The Process of Taiwan Incorporation. Forecasting on the Basis of the Mathematical Model

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Abstract: The modern system of international relations is changing rapidly. The shift of political, economic, military and technological activity towards the East and the South-East Asia leads to the escalation and increase of the role of the irrepressible conflicts. As a result this creates a precedent of their use in the modern policy as an instrument of manipulation of the key actors. Clash of interests between the PRC and the USA in the region of SEA makes the problem of the two Chinas acute and requires solution in the short period of time. The unique approach of forecasting the development of situations on the basis of the mathematical modeling is proposed by authors.

Key words: The PRC - Taiwan - The USA - Trade and economic cooperation - Investment - A conflict

INTRODUCTION

The changes to the direction of dynamic activity and of the PRC aspiration for joining Taiwan can be observed by analyzing of the current state of the China-Taiwan relations. Reunification is dictated by the realization of the USA foreign policy with the aim of establishment of the hegemony in the region of SEA in order to support their own national interests, reduce the role and undermine the legitimacy of the actions of Peking in the regional and international field.

The most important aspect in the problem of the reunification of the PRC and Taiwan is the solution of the issue by force due to the historical past of two actors. However, as it is presented below, such a tendency has minimal risks for the implementation.

In the basis of determining the status of relations between Taiwan and Peking are two vectors. The first one is dictated by geopolitical interests of PRC, whereas the second one by the democratic system of Taiwan government.

Political and Economic Situation in the Region: Today there is an active policy of the USA in SEA. This is dictated by the search of the American economy for new markets, security assurance of trade routes from the Persian Gulf and strategic control of the Strait of Malacca. At the same time, the planned and rapid economic development of China determined the nature of its policy towards neighboring countries as expansionary, in terms of economic impact, by means of investments and allocations.

Achieving favorable investment environment for Chinese companies in key sectors of the economy of Taiwan has become a major point in the “road map” of the relations between parties. According to the economic cooperation agreement (June 2009) Taiwan opened to Chinese investors access to a total of 205 sectors of the economy - manufacturing, finance and services. On the 19th of March in the year 2013 the third stage of the investment liberalization with the opening for the Chinese capital additional 161 categories in sectors such as infrastructure, manufacturing, services, was sanctioned, including 43 public institutions [1].

The main political difference of Taiwan is its democracy. Reunification of Taipei and Peking cannot be achieved until the PRC will not be able to ensure full participation of the Democratic Progressive Party (Taiwan) and the Kuomintang party (Taiwan) in the political decision-making. Taiwan will not be reunited with China, while China will not follow the law and assert human rights. Taiwan will not be reunited with China, as long as at the local level the idea will be not supported by the majority and the local efforts to assert the independence of Taiwan will be not eliminated.

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The current government of China decided to develop a course of democratization, which is exclusive in comparison with the practices used in the West. This process negates the negative factors on the road of creating a unified and harmonious system of “China – Taiwan”, reducing the role of external factors on the domestic political process entirely.

Chang of the domestic policy attitudes with the conditions of support of unification of Taiwan with Peking were shown by presidential elections on the island in the March 2012. The unexpected success of the first female leader of the opposition Democratic Progressive Party led the country to a deep isolation and continued conservative line of general policy of Taiwan after 1949. The electorate of the South and Central parts of the island, consisting mainly of representatives of the agricultural sector, mainly the middle layer of the population shared ideas Tsai Inven.

This presidential race is of interest in general, because the main goal of the current Taiwan President Ma Ying-Jeou - the maximum achievement of a peaceful approach with China based on local trends and national interests. In this light the election campaign was largely predetermined by deep interest of Peking in the future presidency of Ma Ying-Jeou.

Forthcoming visit of Ma at the APEC summit, which will take place in 2014 in Peking, will be the culmination of his political career. First time in the history of Taiwan (1949), his leader will make an official visit to Peking. “The vassal will go to pay tribute to the patron” [from a conversation with Tatiana Komarova PhD Candidate, GIIASS, Tamkang University].

All this makes the task of forecasting in this region particularly interesting. We tried to simulate the possible development of the situation, using an original approach and methods.

**The Basis of the Mathematical Model:** The mathematical modeling was used to predict the possible course of events.

The socio-energy approach (SEA) is the basic approach used by the author. The method is based on the equation stream of social energy through the system [2]. The basis of SEA is a systematic approach, where the social system is considered from an energy point of view. This allows considering intra-and extra-systemic processes such as modification or redistribution of energy within the system and between systems. Moreover, Wiener processes are the internal representation of the processes in the system through the physical analogy.

Wiener process - in the theory of stochastic processes – is a mathematical model of the Brownian motion (it describes the Langevin equation) or of a random walk in continuous time [3–4].

Also the term of “social power” or simply “energy” – E is introduced. Here this term means the quantity that characterizes the potential of the social system to do a work. Attempts to introduce such a term were made before, but with no further use for the creation of a mathematical model, it was limited by generalities.

We think that in a complex social system, there are two main types of energy (as introduced above the notion of social power), which include all others:

\[ E_m = f(E_m^uc, E_m^h, K_d, K_{si}) \]  

(1)

The material energy of system, where

- \( E_m^uc \) - Energy of resources of the social system and its physical property.
- \( E_m^h \) - Energy of material savings and property living (existing) in the social system of people. \( K_d \) - factor of leader, determines the effectiveness of the system of social control.
- \( K_{si} = f(\bar{a}, I_1, K_d, K_s) \) - Rate of scientific and technological progress and development of the system. \( \bar{a} = (a_1, \ldots, a_m) \) - set of parameters, determining the scientific and technical progress in the system. \( I_1\) - transfer function of the inter-system information exchange.
- \( K_s = f(\bar{\beta}, I_1, K_d, N) \) - Coefficient of social activity and moral development, moral state of society.

The coefficients \( K_i \) and \( K_s \) exist for each individual in the system separately and total coefficients of the whole system is obtained by fractional conversion of all the values of individuals and clusters of the system.

\( N \) - Number of individuals in the social system.

\( \bar{\beta} = (\beta_1, \ldots, \beta_k) \) - A set of parameters defining the spiritual and moral development and moral state of society.
The energy of human labor into the social system:

\[ E_h = f(K_o, E_h^2, K_d, K_{sc}) \]  
(2)

\[ \sum E_h \] - The total energy of the work of members of the system depends on the N.

Thus, using (2) we write:

\[ \dot{\Sigma} = \dot{\Sigma}^m + \dot{\Sigma}^h + \dot{\Sigma}^{out} \]  
(3)

Hence using (3)

\[ \dot{\Sigma} = \int \frac{dE_m}{dt} + k \frac{dE_h}{dt} + \gamma \frac{dE_{out}}{dt} \]  
(4)

Writing through (4) and (5)

\[ \dot{\Sigma} = \int \left( \dot{E}_m \frac{dE}{dt} K_d K_{sc} + \frac{dE_m}{dt} K_d K_{sc} \right) + k \left( \frac{dE_m}{dt} K_d K_{sc} K_s \right) + \gamma \left( \frac{dE_{out}}{dt} \xi(K_d K_{sc} K_s I_1) \right) \]  
(5)

For closed type systems the result will be without the last term

\[ \dot{\Sigma} = \int \left( \dot{E}_m \frac{dE}{dt} K_d K_{sc} + \frac{dE_m}{dt} K_d K_{sc} \right) + k \left( \frac{dE_m}{dt} K_d K_{sc} K_s \right) \]  
(6)

This expression is the basic equation of SEA, which expresses the flow of social energy passing through the system. Methods of calculating the coefficients are given in the early work on the social power approach [5-6].

**Computer Modeling:** Social and political processes characterized by the fact that they cannot be strictly specified. They are always subject to small changes and fluctuations. Resorting to analogy, the social process is similar to the Brownian particle - particle moving along a well-defined path, but on closer inspection - much winding, with lots of small breaks. These small changes (just - fluctuations) are explained by the random motion of other molecules. In the social processes fluctuation can be interpreted as a manifestation of the free will of its members.

Description of the social process from the point of view of mathematics, it is necessary to use a stochastic process.

The task was the following: - to simulate changes in the general system of social energy “Taiwan Republic of China” in the next 10-12 years. Additional task - to predict the flow of energy from the social system in China, “Taiwan, Republic of China”. Modeling is carried out in the system MatLab 2009b.

Statistical data for the determination of the system parameters and the coefficients was taken from the following sources: [7-9].

As a result of computer modeling, the following results were received.

Along the Axes of Figures **Fig. 1** – **Fig. 3** were plotted:

- X-axis - time counts, one report is approximately 10 days.
- Y-axis - social energy. A report on the y-axis corresponds to the increase of the overall social energy of the system in 5 percent.
Figures Fig. 1 – Fig. 3 represent three different forecast developments. Green highlighted optimistic scenario, blue - more realistic.

First embodiment. Fig.1. Taiwan is gradually losing the support of the United States ceases to receive additional investment and modern military hardware at discount prices. In this case, the most that can count Taiwan - moderate growth, without sharp fluctuations and the gradual weakening of the army. However China will grow much more rapidly. A more realistic scenario assumes a gradual stagnation of resources and backlog.

Second embodiment. Fig.2. Taiwan receives full support (including the military) of the United States, in view of their possible deterioration of relations with China. In this case, if we exclude the option of a military clash, it is possible that at some point China will resort to trying to short-term blockade of Taiwan, but in general, the optimistic scenario, the social system of the Republic of China will show significant growth, although increasing fluctuation risks. Realistic option remains stagnant, as the economy is considerably inferior to Taiwan and the PRC in case of blockade may incur additional losses.

Third embodiment. Fig. 3. Support for Taiwan from the United States remains a low. It does not give cause for greater action from China, but it will have only a modest increase in the optimistic scenario and again stagnation and gradual lag and realistic. In principle, with one significant difference is observed the number 1.

CONCLUSION

Peking's geopolitical strategy at regional and international levels is determined to ensure national security. In particular this applies to economic growth with a progressive increase in the use of hydrocarbons industrial complex and increasingly wealthy population of the coastal areas of the state. Political activity, tied up at the investment of aggression against other actors in international relations, with a predominant use of soft power is a characteristic feature of the implementation of the foreign policy of China in the modern world.

Lobbying of interests through active involvement in the big politics of Small Island states and today is the basis of the foreign policy of the leading world powers. Multisided insulation is one of the consequences of such practices and can be projected to Taiwan, which has always sought to overcome the political and international legal conflicts in determining the status, claiming and proving the international community’s own identity and the right to independent existence.

Political will and independence of Taipei, this survey shows that, in many respects depends on international climate and trends prevailing in third countries (meaning the U.S. and less influential actors). However, according to the results of modeling, even U.S. support does not guarantee the result of the relative preservation of sovereignty affects strong economic influence of China. The most likely course of events, in the opinion of the authors, this gradual (medium term) incorporation of Taiwan and the prospect of development of the system similar to Hong Kong. The chances of a military solution of the conflict are considered a low, given continuing U.S. support relative. However, in the situation of her disappearance, the chances will rise substantially.

November 15, 2013 it became known that the Gambia severs diplomatic relations with Taiwan. Immediately, there was issued a statement in Peking on the absence of his involvement in the decision. However, this extra argument is in the same direction [10].

REFERENCES