

Analysis and Research of Tianjin Development

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Abstract

Tianjin is an integral and important city in China. Tianjin's development influences China's development. In today's society, the coordinated development of Beijing and Tianjin has become a key consideration. It is also a goal we should strive; therefore, the development of Tianjin is one of the focuses of our study. This paper uses SPSS analysis. The data include agricultural output, the number of enterprises, logistics and transport. This paper studies the main factors in Tianjin, and we use the method of principal component analysis. Agriculture and heavy industry are quite developed in Tianjin. The paper also studies the common development of Tianjin. We concluded that we cannot ignore the simultaneous development of agriculture and heavy industry. In addition, we also study the Tianjin's logistics transportation equipment. We have come to the main road and rail transportation equipment. Finally, we do a short-term forecast on the amount of goods, which proves the feasibility of SPSS analysis.

Keywords

SPSS Analysis, Agricultural Output, Tianjin

1. Introduction

Beijing, Tianjin and China's developments are getting more and more attention by us. The development of Beijing, Tianjin and Shanghai cities will directly affect China's economic development. The main object of this study is Tianjin. Tianjin is a very prosperous region. The content of this paper is the Tianjin's economic factors, the development of agriculture, logistics and transportation. Tianjin's future trends provide a reliable basis. Many scholars have made a profound study on the development of Tianjin. [Zheng Li, and Dai Ying \(2015\)](#), two scholars summed up the basic goals and needs of Tianjin's economic development and economic construction from the point of view of national planning. [Yang Wei, Xu Xuezheng, & Hong Haiyu \(2012\)](#) valued the em-

ployment situation in Tianjin and the Tianjin economic. They thought that the economic development of Tianjin would lead Tianjin to promote employment. Wu Jingkun (2012) considered the development of Tianjin culture and the need to innovate to optimize the flow of commerce personnel work together to make recommendations promote the flow of commerce from the economic foundations. Jiang Xiaochuang (2014) thought that Tianjin has the advantage of the port; Tianjin should make use of port resources and the promotion of port throughput; Tianjin should promote common economic development. Liu Haiyuan and Wu Jinlong (2009) put forward that Tianjin needs the development of logistics; the limiting factor is the shortage of practical talents. Yang Guoliang (2006) proposed that the logistics development of Tianjin needs to adapt to the current national policies. Most scholars analyzed from the factors which affect the development of Tianjin, but they were lack of the data analysis and they did not do in-depth research on the specific situation in Tianjin. Based on the fact, we use a lot of data to analyze it and solve the problem.

2. Tianjin Comprehensive Index Analysis

Principal component analysis method is often used by researchers, principal component analysis can explore a region of the main factors, Therefore, this paper in order to obtain the main factors influence the development of Tianjin, a comprehensive analysis using SPSS software. Firstly, select the total agricultural output value of Tianjin, has a number of enterprises, the number of logistics and transport, light industry and heavy industry to judge and analyze comprehensive index Tianjin. In order to obtain satisfactory results, and data reliability, we took data from 2000 to 2013, the 2014 data also did not give specific numerical data are shown in Table 1.

After factor analysis, correlation coefficient matrix can be drawn, the results as shown in Table 2.

Table 1. Tianjin comprehensive index statistics.

Year	Gross output value	Number of enterprises (unit)	Passenger traffic (10,000 persons)	Light industry	Heavy industry
2000	156.30	456	3474	1263.10	1817.64
2001	169.51	420	3302	1153.73	2212.80
2002	181.07	925	3457	1207.88	2509.84
2003	193.44	900	3507	1254.68	3116.08
2004	221.35	1155	4103	1398.65	4787.39
2005	238.34	1108	4679	1569.06	5600.56
2006	225.04	1103	5670	1664.03	7243.42
2007	240.74	1113	7104	1967.37	8535.54
2008	268.11	1362	8753	2190.54	10,852.37
2009	281.65	1371	25,299	2290.38	11,093.87
2010	317.33	1448	24,873	2800.45	14,306.74
2011	349.48	1494	25,331	3746.71	17,781.63
2012	375.62	1648	28,462	4728.22	19,465.91
2013	412.36	1756	29,518	5861.38	21,421.90

Table 2. Correlation matrix.

Correlation	Gross output value	Number of enterprises (unit)	Passenger traffic	Light industry	Heavy industry
Gross output value	1.000	0.930	0.923	0.955	0.990
Number of enterprises (unit)	0.930	1.000	0.818	0.816	0.905
Passenger traffic	0.923	0.818	1.000	0.880	0.930
Light industry	0.955	0.816	0.880	1.000	0.954
Heavy industry	0.990	0.905	0.930	0.954	1.000

From the data in **Table 2**, we can know the degree of correlation between the five variables are very high, for example, the correlation coefficient contribution of the agricultural economy and heavy industry output value is 0.990, reached a high degree of correlation, therefore, the data analyze the composition of the shots significant variables. Tianjin heavy industry should pay attention to the factors that strengthen the management of heavy industry, optimize the structure and organization of basic industry is the basis for the rational development of Tianjin.

From **Table 3**, we can know, after analysis software, it can mainly extract a principal component, software principle is selected eigenvalues greater than 1 is our target selected, the data in the first primary eigenvalues component is 4.643, the remaining components of the eigenvalues are less than one, so we selected a main component is the first one. And the first principal component can explain 93% of the original information of all the variables, it is a very reliable and value can be applied to real life.

The data in **Table 4** tells us that the main component of the equation can be used to extract the following regression equation:

$$F_1 = 0.996 * X_1 + 0.927 * X_2 + 0.945 * X_3 + 0.956 * X_4 + 0.993 * X_5$$

among them:

X_1 : Gross Output Value.

X_2 : Number of Enterprise.

X_3 : Passenger Traffic.

X_4 : Light Industry.

X_5 : Heavy Industry.

These data tell us that after data processing and standardized regression coefficients of significant indicators, we can know that how much can be seen that the main component of agriculture can be replaced, because agriculture is the coefficient 0.996, the entire data is a maximum. These results suggest that the development of Tianjin’s economy depends mainly on agriculture, therefore, it is to strengthen the focus of Beijing, Tianjin and the Tianjin development of agriculture and protection.

Table 3. Total variance explained.

Ingredient	Initial eigenvalues			Extracting square and load		
	Total	Variance %	Accumulation %	Total	Variance %	Accumulation %
1	4.643	92.866	92.866	4.643	92.866	92.866
2	0.205	4.110	96.975			
3	0.125	2.495	99.470			
4	0.021	0.417	99.887			
5	0.006	0.113	100.000			

Table 4. Composition matrix.

	Ingredient
	1
X_1	0.996
X_2	0.927
X_3	0.945
X_4	0.956
X_5	0.993

3. Logistics Transportation Equipment

Tianjin logistics transportation equipment is an important factor affecting economic development in Tianjin, logistics equipment determines the transport speed of logistics and products, mainly logistics and transport equipment Tianjin rail, road and water transport, under the leadership of logistics equipment, each year in Tianjin will have a lot cargo, but depending on which freight transport logistics and equipment, it is worth our study. This article taken correlation coefficient and regression methods to examine the data, the data shown in **Table 5**, the results of the test are shown in **Table 6** and **Table 7**.

From the correlation coefficient, we can see that the correlation coefficient and cargo railway is 0.9, which is rendered highly correlated and road freight is 0.765, which is showing a moderate correlation, cargo and water transport the correlation coefficient is 0.838, which showed a high correlation, indicating that the main use of the logistics of Tianjin railway and water transport, railway transport capacity mainly for cargo, quantity, unit area of small goods, water generally relates to a very wide range, it including between countries, between the coastal cities of transport logistics.

After analysis of regression equations, linear equations we can draw is:

$$W = 0.958 * U_1 + 1.051 * U_2 + 1.059 * U_3 - 605.635$$

The meaning of the equation is the three streams of cargo and transport equipment exhibits a linear relationship with the increase in rail, road and waterway transport, cargo is showing a rise in the value of times, they exhibit proportional relationship.

Finally, we made the prediction model, predicted results are in line with freight data ARIMA (0, 1, 0) model prediction, graph prediction model as shown in **Figure 1** is a graphical representation of the gradual increase

Table 5. Tianjin logistics transportation equipment.

Year	Freight traffic	Railways	Highways	Waterways
2000	26,400	3079	18,764	4165
2001	28,608	3727	19,382	5037
2002	31,016	4519	19,554	6452
2003	35,252	5662	20,072	8944
2004	37,934	6108	19,560	11,613
2005	40,263	7241	19,850	12,375
2006	42,863	8409	20,290	13,313
2007	51,338	11,288	23,500	15,671
2008	55,065	12,161	27,000	15,096
2009	43,554	11,284	19,800	11,656
2010	41,611	7597	20,855	11,911
2011	44,651	7286	23,426	12,711
2012	47,698	7909	28,228	10,332
2013	51,603	8446	31,985	9884

Table 6. Correlation analysis.

		Freight traffic	Railways	Highways	Waterways
Freight traffic	Pearson	1	0.900**	0.765**	0.838**
	Sig		0.000	0.001	0.000

Table 7. Regression equations.

Model	B Deviation trial version			t	Sig.
Constant	-605.635	367.528		-1.648	0.130
Railways	0.958	0.047	0.304	20.365	0.000
Highways	1.051	0.017	0.487	61.082	0.000
Waterways	1.059	0.035	0.422	30.444	0.000

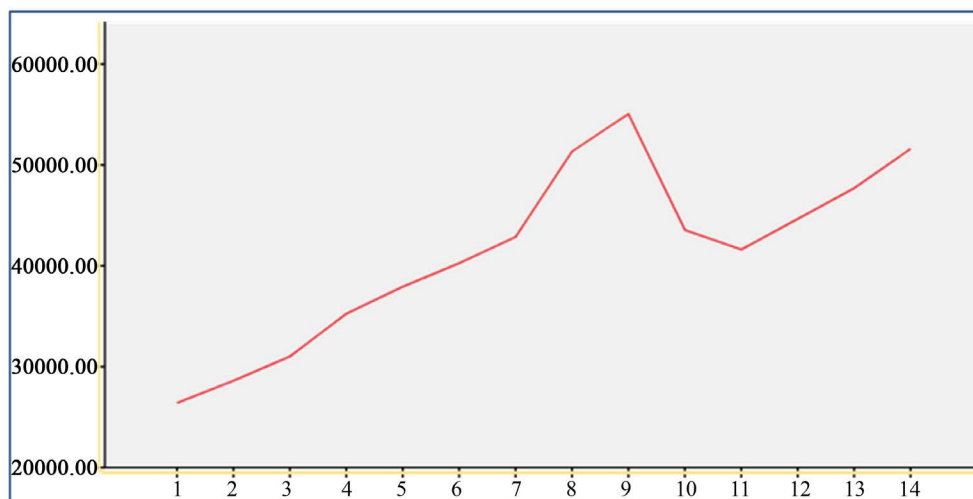


Figure 1. Predictive model. Note: X-axis represents the predicted time point; Y-axis represents the model coefficients.

in the year, cargo showed an increasing trend and it is expected in 2014 to 2016, 2011 to 2014 data show an upward trend, so we expect the 2015 and 2016 data will continue to rise. Tianjin cargo volume will continue to rise, it is a strong basis for economic development in Tianjin.

4. Summary

Tianjin's development is inseparable from the efforts of each other. We should seize the development of Tianjin's agriculture and vigorously develop the agricultural economy. Agricultural development needs the starting from the farmer skills. The local government should make use of Internet technology. The government can spread advanced network platform and guide farmers to learn advanced techniques and theoretical knowledge. For example, the planting outstanding cases are made into a video. It will be spread to the network platform and it will be learned by farmers. In addition, Tianjin should make use of local developed logistics and transport equipment, and make effective combination of rail and road. Tianjin should protect the product quality and safety in the aspect of logistics. When it is necessary, the government should vigorously promote enterprises to establish reasonable safety stock, and reduce transport of goods. It will reduce transport costs and improve service quality. Finally, Tianjin should strengthen the training of staffs. On one hand, it is important to strengthen the capacity of staff hands-on. On the other hand, Tianjin city trains more excellent talents which is also a good way to accelerate the development of Tianjin. It will strengthen the cooperation with Beijing.

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