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of Social System : with a discussion on the
Social Responsibilities of Engineers

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COORDINATION: THE EFFECTIVE WORKING MECHANISM OF SOCIAL SYSTEM¹

--WITH A DISCUSSION ON THE SOCIAL RESPONSIBILITIES OF ENGINEERS

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ABSTRACT: A smooth run and harmonious development of the social system has an intrinsic relation with the social responsibilities of engineers. The engineering technique is a crucial basis for people to understand and reconstruct the world. To construct a harmonious society, coordination is the mechanism making the society run smoothly and develop harmoniously. This paper indicates that coordination is the key for an effective social system, and studies the mechanism of coordination from four aspects including the value, function, malfunction and implementation of coordination. The key of the value of commodity, which exists in the social division of labor and managerial activities, lies in the value of coordination. The division of work promotes working efficiency on the basis of coordination. Managerial activities include coordinating and supervising work. Coordinating work creates value while supervising work does not. Coordination creates value and fuels social development. Additionally, coordination, which is implemented by restrictions, settles the conflict in game. Therefore, the malfunction of coordination stems from the malfunction of restraint, and its primary cause is “institution malfunction” rather than “market malfunction” or “government function”. This paper analyzes the visible and invisible factors that influence coordination, and indicates that the keys of implementation of coordination are confidence and anticipation, the approaches are communication and negotiation, and the mechanism is restraint and incentive. After analyzing coordination the effective working mechanism of social system, this paper explicates from three aspects of the main social responsibilities that an engineer needs to take, which are to propel the innovation and development of engineering technique, to construct the atmosphere and foundation of social cooperation and to promote the comprehensive and continuable development in social harmoniousness.

KEYWORDS: social system, coordination, social responsibilities

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1. INTRODUCTION

The society is a complicated system composed of politics, economy, culture and social life. It is not only an organic system, but also an open one. Generally believed, the social system operates in two ways: one is that the social sub-systems maintain relatively balanced and coordinated, so as to achieve the society's benign operation and harmonious development; another is that the social sub-systems maintain inharmonious, and it can't meet the need of social system, thus keeping the social life from a benign operation. Therefore, whether the social system can run effectively lies in whether the sub-systems of the social system is harmonious, in other words, coordination is the key to the benign operation of society.

In the following part, we will look through the social system from four aspects: the value, function, malfunction and implementation of coordination, and then explain the role coordination plays in the effective operation of the social system. As a result, the social responsibilities an engineer should take will be made clear.

2. MECHANISM OF COORDINATION

2.1. Value of Coordination

Spinoza believes that, "Everything that can sufficiently guide people the common social life, or everything that sufficiently enables the people to have the coordinated life thing, is beneficial; otherwise, everything sufficiently causes the national conflict, is harmful "(Spinoza,1997). Spinoza's words informed us the social meaning of coordination. The coordinated economics proposes "the effective work value theory" motivated through inquiring to the root and the power of social

development, and it holds that "coordination promotion is the root of social development", thus "the coordination" is promoted to a fairly high level and we should look at coordination with new eyes.

The effective work value theory indicates: coordination is critical to the value of commodity. With no or poor coordination, which will cause that the product can not cater to others' need, the value is due to be lost. If the quality of the project is not good or the "product" of the project can not cater to the need of the society, its value will also be depreciated or even lost. Similarly, uncoordination between the organizing systems will also cause the loss of the system value. The exchange activity on the marketplace is displayed as a harmonious activity, which is a kind of invisible activity whereas the order, plan, rules etc. of the organizing systems are also harmonious activities, which are visible. Therefore, the degree of coordination reflects the quantity of the value created. There also exists the problem of effectiveness in the system, and coordination plays an important role in the operation of the system and the evolution of organizations.

We can see clearly from the development and evolution of human society that the physical labor of human beings becomes more and more cooperative, and coordination necessarily becomes the basis on which this cooperative work creates value. The value of coordination can be examined from such two aspects:

(1) What's more important brought about by division of labor lies in the improvement of coordination, thus enhancing the volume of value created. The enhancement of efficiency by division of labor is based on coordination, which is the further reason for the improvement of the efficiency

of labor division.

(2) According to Marx's view, managing activities can be divided into two aspects: coordinating work and purely supervising work. Coordinating work is what is helpful to creation of value, however, supervising work is the work concerning income assignment, and actually it can't create value but cause the transfer of value created, which will necessarily bring about supervisory wastage. Supervising work should be decreased by various mechanisms (such as rules and regulations, legal laws and regulations, morals and ethics, consensus etc.) , and it reveals the value and significance of coordinating work more prominently.

Actually, creating value by coordination is not only manifested in terms of division of labor between individuals, but it has expanded between large organizations, and between huge systems. Coordination has become the bridge between the division inside the system and that outside.

2.2. Function of Coordination

Nearly all the game in realistic society is because of the contention for interests. The fast development of social economy causes the social management to fall behind economical progress, followed by a series of social contradiction and social conflict. The reform and openness and system adjustment have made subsystems such as society, economy , culture (science and technology) , social life of our country gain maximum development, and everyone will benefit from them. However, different regions and departments, different social classes and individuals may enjoy different increase proportion of benefit, and may be different because of order, and even for some parts, some people's benefit may show a negative growth during a period of time. The

disparity between the city and countryside, between regions and between social strata presents a tendency of expansion. All these will result in the unbalanced and unfair assignment of benefits between individuals or groups. Therefore, mechanisms for building and defending the social system are needed. Coordination plays an important role in social stability and development.

The most effective way for coordination to solve the game and conflicts is realized through restraint.

The social system generally includes three original operating ways, namely, sub-systemic independent behavior, intensive control behavior and standard behavior. The sub-systemic independent behavior is a kind of behavior that the system independently makes the decision and puts into practice, or that is conducted by the system according to its own unique standard; the intensive control behavior is a kind of behavior of which the superior leader (individual or group) of the system makes decision and organizes the implementation; the standard behavior is a modeling behavior which happens according to the naturally-formed convention or artificial unified stipulation (standard). These three ways correspond exactly with the three kinds of restraint of human society, namely: (1) self-restraint , namely, autonomy; (2) the counterpart restrains; (3) the third party restraint (such as law , rules etc.). But the contradiction and conflicts in the operation of the social subsystem will cause many social problems, for example, when the social economic system changes, but the social politics, culture, social management, etc. don't have corresponding transformation, or the transformation is delayed, the social structure will be out of balance. At this time, when restraint mechanism is introduced, we need coordinate the relationship of

different social interest communities, in order to realize the fairness and justice of the society.

However, when individual benefits conflict with group benefits, self-restraint and the counterpart restraint will be ineffective. At this time coordination is always realized by the third party restraint, namely, standard behavior. The norm (law, rules etc.) is the basis factor of building the regular order and defending the social stability. The essence of institutional reformation is the transformation of norms, and is also the formulation of such norms as laws, rules, policies, regulations, etc.. In this process of transformation, coordination plays an important part, and is the key to the game. Chandler thought, "Coordination of management is of more productivity in contrast with market mechanism" (Chandler, 1987).

2.3 Malfunction of Coordination

As far as the effective operation of social system be concerned, the importance of coordination and its function lie in the third party restraint, namely, the construction of law and regulation, policy and rule on the level of the country, i.e. the construction of the institution. Coordination is not always effective, and it can also be out of order. In fact, coordination being out of order is displayed by the malfunction of the institution (the third party restraint). Why does the malfunction of coordination appear? Here we will make an analysis in terms of the main body of the market and the government of the operation of the social system.

As is mentioned above, the fundamental reason for the existence of contradiction and conflicts lies in the game of contending for individual benefits and group benefits, and in the dissatisfaction with unfair assignment of social wealth and public

commodity. Traditional economics believes that the lack of capital, labor force, technology etc. can restrict the development of economy, so the institution can be seen as exogenous variable of the resources disposing efficiency and the resources-using efficiency, or institution can be seen as insignificant or of no importance to efficiency. However, new institutional economics discovers institution is also a rare factor of high importance, and institution shortage or delay can also restrict economic development.

The direct cause of social conflicts (such as environment problems, reform and recombination of enterprises, the expansion of gap between urban and rural areas, regions, ranks etc.) is the combined function of "market malfunction" and "government malfunction". Due to the external nature of social commodity, the public nature of social resources, social resource property rights not existing or difficult to define, and the existence of scarcity and asymmetry of the social resource information etc., it makes the market mechanism unable to effectively distribute the social resources, resulting in "market malfunction". The defects of market in effective distribution of social resources provide chances and reasons for government intervention. However, in the process of governmental distribution of social resources, the existence of incompleteness and asymmetry, delay of governmental implementation and rent-seeking activities etc. makes it impossible for the government as "irrational person" to formulate a perfect rules and execute it strictly, resulting in "the failure of governmental supervision".

People advocating governmental supervision has a basic assumption that the government has no selfish interests, and the government's principle is

altruism, and it will act in accordance with the principle of maximizing public interest. But actually it isn't true. The government is still an "economic person" with a strong motive for economic interests. At least the government hasn't become the sage who is utterly devoted to others. Especially the phenomenon of "official speculation" in the period of economic restructuring, and "local protectionism", "department protectionism" etc. prevailing now are all the examples of the government as "the economic person".

Because the government is also an "economic person", and also has the property of selfishness, the government sometimes isn't the natural representative of the public interests, and it is likely to become the tool of some special interest groups. At such time, government supervision will deviate and sacrifice public interest, and it can't achieve the Pareto optimal allocation of resources, thus resulting in "government malfunction".

In fact, "market malfunction" and "government malfunction" are only the external and direct cause of the generation of social contradictions and conflicts, instead of internal and radical reasons. The radical and basic reason for the generation of social problems should be "system malfunction". From the perspective of the game theory, the institution is the rules of social game, and it is the constraints of people's mutual action which are designed by human. Institution is the product of management, but the "institution malfunction" is the deficiencies of institution design and arrangement and of institution function, which is expressed as the failure of management. The design and arrangement of institution are the concrete ways of coordination, and "institution malfunction" is the failure of the third party constraint, resulting in malfunction of coordination.

2.4 Implementation of Coordination

The design and evolution of all the mechanisms and organizations of human society are formed in order to enhance coordination by human consciously or unconsciously. The level of coordination mainly involves two basic factors: restraint and incentive. Restraint is the tie of coordination, while incentive is the driving force of coordination. Next, I will explore the ways of achieving coordination on the basis of pointing out the visible factors and invisible factors of coordination.

2.4.1. The factors influencing coordination

The factors influencing the coordination of social organization systems can be divided into two categories: one is visible; the other is invisible. The invisible factors include: the ability of managers, the level of science and technology, the size and organizing structure of social subsystems, social arrangement of regulations, objectives of the system and the level of social development; as far as the visible factors are concerned, they mainly include the communication mechanism of information, organizing culture within the system, the relationship between subsystems and the traditional ethics of the society and so on. I will not repeat how these factors affect coordination here.

2.4.2. The approach to achieve coordination

In the coordination of the game, confidence and expectation are the key factors, and establishing mutual trust and enhancing expectation mechanism are the principal approach to improve the coordination of the game, so that they can get out of the dilemma in the game.

Communication and negotiation play a vital role in promoting the harmony of human society.

Information exchange is the most fundamental aspects of establishing confidence and improving expectation. But if you want to improve the coordination between organizations and systems, the key lies in establishing a mechanism to facilitate negotiation among the parties, especially in forming a common knowledge (namely reaching a consensus).

Besides, customs and convention is another important mechanism to improve expectation. The customs generating from the social game gradually become the rules of social game. Such rules are the so-called social conventions. In fact, customs and conventions can convert the tacit knowledge into common knowledge through the way of natural evolving, and form social morality, ethics, traditional culture, then affect the relationship between organizational culture and systems, so as to enhance the coordination of the two sides in the game. The mechanism of to enhance expectation is exactly related with the invisible factors which affect the implementation of coordination.

However, constraint mechanism and incentive mechanism are the two important mechanisms for achievement of coordination. The two mechanisms closely relate with dominant factors affecting coordination, especially the ability of managers, the scientific and technological level, social institution arrangement and the institution goals etc.

3.ENGINEERS' RESPONSIBILITIES

“The most important moral foundation of the market economy is the responsibility”(Wangdingding,1996). The responsibility is the credibility of commitment, the actual source of information about the game. The

engineer is a creator, but the influence of his behavior involves social politics, economy, technology, culture and all aspects of social life(the system). Therefore, the responsibility of the engineer is not single, but multiple. He has to not only bear the responsibility for the development of economy and technology, but also take political, cultural, ethical and moral responsibilities. The multiple responsibilities of the engineer reflect the coordination with many social fields, and the responsibility of the engineer relates closely with the coordination of social system. The following points are the important social responsibilities of the engineer:

3.1. The responsibility to propel the innovation and development of engineering technique

Engineering technology is an important means for human to comprehend and remold the world, and it is a catalyst that enables science, technology, humanities and other intellectual achievements to be combined and enables them to serve directly for human, so as to play an extremely important role in promoting the development of economy and society. The creative work of engineers has already and is changing the outlook of the world and the human life. The development of technology requires continuous innovation and integration. Confronted with social issues and social needs, engineers should make full use of their professional knowledge to contribute to the society.

3.2 The responsibility to create the atmosphere and the foundation of social cooperation

Engineers cannot fulfill their duties without cooperation with others, especially with government departments, technical departments, construction departments, project executive departments and other relevant stakeholders. In order to achieve

long-lasting cooperation and effective coordination firmly, we need first a good social atmosphere. Besides, it depends on individual reputation, that is, the social atmosphere should be altruistic, and personal credibility is the foundation of mutual trust.

The internal incentive of cooperation and coordination is both selfish and altruistic; altruism is the effective way for the purpose of selfishness. As what Durkheim said: "Observing moral means to fulfill our responsibility. Any responsibility is limited, and it can be influenced by the limitation of other responsibilities. If we sacrifice too much for others, it would be desperate; if we are to develop our own personality too much, it would be selfish "(Durkheim, 2000). Actually, in an interactive society, the rational people should also consider that in order to increase their income they must also consider the benefit of their counterparts. The effective means of considering interests of others is to stress credibility, to stress that honesty is the principle of life, and to be true to one's words. To form the social atmosphere of both selfishness and altruism and to seek cooperation foundation of honesty is an important social responsibility of the engineer.

3.3 The responsibility to promote the comprehensive and continuable development of social harmoniousness.

The scientific concept of development which is people-oriented, all-round, harmonious and continuable requires not only the harmonious development of nature, economy and society, but also the mutual coordination among people. By such Omni directional efforts as restraining themselves rationally(ideas, ethics, law, etc.),being kind to the nature, innovation of technology, and social

integration, human beings develop and strengthen the material basis, energy infrastructure, information basis and spiritual civilization for the purpose of sustainable development.

Engineers as an intelligent group, also commit the social responsibilities in all directions, especially in the current reform process. The group plays an important role in narrowing the income gap, division of social strata, the society governance reform, reducing the pressure on resources and environment, changing the mode of economic growth, enhancing our capability for independent innovation and opening up,etc. Engineers contribute wisdom and strength to build a harmonious society, which is the demand of the times and historical responsibility.

4. CONCLUSION

The effective operation and sustainable development of the social system benefit from the coordination ability of social management. In fact, to manage is to coordinate. It is a human-centered process operated for the desired goal of social organization.(Zhousanduo,etc.1999).However, because of the university of coordination, coordination becomes the core element in the management across all functions(Hole Deutsch, Weihrich,1993). As the social coordination involves many factors, such as technology, institution, information even ethics, moral and so on, engineers who incorporate these influencing factors into an integral whole ,have natural connections with coordination. And it is more due to the demands of reality and the course of history, rising from the inherent mechanism of coordination to building harmonious society and harmonious world, we can see that the responsibilities of engineers are

particularly important, very profound and far-reaching.

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