSE and HAWK-

ING, 1999). The satisfied research result is that the universe, as a matter of fact, is closed or sealed! This theory is extremely coincident with the theory named as "Vibration Universe Model" ($-\infty, +\infty$). It considers: the universe began from a flash of great explosion, which was also the beginning of the space and time. According to the measurement, the great explosion took place at the hour spot of 10^{-45} before $15 \times 10^9 \text{ a}$, a Pulangke time was to exist in the universe, which is $1/10$ of $1/10^6$ of $1/10^{12}$ of $1/10^{12}$ of $1/10^{12}$ of one second. The history of time began (SAMUAR, 1998). Over a long time after the great explosion, the speed of expansion of the universe might decrease gradually, even universe changed into shrinkage and/or being closed. After more than 10^9 a , the universe would shrink into a small material ball, then it would expand again, inexhaustible. Till here, the question may be posed if this kind of "inexhaustible" form is the foundation of the space and time of the sustainable development or not? The answer is NO. The truth of the fact is to just right opposite. A basic fact must be clarified that, in modern physics' theory, universe' starting and ending are determined by two forces—gravitation (G) and universe driving force (U), which are changable relatively and are of opposite directions. When $G < U$, the globe would enter the next state of the expansion, and there is no stopping for entering, eventually the void universe would form to that time (VAUCOULEURS, 1972). Here, the author believes firmly that the void universe or space must be explanation of the limited and maximum astronomy.

One of the basic attitudes of science is to question. The most basic spirit of science is to criticise. For this reason, the geoscience workers and geographers must learn first to raise question about the relationship between the essence of the sustainable development and the evolution regulation of the Earth's environment on the past, at present, and in the future. Realistic perplexity, crisis of the course of study, and the call of the today's era press us to have to raise various questions about "the sustainable development" by the serious scientific attitude. The purpose of raising question is to search the motive power of the earth's surface layer subject of study for the sustainable development, which is primary motive power to the subject.

The probability of life appearance is the smallest in the universe. According to calculation, it is only $1/10^{4000}$ (NIU, 1987). From the logic point of view, if there is no life (strictly speaking, there is no human being), there is no sustainable development. Then the number of the $1/10^{4000}$ means actually that the possibil-

ity of appearing the sustainable development in the universe is very little, almost can be neglected. So there is no the word of the sustainable development to the all things in the universe. Perhaps they are in need of existing only. However, the mankind as the highest (claimed by mankind himself but not generally accepted) of life evolution, and as the top of the earth's living things care awfully about the sustainable development at this moment. But in fact, it will be to disobey original theory of science that the earth's human being has been saying the sustainable development in the condition of without contacting the all things in the universe — this is the contrary to reason of the sustainable development.

The gap between the poor and the rich of regions, and difference of income at present may be the greatest in the history of Earth life. Even so, some rich nations or regions, and men of wealth do not satisfy to their great wealth (it may be actually regarded as the Earth's resources), and they do not give up their own "development". May we ask what step they would develop? Is their development boundless forever? This question is the perplexity of the sustainable development. Here, the author raises a concept of "development degree" to search for the source of this perplexity. As everyone knows, the lives living on the Earth are not only the species of the human being. If we calculate the quantities of the all animal species, we can know that the human being is only one of the hundreds of thousands of all animal species. Accurately speaking there are about more than 1.5×10^6 kinds of animals on the Earth. Do these 1.5×10^6 kinds of animals exist after being discovered by today's biologists or before? It is obvious that they are the life existing objectively, always exist still in the earth, no matter whether the biology appears. Even their ancestors had existed for previous 3×10^6 a (from the appearance of hard shell life) before the human manufactured tools (3×10^6 a B. P.). This means that they were the masters of the earth before ancient ape appeared. At that old times, they had existed and developed very well. It is worth paying attention to that there are natural differences between the animal community and human being community in their evolution and development ways. The concept of development degree may be helpful to understand the nature of the question. In the mankind position, the range of the development degree is as follows (SONG and ZHANG, 1982):

Ancient living < Ancient animal < Fossile anthropoid < Ape man (straighten human) < Early homo sapiens (Ancient) < Late homo sapiens (New man) <

Modern people < Future people

However, in the view of animals, it is opposed. The mankind occupied their homeland and then threatened their safety and existence. The mankind community had developed but the animals had met with misfortune and disaster. If the animals have intelligence like the mankind they would cherish the memory of the passed history without mankind's assault. Let us put ourselves in animal's position, and let time turn back, the animals have their own development degree that just is opposite to the mankind's:

Ancient living > Ancient animal > Fossile anthropoid > Ape man (straighten human) > Early homo sapiens (Ancient) > Late homo sapiens (New man) > Modern people > Future people

The two above-mentioned ranges of the development degree have revealed the nature of the sustainable development by the abstruse philosophical language: the purpose that we are seeking for development is so inconceivable. To a certain extent, this development is exchanged at a cost of physical and geographical environment (except human being) system's entropy increasing. Here, one objective scientific conclusion has been drawn:

The sustainable development is "non-sustainable development", and the non-sustainable development is "the best sustainable development".

The author thinks that this is a philosophical language but not natural language.

3 RELATIVITY AND LOWEST ENVIRONMENT COST TO EXIST

There are no two geographical objects having the same future and past. Under this restrained condition, it is impossible to go back to prehistoric age for the mankind. In other words, it is impossible to decrease the sustainable development speed by our imagining "to supervise the Earth" (function as the United Nations) for the mankind too. In this significance, self-development is the real nature of all things on the Earth. But we must realize consciously that animals and plants' development is essentially different with the society's development: the development degree of the former almost ≤ 0 , and that of the latter $\geq \infty$. The questions are worth raising that how much the separation degree is between the present situation and real nature of the sustainable development; and whether the global developing speed is too fast or too slow. This geographical responding process about those questions is obviously very different because geographical differ-

ence of the regions, districts, natural zones, climatic zones, cities, villages, societies, families, even individuals. Relatively speaking, the nature of difference lies in various kinds of different mind field (WANG and YAN, 1995). The mind field is the highest show pattern of the unity-arche of universe at present and a great important element of universe. And it is the intermediary of the boundless and limited, the reflection of existence and the concept of the cosmo-holographic unity. The human geography workers must definite the mind field as an important research direction, thus they can participate really in researching of environmental problems of the earth. At the same time, natural science and physical geography workers can raise achievements and train of thought of researching about the mind field based on sufficient understanding of the characters of macroscopic, middle-scopic, and microscopic of the natural world. So the two kinds of scientists can possibly get substantial results in the matters of common concern of researching the mind field. Thereby the cooperation of the two kinds of scientists will make special effort to the global sustainable development.

General Relativity has told us that the time and the space would be conversed in the certain conditions. Space is the amassment of time, and the time is the flow of space. The two could not be separated really. For instance, present relative developing surface (spatial change) was the accumulation that the earth's circle layers has got interaction through very long geological period (temporal change); as a determinative factor for the sustainable development, the state of the *becoming* of geographical environment in the future would be determined by the *being's* quality of geographical environment in developing surface today. From essential point of view, the sustainable development will be regarded as a lasting process (relative infinite) of the existence of the globe inhabitant in the limited space (the earth surface layer), and it is a process to change the *being's* "finite space" to the *becoming's* "endless time". For this objective, its logic premise must request "endless" circulating utilization of natural resources including material, energy, information on the earth surface layer. That is, to make the finite eco-environmental resources trend to "endless situation", which is really basic warranty of the sustainable development. Thus "endless situation" may be determined first by the lasting regeneration ability of the life supporting environment on the earth surface layer, and then by the existing attitude and value view of the globe inhabitant. In fact, the lasting regeneration

ability of the support environment on the Earth is correlated closely with living style of the globe inhabitant. One kind of value view that material life is based on lower environment cost, and spiritual life is promoted unceasingly as time went by, will be conducive to the sustainable development of mankind.

The relativity and fundamental grain physics has told us repeatedly that more and more power is hidden in the smaller microscopic world, which means that infinite energy is hidden in infinite small grain. From the theory of relativity, the smaller grain, the lower its character, but the lower particles may get close to the expansive infinite energy. The smallest grains lead to infinite world through another developing pole. This law has given us inspiration that both of the return of scientific mankind's material life and the high quality in spiritual life seeking at lower environment cost, of which life is simple, tranquil and is to satisfy those fundamental original demand but not for infinite comfort demand, are just like those original developing element demanded by low life evolution and society development. Thus original developing element is getting close to infinite energy degree of mankind society development as it gets smaller. And it can expand the bigger developing space for mankind in the future. The earth event which mankind exist at the lowest environment cost will go to infinite future through another pole. The low the environment cost is, the greater the ability of the sustainable development is. In fact, many efforts have been made for seeking lower environment cost and returning rationality existing situation, such as developing high technology, constructing welfare society and human concern environment etc. The high effective and energy-saving technology without pollution and public nuisance, green industry, ecological human environment, all the above are exactly contemporary practice to get the lower environment cost.

In philosophy textbook, "development" is usually to be comprehended as some follow significances: 1) leap, it is to deny old substance of objects, and to confirm the new substance; 2) deny dialectically, that is, deny unreasonable factors of original objects, and confirm the reasonable factors in it. There are two key problems unsolved in the above-mentioned views of "development". Firstly, if we think that each quality change of the objects may leap from the old substance to the new one, then where does the new substance come from? Has it been originally having in objects itself or attracted from outside objects? If it is the former, the new substance is not new actually, and it is

the only state carried from the original hidden one; if it is the latter, the new substance is just something existed or hidden in outside objects. So-called leap only changes from that matter to this one. Secondly, where is the unreasonable factor denied? Is it absolutely non-existence? If the thing which had been denied becomes to absolutely disappear, then all conservation rules (including quality-energy conservation law) in universe would be nothing. Therefore, both of the confirmed source and the negative outcome, these two problems could not be solved, then so-called development can only be a miracle.

The theory of cosmo-hologram unity (WANG and YAN, 1995) has arrived at the conclusion: there is no really development in the universe. And so-called development is the only process that information form changes continuously, either from the hidden to the apparent or reversely. From the angle of information, there is no increase and decrease of information in the process. But just as the material and energy, information is also conservation, and absolute information quantity may not be changed. The universe will not increase or miss any information in its development process. In this sense, there is no any development in the universe. But by the point of process of expressing information and objects' formation, it should be said that there is development. Thus, the view of development based on the theory of relativity may be summarized simply as: the development is a process that the inside information shows intrinsically under the stimulation from outside information, also a process of transformation from hidden substance to apparent substance. Here, the globe event that mankind depend on lowest environment cost to exist belongs to not only intrinsic arrangement in the man-land relation, but also inside information (inherent information, leaving information from living environment of the ancients and the animals, plants). It is a process of discovering, in which stimulation effects had happen such as environment pollution, ecosystem destroying, resources shortage, and population expanding. This globe event will be sufficient and necessary condition for the strategy of the sustainable development.

4 MIND FIELD OF RELATIVE LOWER ENVIRONMENT COST TO LIVE

The state of the earth's development at present is to drive one mad. This is because of: 1) it seems that the mankind do not understand the realistic sense of existence, they regard money as all and everything; 2) due

to economic reason, the mankind society's speed of self-destruction is increasing as time goes by. For instance, it has been only few ten years till now since we achieved the capability of sending signal to the space, but the mankind had produced weapons which can devastate the all living things in the earth simultaneously just by one attack (KIPPENHAHN, 1984); 3) the mankind use science and technology of being opinionated to develop the military, and its purpose is to murder. For instance, at present the 90% invention and creation based on technology are used firstly to the military, to eliminate the human being itself more than other purpose. From philosophy, the development of mankind does not completely depend on the growth of economy. But why did this kind of terrible "development" appear in the world? The reason is very simple — it results from mankind's extreme ego! For this, the mankind is impossible to prove that its own "development" is a mistake, whose reason is determined by the impossibility to get rid of ego of mankind society, in another word, "The reason that one cannot see the whole mountain is that he is in it."

To eliminate the psychological essence of ego, the mankind society must require a spiritual state. Based on existentialism, this "spiritual state" existed in mankind's potential consciousness. What is this spirit to the end? It is widespread existence in the boisphere for the natural environment, and it is the spirit of life of maintaining existence costing the relative lower limit environment resources! May be predicted, when this spirit and/or mind field is distributed over an extensive global, at that time the wisdom of thought of the sustainable development would be illuminated.

Costing the lower limit environment resources to live is simply a relative concept. This is the same as the EINSTEIN's scientific theory of "everything is relative" in the universe, and it also abides by principle of equal value of quality and energy of the special theory of Relativity: $E=mc^2$, E is material energy, m is mass and c is light speed. As being equal to $900 \times 10^{12} \text{ (m/s)}^2$, c^2 is a very large number. So even if the object's quality is quite small, it should produce enormous energy. Here we try to take E as the state of relative static of energy (or capability) of the sustainable development, and it is a quality model but not quantity one for the sustainable development; and as the quality of the sustainable development, m is the function of index number collection (s) of the lowest environment cost to exist, that $m=f(s)$ (to expect index number collection reaching the level of atom or electron that is smaller than atom). Thus there is:

$$E=f(s)c^2, D(f) = (-\infty, +\infty) \quad (1)$$

$f(s)c^2$ may be regarded as the motivity of the sustainable development in certain restraining conditions (like the world peace, all regimes collapse, the mankind society's reciprocal favored treatment etc.). Relative low environment cost to exist is lasting adjusting process of internal mankind society, which just like that the material trending to infinite small, hidden strength of the sustainable development will be apparent with this process, and the combination of time and space of the man-land relation will trend to be more reasonable. Since c is relative enormous, so long as s is not equal to 0 and it trends from $+\infty$ to 0, vector E would be large enough (now the E enters to movement state from static state). The process from $+\infty$ to 0 is exactly the process that mankind struggle for the ideal of the lowest environment cost to exist. The Classic Relativity had told us that the energy of the object keeping still might be relatively "boundless", which has explained extremely the philosophical language of the sustainable development—non-sustainable development (the relative static state) is the best sustainable development (the relative eternal state)! The ancients' development in remote antiquity had, indeed, practiced this state of relative eternal. According to the research (REN *et al.*, 1981) on ancients' living environment of the Beijing Zhoukoudian, the ancient Beijing men had existed and dwelled for 300×10^3 years in the cave from 500×10^3 a B. P. to 230×10^3 a B. P. The Beijing men and their living caves were blended as well as milk and water in those 300×10^3 years. The two (man and cave) depend on, advanced each other, and co-evolved. At the same time, they had achieved extreme high level of civilization of equality, working together with one heart, helping each other. This instance reflected fully that the personalized "land" (necessity condition) and the man's mutual help, self-generation and coexistence (sufficiency condition) have very important effect on life's form, existence, multiplication, evolution, and sustainable development in the process of man and land coordinating development. The importance is reflected on the background of space and time that man-land contain each other and connect as a unit. Further to say, it is to get the circulation of conforming to nature, geographical organization effects, in other words, to carry out the best space combination in the time using the lowest cost of environment. To summarize as the most popular scientific terminology, that is to make negative entropy and information unify completely in the four-dimensional space. The ancient information interacted by the an-

cients life and the ancient cave environment inform present people: the ancient Beijing men had had their "the sustainable development" for 300×10^3 years in nonculture (character, language) and simple boundary of thought. But the present people with high civilization, high wisdom, high cultural degree are to be faced with threat of existing environment after so-called mankind society civilization has appeared for 5000–6000 years. To get rid of predicament we have to raise slogan of "the sustainable development". Comparing the evolving history of man-land relationship of ancient people with that of the present people, the geographers have to revoke deep thought about the background from space and time of man-land coordination, and feel unset to present worlds' perplexity of the sustainable development.

The mankind development history indicates that primitive mankind bear the greater pressure from environment, but the harmonious extent of themselves and ancient environment was higher than one of any society period after it (QIAN *et al.*, 2000). On the other hand, up to now the sustainable development is confronted with strong force of resistance of stockpile of evolution history from theory to practice. The mankind society would develop externally and internally into a harmonious stage, but internal contradiction is impossible to disappear. It must be coordinated by law, ethics, morals, politics, economics, marriage and family system, but there is no necessary logic contact with natural selection, dynamic selection, high layer selection and environment selection. This shows that mankind society's sustainable development has only one strategy selection—the relative lower environment cost to live. The ancient biology and molecular biology have revealed that the biology evolution has showed tempestuousness, discontinuity, leap nature, random nature, and some necessity of macroscopic evolution tendency in entirety, from the cosmo-hologram theory (CHEN, 2000), the mankind society's sustainable development has presented so, which is the reflection of connotation of indefinite of the sustainable development. The strategy of the relative lower environment cost to live will decrease this indefinite at most. In view of biology macroscopic evolution's human significance, earlier HUXLEY T H, SPENCER H, present WILSON, DOUKINGS, social Darwinists, think that physical law and social moral standards are conflict with each other. The physical law is that each individual or gene is going to fight other individual or gene for its own existence and development, in this view, the various hideous behaviors are

seemingly accorded with physical law, and social moral standards is anti-nature. But the author believes firmly that the most basic law is "coordinating diversity development" in the original natural world and mankind society. From this, physical law and social moral standards are actually identical, and various hideous behaviors of mankind are anti-physical law. Anti-nature and the extreme ego state will be imperatively enormous force of resistance to the sustainable development. The most effective way to overcome this force of resistance is to practice "the relative low environment cost to live". Through the environmental education to mankind, and consummating step by step existence's personality of mankind, the final purpose to make each global citizens set up his own field of the lowest cost can be got. The boundless material stimulus will turn to the boundless spirit wealth or fortune and self-satisfied feeling. In that time, without hostility, the countries and the people in the world will naturally obtain the motivity of the regional sustainable development.

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