Study on the System of Technical Innovation in Our Country’s Textile Industry

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Abstract
After our entering WTO, the insufficient ability of new technical creating and the lags of the facilities and craftwork have become the main problems that restrict the confineable progress of our country’s textile industry. In the base of having collected a great deal of data, this essay analyses the main facts that can influence technical innovation of our country’s textile industry, and creating the estimating system of technical innovation of our country’s textile companies which is fit for our country’s textile industry.

Keywords: Textile industry, Technical innovation, The estimating system

The textile industry is traditional and indispensable industry of our country. It is the third biggest export industry which is only inferior to electronically machine and tourism. With the quota of some restricted goods from many main export markets, such as America, UN, being cancelled, the free trade in textile globally will help the textile industry of our country make best of the foreign and domestic resources and expand not only domestic market, but also domestic one.

But now, the insufficient ability of new technical creating and the lags of the facilities and craftwork have become the main problems that restrict the continual progress of our country’s textile industry. If we want to exert more competitive advantages of our country’s textile industry, and confirm correctly the position that our country’s textile industry stands in the Asian and even the international textile industry, and collocate all kinds of resources reasonably to generate main competitive power, then promote the continual progress of our country’s textile industry, we should change the actuality of concerning on quantity, and focus on the technical innovation of our textile industry, especially the technical innovation system’s creating and efficient running.

In the course of running the system of technical innovation in textile industry, all the innovational resources get together in the company, and get the new combination which is based on the textile company, and then achieve the purpose of improving company’s main competitive capabilities and economical benefits. Whether the technical of innovation in textile industry are high or not is the gist that could judge the running status of the whole technical innovation system of textile industry. In this condition, creating the judging system of technical innovation capability in textile industry externally and scientifically makes significant effort in a textile company’s realizing its advantages and disadvantages, and making suitable innovation strategies, then improve the running efficiency of the whole industry system.

1. Picking up the index that can judge the technical innovation capability of textile industry
The technical innovation capability of a textile company is an integer which is formed by many facts. According to the process of technical innovation and the features of textile industry, and in the base of the comprehensive principle, the systemic principle and the feasible principle, we can divide the technical innovation capability of a textile company into many facts, such as policies, innovation resources, market surroundings, information surroundings, people resources, and technical serves agency. After surveying more than one hundred companies, we had created the judging system of technical innovation capability in textile industry.

| The System of Technical Innovation | index |
|-----------------------------------|-------|
| Policy (C1)                       |       |
| Industrial Policy (P1)            |       |
| Technical Policy (P2)             |       |
| Financial Policy (P3)             |       |

Table 1. the index that can judge the technical innovation capability of a textile company
2. Confirming the model of the judging system of technic innovation capability in textile industry

First, according to the certain subject function relationship, calculate the results of every index. In the process of constructing certain subject, we use the method of model comparing, as to the positive index, its function is

\[ A_i = \frac{X_i - X_{imin}}{X_{imax} - X_{imin}} \]

In the function, \( X_i \) is the real value of \( X \), which is the no. company’s no. index; \( X_{imin} \) is the min value of \( X \), which the no. index of the sample textile company. \( X_{imax} \) is the max value of \( X \), which the no. index of the sample textile company. \( A_i \) is the value of \( x_i \), which is the no. index of no. Textile Company.

Second, confirm index’s average.

Third, calculate the sample textile company’s average score.

To be convenient, we can use the method of linearity average to calculate the scores of every sample textile companies. When index judging system are \( X_1, X_2, \ldots, X_{P-1}, X_P \), and there are \( P \) textile companies judging, in this condition, the formula is

\[ Z_i = \sum_{i=1}^{P} w_i A_i \]

In this formula, \( W_i \) is the average of the no. index; \( Z_i \) is the average scores that no. Textile Company gets.

Forth, compare in accordance to scores that every company gets, and judge

3. Assessing the relative average of system of technic innovation capability in textile industry

We use the analytic hierarchy process, AHP for short, to confirm the average. Our country’s textile industry should optimize the effect of technical innovation to the largest extent. To achieve this goal, we should consider policy, system surroundings, market surroundings, resource supporting surroundings, people resource surroundings and information supporting surroundings. However, those facts are related to some subsidiary facts. So, the judging levels are divided into two parts in
In this essay, the first is $c_i$ and the second is $p_i$.

Based on a large number of researches towards all kinds of textile companies, we collect the survey results. According to the analytic hierarchy process, we form matrix to the facts of all levels to confirm the average fact in the system. Then, we compare every fact's relative importance degree with each other, and we can get the matrices, $A—C_i, C_1—P_i, C_2—P_i, C_3—P_i, C_4—P_i, C_5—P_i, C_6—P_i$

| Table 2. Matrixes $A—C_i$
|---|
| $A$ | $c_1$ | $c_2$ | $c_3$ | $c_4$ | $c_5$ | $c_6$ | $w_i$ |
| $c_1$ | 1 | 1/2 | 2 | 4 | 3 | 5 | 0.266171 |
| $c_2$ | 2 | 1 | 3 | 5 | 4 | 6 | 0.360618 |
| $c_3$ | 1/2 | 1/3 | 1 | 3 | 2 | 3 | 0.168871 |
| $c_4$ | 1/4 | 1/5 | 1/3 | 1 | 1/2 | 3 | 0.056386 |
| $c_5$ | 1/3 | 1/4 | 1/2 | 2 | 1 | 2 | 0.104471 |
| $c_6$ | 1/5 | 1/6 | 1/3 | 1/3 | 1/2 | 1 | 0.043506 |

$\lambda_{\text{max}} = 6.25146$

| Table 3. Matrixes $C_1—P_i$
|---|
| $c_1$ | $p_1$ | $p_2$ | $p_3$ | $p_4$ | $p_5$ | $p_6$ | $p_7$ | $w_i$ |
| $p_1$ | 1 | 4 | 2 | 3 | 5 | 5 | 6 | 0.295959 |
| $p_2$ | 1/4 | 1 | 1/3 | 1/2 | 2 | 3 | 4 | 0.126162 |
| $p_3$ | 1/2 | 3 | 1 | 2 | 4 | 5 | 6 | 0.244735 |
| $p_4$ | 1/3 | 2 | 1/2 | 1 | 3 | 4 | 4 | 0.168848 |
| $p_5$ | 1/5 | 1/2 | 1/4 | 1/3 | 1 | 2 | 3 | 0.082906 |
| $p_6$ | 1/5 | 1/3 | 1/5 | 1/4 | 1/2 | 1 | 2 | 0.051034 |
| $p_7$ | 1/6 | 1/4 | 1/6 | 1/4 | 1/3 | 1/2 | 1 | 0.030355 |

$\lambda_{\text{max}} = 7.3373$

| Table 4. Matrixes $C_2—P_i$
|---|
| $c_2$ | $p_8$ | $p_9$ | $p_{10}$ | $p_{11}$ | $w_i$ |
| $p_8$ | 1 | 1 | 3 | 6 | 3 | 0.475678 |
| $p_9$ | 1/3 | 1 | 4 | 1 | 0.231735 |
| $p_{10}$ | 1/6 | 1/4 | 1 | 1/4 | 0.060983 |
| $p_{11}$ | 1/3 | 1 | 4 | 1 | 0.231735 |

$\lambda_{\text{max}} = 4.091498$

| Table 5. Matrixes $C_3—P_i$
|---|
| $C_3$ | $p_{12}$ | $p_{13}$ | $p_{14}$ | $p_{15}$ | $p_{16}$ | $w_i$ |
| $p_{12}$ | 1 | 1 | 1/3 | 1/4 | 1/4 | 0.067412 |
| $p_{13}$ | 1 | 1 | 1/2 | 1/4 | 1/5 | 0.070188 |
| $p_{14}$ | 3 | 2 | 1 | 1/2 | 1/2 | 0.166548 |
| $p_{15}$ | 4 | 4 | 2 | 1 | 1 | 0.28551 |
| $p_{16}$ | 4 | 5 | 2 | 1 | 1 | 0.309303 |

$\lambda_{\text{max}} = 5.028566$

| Table 6. Matrixes $C_4—P_i$
|---|
| $C_4$ | $p_{17}$ | $p_{18}$ | $p_{19}$ | $w_i$ |
| $p_{17}$ | 1 | 1/4 | 3 | 0.270701 |
| $p_{18}$ | 4 | 1 | 5 | 0.636943 |
| $p_{19}$ | 1/4 | 1/5 | 1 | 0.092357 |

$\lambda_{\text{max}} = 3.049611$
### Table 7. Matrixes C5—Pi

| c5 | p20 | p21 | wi   | $\lambda_{\text{max}}$ |
|----|-----|-----|------|----------------------|
| p20 | 1   | 2   | 0.666667 |
| p21 | $1/2$ | 1   | 0.333333 |

### Table 8. Matrixes C6—Pi

| c6 | p22 | p23 | p24 | p25 | wi   | $\lambda_{\text{max}}$ |
|----|-----|-----|-----|-----|------|----------------------|
| p22 | 1   | 3   | 1   | 4   | 0.3731343 |
| p23 | $1/3$ | 1   | $1/5$ | 1   | 0.1050304 |
| p24 | 1   | 5   | 1   | 3   | 0.4145937 |
| p25 | $1/4$ | 1   | $1/3$ | 1   | 0.1071034 |

$\lambda_{\text{max}}$ —— the Max Character value

$CR$ —— the index of accordance

$$\lambda_{\text{max}} = \frac{AW}{\sum_{i} (AW)_i}$$

$$CR = \frac{\lambda_{\text{max}} - n}{n - 1}$$

| CR_A | CR_C1 | CR_C2 | CR_C3 | CR_C4 | CR_C5 | CR_C6 |
|------|-------|-------|-------|-------|-------|-------|
| 0.00091 | 0.041338255 | 0.034269 | 0.006376 | 0.047703 | 0 | 0.016922 |

CR $< 0.1$, it means all the consequence is satisfied.

| index | c1    | c2    | c3    | c4    | c5    | c6    | CR | the average of the index | composter |
|-------|-------|-------|-------|-------|-------|-------|----|--------------------------|-----------|
| p1    | 0.266171 | 0.360618 | 0.168871 | 0.056386 | 0.104471 | 0.043505 | 0.078776 | 4 |
| p2    | 0.126162 | 0.078776 | 0.033581 | 0.036514 | 0.044943 | 0.013584 | 0.00808 | 22 |
| p3    | 0.244735 | 0.475667 | 0.168848 | 0.082906 | 0.051034 | 0.030355 | 0.171534 | 1 |
| p4    | 0.168848 | 0.231735 | 0.051034 | 0.050983 | 0.067412 | 0.0231735 | 0.083568 | 2 |
| p5    | 0.082906 | 0.060983 | 0.231735 | 0.28551 | 0.067412 | 0.030355 | 0.021992 | 15 |
| p6    | 0.051034 | 0.475667 | 0.231735 | 0.231735 | 0.067412 | 0.166548 | 0.083568 | 3 |
| p7    | 0.030355 | 0.231735 | 0.231735 | 0.231735 | 0.067412 | 0.28551 | 0.021992 | 15 |
| p8    | 0.060983 | 0.067412 | 0.270701 | 0.067412 | 0.067412 | 0.28551 | 0.015264 | 18 |
| p9    | 0.231735 | 0.070188 | 0.060983 | 0.070188 | 0.070188 | 0.060983 | 0.011384 | 21 |
| p10   | 0.070188 | 0.231735 | 0.070188 | 0.231735 | 0.231735 | 0.231735 | 0.011384 | 21 |
| p11   | 0.166548 | 0.060983 | 0.28551 | 0.060983 | 0.28551 | 0.28551 | 0.011384 | 21 |
| p12   | 0.28551 | 0.067412 | 0.270701 | 0.067412 | 0.067412 | 0.067412 | 0.011384 | 21 |
| p13   | 0.060983 | 0.28551 | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.011384 | 21 |
| p14   | 0.060983 | 0.28551 | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.011384 | 21 |
| p15   | 0.060983 | 0.28551 | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.011384 | 21 |
| p16   | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.011384 | 21 |
| p17   | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.011384 | 21 |
| p18   | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.011384 | 21 |
| p19   | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.011384 | 21 |
| p20   | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.011384 | 21 |
| p21   | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.231735 | 0.011384 | 21 |
We can find from the total compositor, those facts can be made in order from high influence made to the technical innovation of textile industry to low influence: R&D devotion, R&D personnel devotion, innovation risks, industrial policy, capability of enterpriser, financial policy, technical import, innovation efficiency, resource surroundings, flat of industrial technical, ability of innovation personnel, technical information, people obtaining employment, system structure, market concept, other policies, information management, brokers, and broker serves manager system. All these facts react and are related with each other, and influence the technical innovation abilities of our country’s textile industry. Through the judge of textile companies, we can judge of a certain company’s ability of technical innovation better, and give the gist to the companies for them further development.

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