

Be prepared for danger, maintain order and peace**Summary**

Since ancient times, a harmonious and stable society has always been the pursuit of mankind. Throughout global history, we can see countless events of social upheaval. For example, war and class struggle were frequent. Now mankind has ushered in an era of peace, and in the rapidly developing information age, the level of science and technology, medical treatment and other levels have reached a new height, and the ability of human beings to respond to crises has also been greatly improved. However, crises always lurk in the future. It is said that one should be prepared for danger in times of peace. In today's complex and changeable international situation, the monitoring of social order and the consideration of potential risks are becoming more and more important. In this paper, we establish a social stability evaluation model. By calculating the result can directly reflect the stability of the society.

In the first step, we quantified the social stability to obtain the social stability index, and then selected some reference indicators through scientific journals as the index set. Then the grey relational degree analysis method is used to calculate the correlation degree between each preselection index and social stability index. Finally, 18 indicators with high correlation degree were selected to establish the final evaluation index system and the correlation and causality of the indicators in the system are analyzed.

The second step is to apply the above evaluation model to the social stability assessment of specific countries. We found out a number of countries and regions that had broken out color revolution, and finally selected Belarus, where the color revolution failed, and Ukraine, where the color revolution successfully overthrew the regime, as the research object. In the analysis of Belarus, the TOPSIS evaluation model is used to calculate the social stability index of Belarus in the revolutionary period. The results show that the social stability of Belarus is still high even under the background of color revolution.

In the third step, we establish a social stability prediction model, and in the analysis of the causes of the outbreak of color revolutions, We use particle swarm optimization to find several indicators with high volatility. We use post-revolution indicator data to plot the trend of social stability in Belarus after the revolution and analyze the trends. According to the results, discuss the reasons why Belarus successfully suppressed the color revolution and maintained social order.

In the fourth step, in the analysis of Ukraine, we first used TOPSIS evaluation model to calculate the social stability index of Ukraine during the revolution. The results show that the social situation in Ukraine is extremely volatile; Then we use relevant literature to further demonstrate the inevitability of regime change in Ukraine under the impact of color revolution and through comparison with Belarus, it further points out the main reasons for its regime change. Finally, based on all the research and analysis we have done before, we make recommendations to maintain social stability.

Key words: Grey relational degree analysis; TOPSIS evaluation model; CIRTIC algorithm; Color revolution

Contents

1. Introduction	3
1.1 Background	3
1.2 Restatement of the Problem.....	4
1.3 Our Work	5
2. Assumption	5
3. Notation.....	5
4. Model preparation	6
4.1 Data Processing	6
4.2 Establish an indicator system	6
5. Social Stability Evaluation Model	9
5.1 CIRTIC Weights of the Indicator System	9
5.2 TOPSIS Evaluation Model	11
5.2.1 Normalization	11
5.2.2 Standardization	11
5.2.3 TOPSIS Evaluation Model.....	11
5.2.4 Model Results.....	12
6. Model Application	13
6.1 Color Revolution in Belarus	13
6.1.1 Topsis weighted scoring.....	13
6.1.2 Outbreak and Failure of Color Revolution.....	14
6.2 Orange Revolution in Ukraine.....	19
6.2.1 TOPSIS Weighted Scoring.....	20
6.2.2 Success of the Orange Revolution	20
7. Evaluation of Strengths and Weaknesses	21
8. Our Suggestions	22
9. References.....	23

1. Introduction

1.1 Background

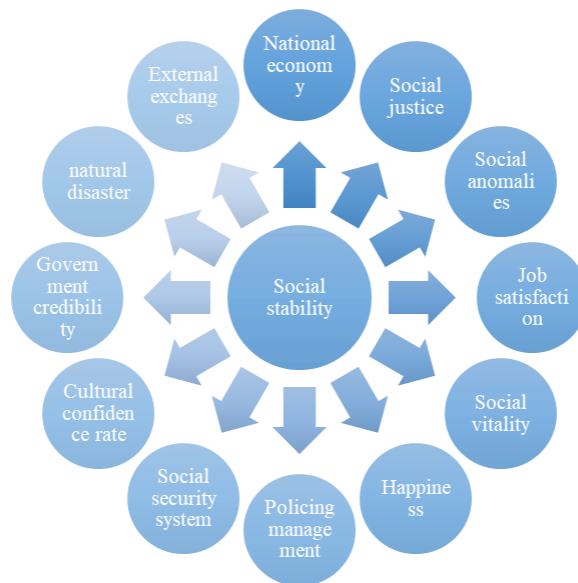
Social stability is a widely used concept with multiple definitions, for example, some sociologists describe it as "social stability refers to the stable, stable and harmonious operation of society, and is the normal order of social operation".

Social stability is crucial to the development of a country and even the world, and it is the result of the coordination and comprehensive impact of multiple systems such as economic operation, policy environment, social security, life and health, education quality, cultural atmosphere, and foreign exchanges, In the process of dynamic social development, the state needs to pay close attention to the development trend of society, timely foresee potential risks and crises, and control the dynamic changes of various systems within a reasonable and favorable range through governance and regulation. Otherwise, once a system in the social operating system has a large negative change, it may cause serious consequences to society.

In the current era, there are many examples of successful social stability through effective governance, but there is also no shortage of cases of social unrest and instability. In this rapid development of global informatization, unknown factors in the process of social development have also increased, and the international situation is full of complexity and uncertainty.

In peacetime, local wars still occur, international frictions and conflicts continue one after another, and color revolutions and terrorist attacks still exist, And this often poses a great threat to the development of society, and may even bring immeasurable losses and damage. Therefore, early warning of social crises should be given greater attention in the existing environment.

In order to make the monitoring and prediction of social stability more convenient, we have established an evaluation model that can be used as an early warning mechanism, and intuitively reflects the social situation by scoring social stability.



Factors influencing social stability

1.2 Restatement of the Problem

(1) In order to determine the index system for evaluating social stability, we analyze the correlation between the social stability coefficient and all preselected indicators, The final evaluation index system was established by selecting the indicators with high correlation, and the correlation and causality analysis of these indicators were carried out.

(2) After assigning weights to each indicator in the above indicator system, we established a universal social stability evaluation model.

(3) Select a country where color revolutions have occurred but ultimately failed to overthrow the regime, and apply the evaluation model we have established to assess its social stability.

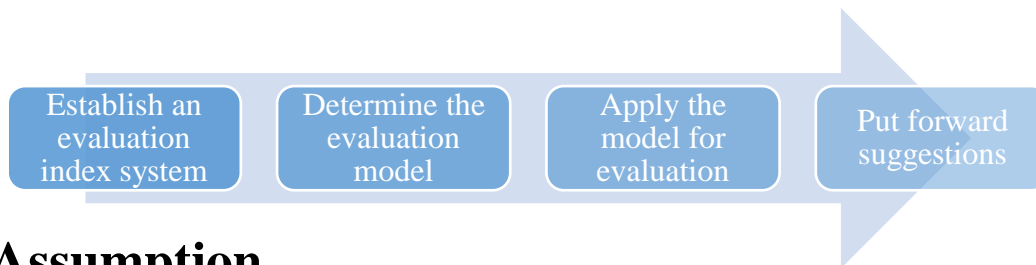
At the same time, the main reasons for the failure of the color revolution are analyzed, and the future development trend of social stability in the country after the revolution is judged.

(4) In contrast to the previous question, select a country where a color revolution has occurred and the revolution eventually succeeds in leading to regime change, and uses the evaluation model we have established to analyze and point out the reasons for the success of the color revolution in that country.

(5) Based on the social stability evaluation system we have established and the above research, relevant suggestions for maintaining social stability are put forward.

1.3 Our Work

- ☑ By consulting the data, the indicators that may affect social stability are selected as pre-selections, Through data analysis, the index which is closely related to social stability is selected and the evaluation index system is established.
- ☑ Based on the established evaluation index system, the weight of each index is determined by the selected algorithm, and an evaluation model for evaluating social stability is established.
- ☑ Find out a number of countries that have had color revolutions, use the evaluation model to evaluate the social stability, analyze the causes of revolution failure, and predict the future trend of social stability.
- ☑ Select a country with a successful color revolution, use the evaluation model to evaluate the social stability, and analyze the reasons for the success of the revolution and the change of the regime.
- ☑ Based on the research and analysis done, relevant suggestions for maintaining social stability are put forward.



2. Assumption

With the same degree of change, each index in the evaluation system has the same impact on the social stability of all evaluation objects. Although in reality, the national conditions of different countries are different, so the weight of indicators may be slightly different for different countries, but our purpose in this paper is to establish a general model that can be used to score and compare different countries and regions, so the weight difference is ignored.

3. Notation

symbol	despcription
y	social stability factor
S	the score calculated by evaluation model
x	the value of indicators

4. Model preparation

4.1 Data Processing

In this paper, we use data from multiple countries around the world, including several indicators such as **GDP**, **unemployment rate**, and more for each country.

First, if an indicator changes that are not conducive to social stability, it may lead to the destruction of social stability, which means that changes in indicators can be the cause of the destruction of social stability. Therefore, we calculated the degree of change in the indicators.

After that, we quantify social stability and define the social stability coefficient. Through reviewing relevant papers, we decided to measure social stability by combining relevant indicators such as economic development quality, public opinion surveys, and overall social stability, and decided to quantify social stability by harmonizing the average method. Let the quality of economic development be ξ_1 , the poll be ξ_2 , and the overall social stability rate is ξ_3 , then the harmonic average is

$$y = \hat{\xi} = \frac{\xi_1 \xi_2 \xi_3}{\xi_1 \xi_2 + \xi_2 \xi_3 + \xi_1 \xi_3}$$

So we get the social stability factor.

4.2 Establish an indicator system

In order to screen out the indicators that have a greater impact on social stability and establish an evaluation index system, we use the gray correlation analysis method to calculate the correlation between various indicators and social stability.

For n evaluation objects and m evaluation indexes, the social stability coefficient y was used as the parent sequence.

$$X_0 = (y_1, y_2, \dots, y_n)^T$$

Then take the values of each indicator as a subsequence

$$X_j = (x_{1j}, x_{2j}, \dots, x_{nj})^T$$

Arrange to get the matrix

$$X = (X_1, X_2, \dots, X_m)$$

Calculate the correlation coefficient of X_j at k time

$$\zeta_j(k) = \frac{\min_i \min_k |x_0(k) - x_i(k)| + \rho \max_i \max_k |x_0(k) - x_i(k)|}{|x_0(k) - x_i(k)| + \rho \max_i \max_k |x_0(k) - x_i(k)|}$$

The value of the resolution coefficient $\rho = 0.5$, and finally the gray correlation degree of X_j to X_0 is calculated.

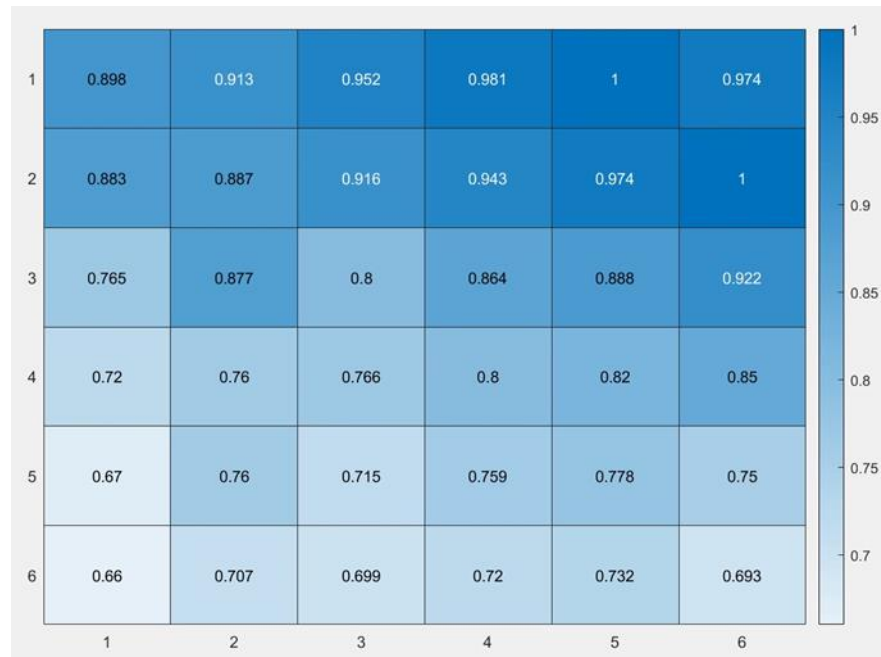
$$r_{0j} = \frac{1}{n} \sum_{k=1}^n \zeta_j(k)$$

In the end, we came up with the following results:

Index(change)	Degree of relevance
<i>GDP per capita</i>	0.921
<i>Public Finance GDP</i>	0.930
<i>Environmental impact factors</i>	0.935
<i>jobless rate</i>	0.942
<i>The Gini index of the gap between rich and poor</i>	0.950
<i>The social security system is perfect</i>	0.956
<i>Policing management</i>	0.960
<i>Demographics</i>	0.972
<i>Disease rate</i>	0.963
<i>natural disaster</i>	0.947
<i>Government credibility</i>	0.937
<i>Policy document support rate</i>	0.931
<i>Cultural confidence rate</i>	0.921
<i>The level of satisfaction of the people</i>	0.914
<i>Corruption cases</i>	0.911
<i>Higher education ratio of people</i>	0.904
<i>Engel's coefficient</i>	0.898
<i>Degree of external communication</i>	0.901

It can be seen that the correlation between the above indicators and the peace stability index is very high, Therefore, we use the above indicators to establish an evaluation index system.

In order to analyze the correlation and causality between the above indicators, the correlation coefficient matrix is calculated, and the causality analysis is carried out using the Granger model, and the results are as follows:



paired sample		F	P
social stability factor	<i>GDP per capita</i>	9.371	0.000***
social stability factor	<i>Public Finance GDP</i>	2.497	0.084*
social stability factor	<i>Environmental impact factors</i>	7.855	0.000***
social stability factor	<i>jobless rate</i>	3.099	0.047**
social stability factor	<i>The Gini index of the gap between rich and poor</i>	2.168	0.117
social stability factor	<i>The social security system is perfect</i>	2.887	0.058*
social stability factor	<i>Policing management</i>	0.938	0.393
social stability factor	<i>Demographics</i>	0.465	0.629
social stability factor	<i>Disease rate</i>	7.691	0.001***
social stability factor	<i>natural disaster</i>	11.055	0.000***
social stability factor	<i>Government credibility</i>	10.486	0.000***
social stability factor	<i>Policy document support rate</i>	12.231	0.000***
social stability factor	<i>Cultural confidence rate</i>	17.564	0.000***
social stability factor	<i>The level of satisfaction of the people</i>	17.931	0.000***

social stability factor	<i>Corruption cases</i>	21.005	0.000***
social stability factor	<i>Higher education ratio of people</i>	13.671	0.000***
social stability factor	<i>Engel's coefficient</i>	11.578	0.000***
social stability factor	<i>Degree of external communication</i>	7.985	0.000***

Note: ***, ** and * represent the significance level of 1%, 5% and 10% respectively

5. Social Stability Evaluation Model

5.1 CIRTIC Weights of the Indicator System

Through the previous analysis, we have obtained an indicator system. But in real life, different indicators have different degrees of impact on social stability, For example, a sustained economic decline over a period of time will lead to the destruction of social stability, while disasters and accidents may cause social anxiety and unease once they occur, and it is clear that the latter has a greater impact on social stability than the former. In order to establish a more meaningful model, we use the CIRTIC algorithm to find the weight of each indicator feature through the distribution of data.

The CIRTIC algorithm synthesizes the objective weight of the indicators based on the contrast strength of the evaluation indicators and the conflict between the indicators, and takes into account the correlation between the indicators while considering the variability of the indicators. To make the article more organized, first explain the relevant concepts.

(1) Variability of indicators

Standard deviation is used to measure metric variability. The standard deviation indicates the fluctuation of the difference in the internal values of each indicator, and the larger the standard deviation, the greater the difference in the value equivalent to the index, which means that the greater the amount of information carried by the index, the stronger the evaluation intensity of the indicator itself, and the greater the weight that should be assigned to the index. The standard deviation is calculated as:

$$S_j = \sqrt{\frac{\sum_{i=1}^n (x_{ij} - \mu_j)^2}{n-1}}, \quad \mu_j = \frac{1}{n} \sum_{i=1}^n x_{ij}$$

(2) Conflicting indicators

Use the correlation coefficient to measure indicator conflict. The more relevant an indicator is to other indicators, the less conflicting it is with other indicators and the higher the rate of duplication of information reflected, This somewhat weakens the evaluation intensity of this indicator, so it should be given less weight. If the correlation coefficient between indicator k and index j is r_{kj} , then the formula for calculating the conflict of index j is

$$R_j = \sum_{k=1}^m (1 - r_{kj})$$

(3) Amount of information

C_j indicates the amount of information for the j the valuation indicator. The larger the value of C_j , the greater the role of indicator J in the overall evaluation index system, and it should be given more weight. The formula for calculating C_j is:

$$C_j = S_j \sum_{k=1}^m (1 - r_{kj}) = S_j \times R_j$$

The objective weight of indicator j is calculated as:

$$\omega_j = \frac{C_j}{\sum_{j=1}^m C_j}$$

Through the algorithm implementation of MATLAB, we finally derive the following weights:

Index(change)	weight
<i>GDP per capita</i>	0.0472
<i>Public Finance GDP</i>	0.0546
<i>Environmental impact factors</i>	0.0443
<i>jobless rate</i>	0.0441
<i>The Gini index of the gap between rich and poor</i>	0.0453
<i>The social security system is perfect</i>	0.0477
<i>Policing management</i>	0.0598
<i>Demographics</i>	0.0681
<i>Disease rate</i>	0.0699
<i>natural disaster</i>	0.0640
<i>Government credibility</i>	0.0585
<i>Policy document support rate</i>	0.0474
<i>Cultural confidence rate</i>	0.0466
<i>The level of satisfaction of the people</i>	0.0636
<i>Corruption cases</i>	0.0666
<i>Higher education ratio of people</i>	0.0592
<i>Engel's coefficient</i>	0.0626
<i>Degree of external communication</i>	0.0506

5.2 TOPSIS Evaluation Model

5.2.1 Normalization

The purpose of Normalization is to transform very small indicators into very large indicators, so that the types of indicators in the evaluation system are consistent. In an evaluation model, larger values for very large metrics are better.

5.2.2 Standardization

The purpose of standardization is to eliminate the influence of dimensions on the data. Different dimensions lead to different orders of magnitude of various indicators, and standardization can convert data into values within the interval [0,1].

For n evaluation objects and m evaluation indicators, the following forward matrix can be formed

$$X = \begin{pmatrix} x_{11} & x_{12} & \cdots & x_{1m} \\ x_{21} & x_{22} & \cdots & x_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ x_{n1} & x_{n2} & \cdots & x_{nm} \end{pmatrix}$$

The normalized matrix of X is Z, elements in Z

$$z_{ij} = x_{ij} / \sqrt{\sum_{i=1}^n x_{ij}^2}$$

5.2.3 TOPSIS Evaluation Model

Define the evaluation matrix

$$Z = \begin{pmatrix} z_{11} & z_{12} & \cdots & z_{1m} \\ z_{21} & z_{22} & \cdots & z_{2m} \\ \vdots & \vdots & \ddots & \vdots \\ z_{n1} & z_{n2} & \cdots & z_{nm} \end{pmatrix}$$

Since the forward processing has been carried out, the elements in Z are very large indicators, so we define the optimal solution and the worst solution respectively

$$z^+ = (\max_i z_{i1}, \max_i z_{i2}, \dots, \max_i z_{im}), \quad z^- = (\min_i z_{i1}, \min_i z_{i2}, \dots, \min_i z_{im})$$

The distance between object i and the optimal and worst solutions is defined by weighted Euclidean distance

$$d_i^+ = \sqrt{\sum_{j=1}^m [\omega_j (z_j^+ - z_{ij})]^2}, \quad d_i^- = \sqrt{\sum_{j=1}^m [\omega_j (z_j^- - z_{ij})]^2}$$

ω_j is the weight of indicator J , and the significance of assigning weight to indicators has been analyzed earlier, which represents the influence of indicators, so the impact of different indicators from the best and worst points is different. Finally, set

$$S_i = \frac{d_i^-}{d_i^+ + d_i^-}$$

The degree to which individuals are far from the worst compromise. Obviously, the larger the S_i , the closer the individual i is to the optimal solution, and the score of individual i should be higher, and the value of S_i can be used as its score.

5.2.4 Model Results

After establishing the Topsis evaluation model, we substitute the sample data points into the model, and use the obtained series of score S_i as the predicted value \hat{y}_i of the social stability factor. Then the relative error is calculated according to the predicted value and the true value, so as to evaluate the applicability of the model. The relative error is calculated as

$$\delta = \left| \frac{\hat{y}_i - y_i}{y_i} \right| \times 100\%$$

The calculation result is as follows:

social stability factor	predicted value	true value
2.76	2.59	6.14%
2.19	2.03	7.34%
-2.56	-2.74	6.87%
-0.54	-0.70	28.85%
-0.39	-0.58	49.23%
0.84	0.68	18.67%
2.74	2.58	5.68%
2.74	2.60	5.01%
2.59	2.42	6.52%
2.37	2.23	5.91%
2.47	2.29	7.54%

6. Model Application

Analysis of Color Revolution Countries

The Color Revolution refers to the color-named colors that took place in the former Soviet Union and the Middle East and North Africa in the early 21st century. Peaceful, nonviolent regime-change campaigns usually take place during elections. The trajectory of this revolution is basically the same: with the support and instigation of Western forces, the opposition, after the presidential or parliamentary elections, refused to recognize the results and protested on the grounds of fraud in the electoral process.

Up to now, there have been many color revolutions around the world, including many countries where the revolution has succeeded, but there are also special cases where the government has succeeded in stabilizing the social situation. In this part, we select Belarus and Ukraine as examples of the failure of color revolutions and the success of color revolutions, respectively. Using the evaluation models we have established, we assess the social stability of these two countries and analyze the causes of these two revolutionary outcomes.

6.1 Color Revolution in Belarus

In the context of the wave of color revolutions sweeping through Eurasia and North Africa, regional countries have become vigilant and have taken countermeasures to prevent color revolutions. However, some marginalized countries, such as Belarus, could not escape the fate of being affected by the color revolutions. So far, there have been three color revolutions in Belarus, in March 2006, December 19, 2010 and August 9, 2020, The revolution took place because of the successful election of President Lukashenko.

Below we take the first color revolution in Belarus as the research object, evaluate the social stability of Belarus at that time, analyze the reasons for the failure of the color revolution, and predict the change trend of social stability in Belarus after the first color revolution.

6.1.1 Topsis weighted scoring

Firstly, the established weighted Topsis evaluation model was applied to score the social stability of Belarus. We collected a number of data from the outbreak of the first color revolution in Belarus and calculated the degree of change in each indicator over the selected study period. From this, the values of the evaluation indicators of Belarus during this period were obtained.

index	Index value
<i>GDP per capita (change)</i>	0.60
<i>Public Finance GDP</i>	0.37
<i>Environmental impact factors</i>	0.36
<i>jobless rate</i>	0.47
<i>The Gini index of the gap between rich and poor</i>	0.74
<i>The social security system is perfect</i>	0.81
<i>Policing management</i>	0.65
<i>Demographics</i>	0.37
<i>Disease rate</i>	0.43
<i>natural disaster</i>	0.65
<i>Government credibility</i>	0.45
<i>Policy document support rate</i>	0.37
<i>Cultural confidence rate</i>	0.94
<i>The level of satisfaction of the people</i>	1.55
<i>Corruption cases</i>	1.30
<i>Higher education ratio of people</i>	1.30
<i>Engel's coefficient</i>	1.25
<i>Degree of external communication</i>	0.98

The final score is in the form of $S_i(0 \leq S_i \leq 1)$, where i represents Belarus. A weighted calculation gives Belarus a social stability score of 0.7707. According to the meaning of S_i in Topsis evaluation model and its value range, we can see that the social stability of Belarus is relatively high.

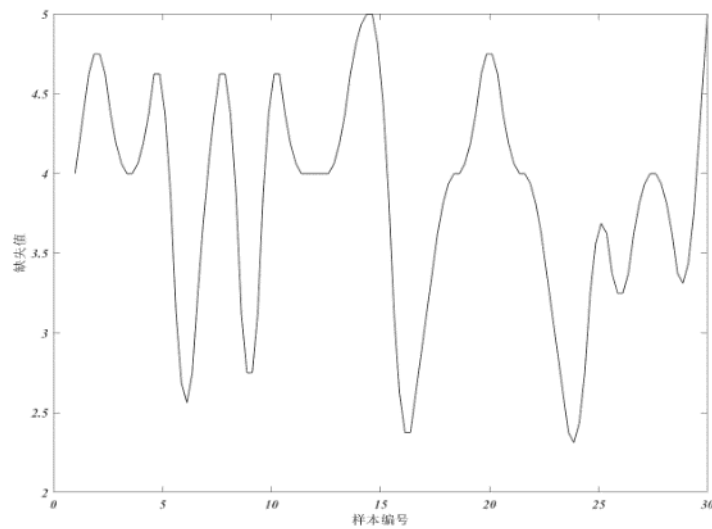
6.1.2 Outbreak and Failure of Color Revolution

After the first wave of the color revolution, which ended in failure, the two-term president of Belarus, Alexander Lukashenko, was re-elected, It also disappointed Western countries expecting regime change in Belarus. In the early 21st century, before this revolution, there had been a number of color revolutions in Eurasia, and with the success of these color revolutions, the Western power continued to intervene in Eurasia, Trying to continue the color revolution eastward. In this case, however, Belarus has suspended its ambitious project, and thus Belarus has become a special object of attention.

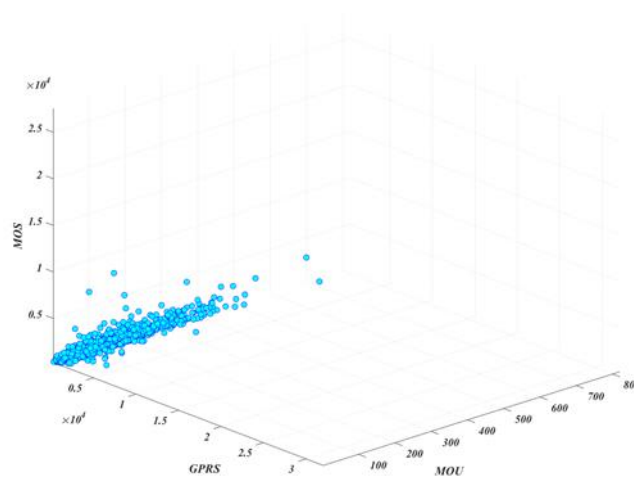
In this part, we try to analyze the outbreak of this color revolution and the reasons for its failure.

Firstly, in order to improve the accuracy of the analysis, we collected a number of relevant indicators in Belarus in the years before and after the outbreak of the first color revolution in 2006. Among them, there are 18 outliers and 16 missing values in the original data. We

supplement the data completely by means of mean, mode, median and K proximity algorithms. The distribution statistics of missing values and outliers are shown in the figure:



A scatter plot of the data distribution of the year and two indices is drawn:



In order to find out the main reasons for the outbreak of color revolution and the changing trend of social stability after the revolution, We decided to find the main variables of the cause by using the small element method first

$$\frac{dC_i}{dt} = f\left(\frac{dW_i}{dt}\right) \cdot f\left(\frac{dW_{i+1}}{dt}\right)$$

$$C_i = g(W_i)$$

$$\int C_i = \sum_i \sum_j W_{ij}$$

C_i is the instability coefficient, W_i is the influence of all indicators in the system on social stability. Then we can surprisingly find that C in the target function is correlated with H and W . This translates to having a minimum value for the objective function when the correlation is maximum, Therefore, the goal of this problem is to find the index C with the highest correlation degree between C and W . These indicators are the representative indicators we are looking for, which is the main reason for the color revolution. The particle swarm optimization algorithm was used to solve the problem to get these indicators

$$V_i^{k+1} := wV_i^k + c_1r_{i1}^k(P_i^k - X_i^k) + c_2r_{i2}^k(P_g^k - X_i^k)$$

$$X_i^{k+1} := X_i^k + V_i^{k+1}$$

Here, we explain the variable symbols in the above formula:

- V_i^{k+1} : Indicates the speed of the k+1 iteration in the ith example, and the initialization speed is 0
- w : It is inertial weight, which is used to control exploitation and exploration as mentioned earlier
- c_1 : It's called the cognitive constant, and it's usually 2
- c_2 : Called the social constant, this part simulates the interaction with the social population and usually takes the value of 2 as well
- r_{i1}^k, r_{i2}^k : Two random numbers of normally distributed values in the range of [0,1]
- P_i^k : Is by the K-th iteration, the i-th particle obtains the optimal target
- P_g^k : It is the best goal among all particles by the k-th iteration
- X_i^k : Is the k-th iteration, the corresponding solution of all particles

In order to solve the above programming function quickly, a penalty function is introduced to limit the fluctuation range of particles. Use Lagrange multiplication to add penalty terms as constraints to the objective function, and the new objective function is:

Among them

$$h(k) = \sqrt{k} \text{ or } k\sqrt{k}, \quad H(x) = \sum_{i=1}^m \theta(q_i(x)) q_i(x_i)^{\gamma(q_i(x_i))}$$

In the above formula, $f(x)$ is the original target function; $h(x)$ is the penalty coefficient of dynamic update, which is related to the number of iterations; $H(x)$ is the constraint penalty term; $q_i(x)$ is the relative constraint penalty function; $\theta(q_i(x))$ is a piecewise assignment function; $\gamma(q_i(x))$ is the penalty index.

Finally, we get the main particle volatility of various indicators and social stability as follows:

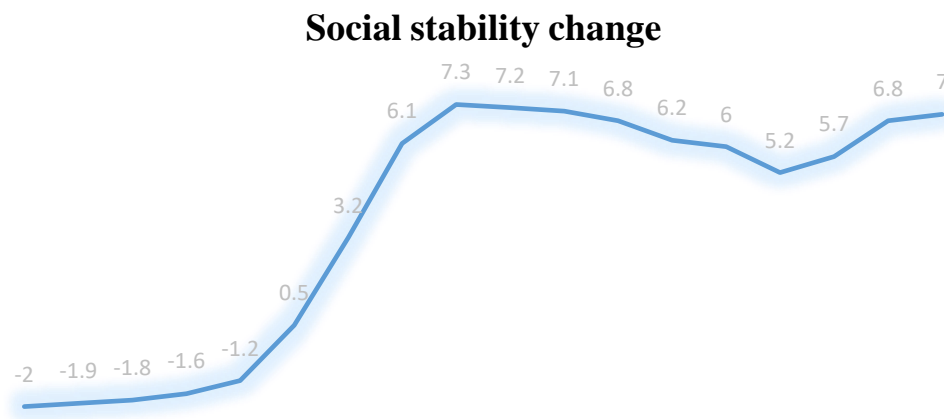
Result		
Evaluation item	Volatility	Ranking
<i>Government credibility</i>	0.981	1
<i>Degree of external communication</i>	0.961	2
<i>The Gini index of wealth inequality</i>	0.936	3
<i>The social security system has been improved</i>	0.92	4
<i>GDP per capita (change)</i>	0.902	5
<i>Policing management</i>	0.897	6
<i>Higher education ratio of people</i>	0.837	7
<i>jobless rate</i>	0.831	8
<i>Cultural confidence rate</i>	0.83	9

Therefore, we select government credibility, foreign exchanges, the gap between the rich and the poor, and the social security system as the main reasons to analyze the changes in the social stability index of this topic. Next, in order to predict trends in social stability in Belarus, we investigated the changes in the above key indicators in Belarus over the next few years:

Month	Government credibility	Degree of external communication	Gap between rich and poor	Social security
1	100	100	100	100
2	97	93	92	89
3	92	90	87	87

4	86	82	73	81
5	83	70	63	74
6	71	52	46	65
7	20	20	18	13
8	19	12	11	13
9	10	3	-6	3
10	5	-9	-10	-3
11	0	-12	-16	-8
12	-3	-39	-41	-8

Finally, we put the data into the Topsis evaluation model for evaluation and prediction, and the social stability change trend curve obtained is shown in the figure:



The above trends indicate that after the first color revolution, social stability in Belarus generally showed an upward trend. Among them, social stability rises at a very small range at first, then suddenly appears a sudden increase trend, and then begins to decline at a slow speed after reaching the peak, and then slowly rises again after reaching the lowest point. We know from relevant literature that during President Lukashenko's administration, Belarus enjoyed political stability, sustained economic development and high life satisfaction. Therefore, President Lukashenko was deeply loved by the people. In this case, a rapid increase in social stability is almost inevitable, which provides a reasonable explanation for the sudden increase in

the graph. The decline in social stability in Belarus, which experienced a second color revolution in 2010, is also a reasonable explanation.

We consider the failure of the Color Revolution in Belarus to be predictable. First of all, when the weighted Topsis model was used in the previous scoring, We have seen that even during the first color revolution Belarusian society was relatively stable. Secondly, from the value of each index in the evaluation index system, The indicators in our system are very large indicators that bigger is better, All indicators in Belarus are positive number, which means that they show a positive change; Finally, through consulting relevant information, we learned that Belarus is a country with good economic development in general and the gap between the rich and the poor is at a relatively reasonable level. At the same time, there are many policy benefits and people's living standards are high. In terms of foreign exchanges, Belarus has a good diplomatic relationship with Russia and has been supported by Russia in natural gas, oil and other resources. Therefore, taken together, it is clear that Belarus's social stability has remained at a high level.

6.2 Orange Revolution in Ukraine

Like neighbouring Belarus, Ukraine, in the former Soviet Union, was affected by a wave of colour revolutions. But in contrast to Belarus, the two colour revolutions in Ukraine so far have succeeded in bringing about regime change. The two Orange revolutions in Ukraine took place in October 2004 and February 2014.

During the first Orange Revolution in November 2004, Ukraine's then-prime minister, Viktor Yanukovich, won a majority in the second round of elections. After the results were announced, the opposition staged demonstrations in protest. On the day the results were announced, the mayor of Kiev, the capital, even endorsed the Orange Revolution by issuing a statement denouncing the results and supporting the demonstrators. In fact, the full support of the city government can be said to be directly related to the success of the revolution. And while the aftermath of the first Orange revolution was still in its wake, disgruntled citizens protested again in late 2013 after Viktor Yanukovich refused to sign a cooperation agreement with the European Union. Then, in February 2014, ahead of the presidential election, the second Orange Revolution took place. Compared with the first Orange Revolution, the momentum of the second Orange Revolution was more violent and the social situation in Ukraine deteriorated more seriously. This

revolution even resulted in many casualties, which went beyond the original definition of "moderate" and "non-violent" color revolution.

Next, we take the first Orange Revolution in Ukraine as the research object and use the Topsis evaluation model we established to evaluate the social stability of Ukraine during this period and Combined with the previous discussion on Belarus, the following is an analysis of the reasons why the Orange Revolution in Ukraine successfully led to regime change.

6.2.1 TOPSIS Weighted Scoring

As in the previous assessment preparation, we collected data from Ukraine during the outbreak of the first Orange Revolution, calculated the indicators of changes in the assessment system, and then calculated the score, $S_i=0.2321$, This clearly means that social stability in Ukraine was at a very low level during the Orange Revolution, The social environment is likely to be in a very volatile state. At the same time, this score also directly reflects the inevitability of the Orange Revolution leading to regime change.

According to the law of reality, in a very volatile social environment, Each system in the social operating system will also be affected to some extent by this turbulent environment, And so there is deterioration, which means that to a certain extent there is actually an interaction between social stability and the indicators in the evaluation system. For example, during the more violent Second Orange Revolution mentioned above, there were even many casualties, and the increase in the number of casualties would inevitably aggravate people's anxiety and panic, which would further deteriorate the social situation. Under this rule, When social stability is low to a certain extent, it becomes more and more difficult for the government and the state to regulate. This further emphasizes the importance of building an early warning model.

6.2.2 Success of the Orange Revolution

First of all, the scores calculated by Topsis model have shown very intuitively that Ukraine's social stability was too low during the Orange Revolution. In the Color Revolution of Belarus, the president and the government carried out timely control in the already relatively stable social environment and successfully maintained social stability. However, for Ukraine, where the social order is already in jeopardy, it is extremely difficult to suppress social unrest through the control of the authorities, not to mention that even the city governments of the capital cities have become supporters of the revolution. So it was almost certain that the Orange Revolution would lead to regime change.

In addition to that, by looking at the literature and reading the literature, In the Orange Revolution, the size of the opposition was large, which directly reflected the level of discontent of the people. In fact, in the first years after the outbreak of the First Orange Revolution, the economy of Ukraine has been growing steadily, and the standard of living of the population has also improved, And while these indicators showed a positive development, the people still launched the Orange Revolution, marched and demonstrated, which is enough to reflect the people's dissatisfaction with the president of the authorities. Therefore, we believe that in the evaluation index system we have established, people's satisfaction is the main reason leading to the successful overthrow of the regime in the revolution. Compared with the Belarus analyzed above, this fact is even more prominent. In the color revolution in Belarus, thanks to high policy benefits and other factors, even though the opposition initiated the color revolution, most people still supported the president of the regime, That will make it easier to suppress the opposition. In contrast, the dissatisfaction of the Ukrainian people with the President of the Authority is even more pronounced.

7. Evaluation of Strengths and Weaknesses

Strengths:

- In this paper, we establish a weighted TOPSIS model as an assessment model for social stability, which is a relatively simple, operable and objective model. And the score output by the model can intuitively reflect the social situation of a country or region.
- There are no strict restrictions on data distribution, sample size, and indicators, It is suitable for both small sample data and multi-evaluation units, The large system with multiple indicators is more flexible and convenient

Weaknesses:

- In this article, from a realistic point of view, the indicators we selected do not specify the best and worst values. Therefore, after normalization the sample data, We directly use the maximum and minimum values of each index as the optimal and worst solutions in the TOPSIS model". This means that TOPSIS model cannot output accurate results if the data of the evaluation object is relatively special.
- Data required for each indicator, the selection of corresponding quantitative indicators will be difficult
- It can only be used with two or more research object

8.Our Suggestions

To: MCM/ICM organizing committee

From: Team MI00008

Date: February 7,2023

Subject: In order to prevent color evolution and maintain social stability

The second "color revolution in Ukraine shows that "color revolution" is probably not a concept in the historical past tense. Looking through the "color revolution", we can find that although its form has undergone two major transmutations in the past ten years, there are still clues to its connotation. No matter how the pattern changes, the "color revolution" is still an anti-government movement instigated by international powers against the target country or region according to their strategic interests ,which take advantage of domestic political and economic contradictions and use the people's social resistance movement to try to overthrow the current regime of a country.

And not every country is helpless in the face of the encroachment of "color revolutions". Uzbekistan, Belarus and other countries have successfully resisted "color revolutions". From their experience, we can roughly summarize a few suggestions:

- Keep a firm grip on the local media to prevent public opinion from getting out of control. There is no substitute for the role of the media in regime change, and its entry into and occupation of a country's position of public opinion can help to bring down that country's regime. For the ruling party, therefore, to give ground. That means the beginning of the loss of power, public opinion out of control not much time.
- Legislation restricting the activities of NGOs in the country. On November 23, 2005, the Russian Duma adopted a draft law on non-governmental organizations inside and outside Russia "According to this bill, non-governmental organizations in Russia are not allowed to accept foreign funds to engage in political activities, and foreign non-governmental organizations cannot fund non-governmental organizations in Russia to engage in political activities, and will clean,rectify and restrain the behavior of informal organizations at home and abroad by means of registration, review of charters. Supervision of the source and flow of funds, and inspection of whether the activities of non-governmental organizations are consistent with their purposes.
- It is necessary to handle the relationship with the opposition well. In the tactics of dealing with the opposition, countries that are not very tense in partisanship generally use the

strategy of both unity and struggle. Kazakhstan, for example, on the one hand, has taken harsh measures against the excesses of some hardline opposition parties that disturb social order. On the other hand “in his address to Parliament in September 2005, the President stated that Kazakhstan planned to establish a 'State Commission for the Elaboration and Refinement of a programme of Democratic Reform' under the direct authority of the President and to invite all political parties, public associations and non-governmental organizations to participate in order to expand the space for the opposition's political participation”.

- Strengthen control over powerful departments such as the military and police. The inaction of the military, especially the police force and the internal guard forces, when the “color revolution” took place, was actually a disguised “initiative” that is, supporting the opposition's attack on the current regime with actual actions.

9. References

[1]Wang Wen. Basic Elements and Important Support for Maintaining Social Stability [J]. People's Forum, 2021, 08

[2]Du Jing.Construction of social stability risk assessment mechanism for major projects [J].Western Economic Management Forum,2018,02

[3]Du Jing,Gan Jiaying,Yang Yang.Summary of research on social stability risk assessment of major projects [J].Environmental protection and circular economy,2017,07

[4]Hu Jianhui.Discussion on social stability risk assessment of major projects [J].Business Economics,2016,07

[5]Yang Yaoyi.How Belarus Resists the "Color Revolution" [J].Party and Government Forum, 2006,5

[6]Liu Leiming, Chen Anqi. On the reasons and enlightenment of Belarus's successful response to the three "color revolutions" [J].China's military to civilian conversion, 2021,12

[7]Luo Dongmei.Ukraine's language policy under the background of "color revolution" [D].
Shanghai: Shanghai Foreign Studies University,2021