

THE HISTORY OF OR/SA IN CHINA

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President Shin, distinguished guests, ladies and gentlemen:

It is indeed a great pleasure and distinct honor for me to be invited to give this address to the First Annual Symposium of Korean Operations Research Society. In the past years we have witnessed the fantastic growth of economic capabilities of the Republic of Korea. So, it is particularly meaningful to me being given this chance to really see the progress, which I have dreamed for several years. President Shin, in his letter to me, asked me to deliver an address entitled "The History of OR/SA in China." As you know, to dig out a newly developed technique from the Chinese lengthy history is not so easy. However, for the interflow of knowledge, I will try to do my best.

Everybody knows that Operations Research and Systems Analysis are synonym. In 1940, during the early stage of World War II, the British Armed Forces, with the assistance of Manchester University, established a "Blackett's OR Team", which used scientific analysis methodology to assist the conduction of war. Later Allied Armed Forces followed the British and also established "OR Team" to perform the same purpose. This establishment greatly enhanced their combat effectiveness in the war. Briefly speaking, the operations research includes systems analysis, cost effectiveness analysis, policy science, management information systems, planning, programming and budgeting system, computer science, and information technology. However, this newly developed methodology for dealing with the management problem has been implicitly utilized by the people and implemented by the dynastic government in ancient China. According to the records of Chinese history, for instance, there are two economic principles in ancient time. One advocated by Chou Kung (周公) in Chou Dynasty which is about 1000 years before Christ. He implemented the combination of culture and livelihood with national defense as the guiding principle for governing the nation. The other is that all great economists of the past combined rationality and pragmatism to form a system. The late President Chiang Kai-Shek of the Republic of China especially emphasized the achievements of Kuan Chung (管仲) and Chi Jen (計然). Both of them were born in War Time Period (戰國時代) of ancient China (about 500 B.C.). Kuan Chung was employed as the premier of Kingdom Chi (齊國). He performed his principle and had made Kingdom Chi the strongest kingdom in a long period and had gathered together the heads of all other kingdoms nine times for consultation. The success was attributable to his policies on agriculture, commerce, military service and price control. These policies were praised by Confucius, who embodied the thought of the great society's principles of economy, which says that all merchandise are for the use and enjoyment of the people. The economic policies of Dr. Sun Yet-sen of the founder of my Country and the late President Chiang Kai-shek heavily influenced by the above economic concept. The economic prosperity of Taiwan in recent years provides an eloquent fact to the validity of this traditional economic thought.

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Speaking of Chi Jen, I would consider him as the pioneer in concepts of econometrics. He was good at computation and quantitative methods. The Book of Shi-Kee (史記) says: "Chi Jen's policy consists of ten principles. The implementation of only five of them has brought prosperity to Kingdom Viet of the War Time Period". In the Book of Han(漢書), an anecdote of an ancient general by the name of Fan Li (范蠡), a student of Chi Jen, says "Chi Jen's policy consists of ten principles. Implementation of only five of them has brought prosperity to Kingdom Viet. Since these principles have been used in governing the nation, I intend to use them in regulating family life." Being a man of pragmatism and knowing that Emperor Viet would not let him alone, Fan Li changed his name and fled to a place called Tao in Kingdom Chi. During the 19 years of exile, he made great fortunes three times, and each time he distributed his wealth to the poor. During his old age, he left the management of his property to his son and became "brilliantly wealthy" in the Kingdom. His name was well known to the Chinese people. Some of Chi Jen's policy of ten principles are: Observing the likings of the people, promoting the movement of goods, equal distribution of wealth, avoiding amass.

The other econometric scholar in ancient Chinese History is San Hun Yang(桑弘羊). He was the minister of Agriculture under Emperor Wu (漢武帝) in Han Dynasty. His job was in charge of salt and iron monopoly, he had exhibited his great talent in management by mentally figuring out the revenue from the sales of salt and iron. This is another evidence of his being a quantitative economist. Sang Hun Yang made Han the wealthiest dynasty in Chinese history.

In the late history of China, the greatest and most distinguished person who had created and implemented the concept and the methodology of scientific management for every aspect of national affairs is my Country's late President Chiang Kai-Shek. In 1925, he had said in his speech "The Spirit of Doing Things" that in managing things we must place emphasis on organization, system and scope. That is, we must use inductive, deductive and statistical methods for working out the problems we are faced everyday. Fifteen years later, Dr. Blackett materialized Chiang's idea and made a remarkable contribution on operations research.

Chiang had also said "The western economic theory is based on the desire, especially the individual desire. Because of this cause, the techniques of production and national defense can not be used to improve the livelihood of the people. On the contrary, they will be misused to exploit the people, and in the worst case, to extirpate human nature. In the economic theory of China, human nature is taken as the starting point. The objective is to make the livelihood of the people better. Economic systems and policies are designed to increase the well-being of the people."

In order to instruct the administrative officers of the government, Chiang has issued his essential points of view on operations research. They are "In formulating plans and programs, we should consider the effect they will produce (this is equivalent to the cost effectiveness concept in systems analysis). Particularly, in review and analysis of the results, we should consider whether making on-the-spot inspection (this means that we need management information system for real-time routine management). The most important thing is that the plan or program itself must be realistic and concrete. That is every program should have an implementing plan and schedule in matching with the budget (this refers to PPBS.)"

Although Chiang had promoted the concept of OR methodology several decades, the Republic of China had not thoroughly implemented OR technique in her governmental agencies until late sixty.

In 1969, Chiang presided at the National Military Conference and directed that the Chinese Armed Forces should implement systems analysis. The Systems Analysis Division was then established in September, 1970 under the command of MND. And, the Army, Navy, Air Force and Combined Service Forces established their own SA Sections in September 1972, with the directions and assistance of MND so as to implement PPBS in the Chinese Armed Force. Since then, systems analysis has been implemented throughout the Chinese Armed Forces.

In the academy, the first "Operations Research" course was given to the students in 1963 in National Cheng Kung University at the southern part of Taiwan. This marked the beginning of the introduction of management sciences to the Republic of China. In 1972, intrusted by the Ministry of National Defense, Tamkang College established the Graduate Institute of Management Science. At the same time, the Scientific Analysis Section of MAAG, ROC was reorganized as Management Science Section. Operations research has now grown to include all of the services, and is making inroads into other governmental agencies as well. Significant milestones in our growth have been the establishment of the Systems Analysis Society of the Republic of China and the development of a Ph.D. program in Operations Research/Systems Analysis at Tamkang College nearly 2½ years ago. The Tamking College, the sponsor of the 1976 Pacific Conference on Decision Analysis which Dr. Soondal Park participated several days ago in Taiwan, is the first institution in the Republic of China to offer both MD and Ph.D. program in OR/SA. This will induce a continuous supply of qualified OR personnel for the society.

In Taiwan, most major departments, bureaus, organizations and enterprises currently have employed and implemented the operations research techniques to work out their critical problems. I will mention some of them as follows:

- traffic control
- public administration
- simulation of war game
- engineering design
- logistics
- project control
- power dispatching system
- water resource analysis
- irrigation
- agricultural resource allocation
- inventory control
- manufacturing process
- data base and management information system

Though some of the above-mentioned items are still in developing stage, however, a lot of experiences have been gained by the operational personnel. It is sure that the current prosperous state of Taiwan should be attributed to the guiding principles of traditional Chinese culture and the methodology of operations research.

Thank you for your paying attentions to this address. Please give comments without any hesitation.