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Metasynthesis System Approach for Solving Social Complex Problems

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ABSTRACT

In this paper, we pay attention to the concerned social problems to meet the social demand of achieving a harmony society. During the application of metasynthesis approach supported by our developed tools or platforms, some new phenomena are in serious consideration for metasynthetic methods.

(a) For social problem solving mental factors instead of physical factors play more important roles to social impact.

(b) Internet is now another carrier of public opinions.

(c) It is necessary to consider opinions from human expert. To facilitate expert mining, computerized tools, such as group argumentation environment (GAE) and new functions are needed to be explored.

(d) We wish to use a system of the modeling paradigms to help people to describe the total system from different perspectives and from qualitative thinking to quantitative thinking.

(e) We wish run a series of tests including both social test and computer tests to check the validity of models and to forecast the possible results under different scenarios.

Keywords: Metasynthesis, text mining, psychology mining, expert mining, social harmony problem

1. INTRODUCTION

In reality, problems related to social problems, such as population, unemployment, social security, social safety, social harmony etc. are very difficult to deal with. The size and scale of those social systems are very large; the interrelations between different parts within systems and those between system and environment are very complex; there are information exchanges between system and external environments. Such kind of systems are classified as open complex giant system (OCGS) by Chinese system scientist Qian Xuesen et al, who had

also proposed a metasynthesis system approach to tackle such kind of problems [1].

For realizing this system approach our team in a major project supported by National Natural Science Foundation of China (NSFC) has designed a flowchart. And a series of theory, methods, modeling paradigms and computer software and platforms are developed, and had been applied to analyze some macroeconomic problems [2].

In this paper, we pay attention to the concerned social OCGS problems to meet the social demand of achieving a harmony society. Considering new features in the social harmony system, we will apply some new techniques and methods, such as text mining, expert mining and psychology mining.

2. SOCIAL HARMONY SYSTEM

Among various OCGS, the most complicated are social systems, which are of specific features as complexity, adaptability, versatility and emotion-driven. For our research purpose we may define following systems, which closely related with the social harmony system.

- (1) Nature-Resource-Environment system;
- (2) Economic system;
- (3) Social system

These three systems are closely interrelated (see Figure 1). China has paid much attention to coordinate the relationships between these three systems, e.g. in recent more than twenty years our economy had got rapid development but some environment, pollution and over-development of resources problems emerged, for coordination between (1) Nature-Resource-Environment system and (2) Economic system our top leaders in government and communist party had proposed the policy for sustainable development. Many scientific methods have been developed to describe the sustainable development based on more clear qualitative and quantitative demonstration.[3]. Since 1999, sustainable development research team of Chinese Academy of Sciences led by Niu Wenyuan publish strategic report about China's sustainable development

every year. The annual report in 2005 introduced three parts: 1) sustainable development strategies for cities of China; 2) statistics for China's sustainable development; 3) China's capital debts for the sustainable development capability [4]. In these reports they not only gave the description of China's situation in sustainable development in qualitative aspect, but also in quantitative aspect. A series of assessing indices for sustainable development had been introduced and some methods for quantifying the concrete situations of sustainable development in all China 31 provinces and cities are used. In recent ten years with the development of economy another contradiction has emerged between the economic system and social system. While high-speed economic growth and dramatic social changes continue to distinguish China across the globe, the country's leadership is eyeing a smoother ride on its development path by setting forth a guideline prioritizing harmony. Sustained reforms and opening-up over the past two and half decades have resulted in prosperity for many Chinese citizens, but social problems such as corruption, income gap between interior areas and coastal regions as well as between urban and rural population, unemployment, poverty, poor production safety and pollution are among top concerns of the country's vast commoner stratum. Niu has postulated that the concept of *social ignition point* which lies somewhere between a per capital gross domestic product of \$1,000 and \$3,000. China's per capita GDP at present is \$1,200 [5]

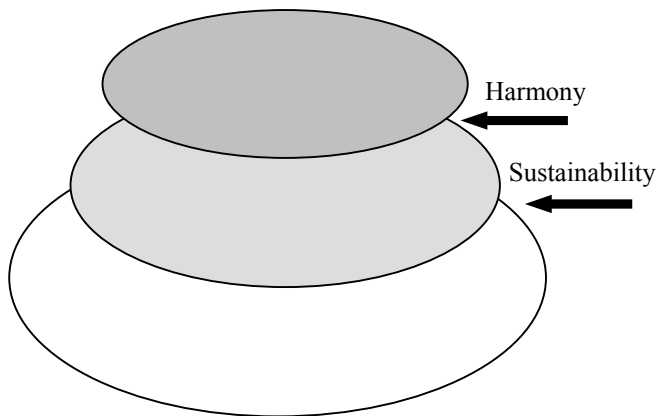


Figure 1. Interrelation between three

In order to establish the harmony society or coordinate the relationship between systems (1) Nature-Resource-Environment system, (2) Economic system and (3) Social system again we have to use scientific methods both from social and natural sciences to describe the phenomena more deeply and widely. From the channels of acquaintance of information and knowledge we may divide our society into three societies: formal society;

informal society and networked society (see Figure 2).

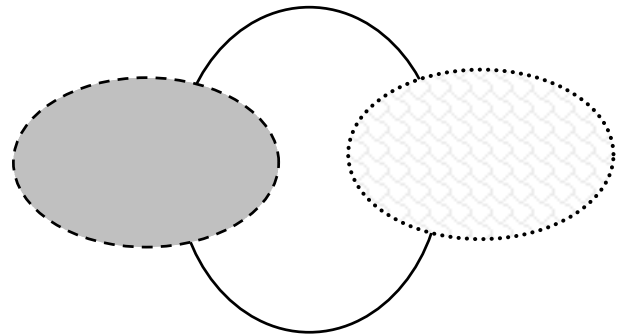


Figure 2. Three sub-societies in social system

The first one no-doubtly controls our society dominantly, we may use most formal information from press and documents from authorities in different level of governments. But we may also find that the another two societies have their own channels for obtaining informations and knowledge which played some roles in our society [6,7].

3. METASYNTHESIS SYSTEM APPROACH

For realizing this system approach our team in a major project supported by National Natural Science Foundation of China has designed a flowchart:

Synchronous \rightleftharpoons Asynchronous \rightleftharpoons Synchronous,
or
Meeting I \rightleftharpoons Analysis \rightleftharpoons Meeting II.

And a series of theory, methods, modeling paradigms and computer software and platforms are developed, and had been applied to some macroeconomic problems, e.g. forecasting the GDP growth rate and the one under the impact of SARS, and some general complex economic systems[8].

4. SOME TECHNIQUES FOR ANALYZING THE SOCIAL HARMONY SYSTEM

(a) For social problem solving mental factors instead of physical factors play more important roles to social impact. Then psychological factors and social behavior modeling will be in consideration to expose some attitudes towards some concerned problems based on psychological tests[9]. On the other hand, psychological tests are time consuming and expensive.

(b) Internet is now another carrier of public opinions. Although there are official channels to get information,

prompt information and true public opinions may be easier emerged via unofficial channels. From technical point of views, more mining techniques, such as text mining, web mining and opinion mining, multi-media information mining shall be applied to acquire further information from different media [10].

(c) Both psychological tests and various technologies provide information via diverse channels, while it is still necessary to consider opinions from human expert.

Expert meeting is a usual way to collect opinions or even knowledge or wisdom toward difficult issues. Moreover, it is a way of collective problem solving. From another point of view, expert meeting could also serves as one kind of expert mining, i.e. to acquire more information from human experts. To facilitate expert mining, computerized tools for group work will be applied; such as group argumentation environment (GAE) and new functions are needed to be explored [11].

There are three types for convening the expert meetings, 1) *brainstorming type* for collecting the vivid and frank opinions; 2) *studying type* for collecting and studying some opinions on the base of deep investigation; 3) *decision type* for concentrating the opinions. In order to obtain the consensus from experts we also studied different methods, tools for getting the consensus [12].

(d) We wish to use a system of the modeling paradigms, modeling by knowing mechanism, modeling by analogy, modeling by data, modeling by learning, modeling by knowing rule and evolutionary modeling to help people to describe the total system from different perspectives and from the qualitative thinking to the quantitative thinking [8], especially for social problems we should establish some special models which may combine the qualitative and quantitative factors.

(e) We wish run a series of tests including both social test and computer tests to check the validity of models and to forecast the possible results under different scenarios [13].

5. CONCLUSION

The investigation for social harmony system in China is just started in recent years. We will put a lot of efforts for running investigation, especially if we can collect a lot of data and use many new techniques, the problem for metasynthesizing all concepts, methods and tools still stands as a hard task for our Chinese scientists.

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