Research on performance intelligent evaluation of automobile manufacturing informatization based on DEA and C2RS2 model

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Abstract. This paper intends to analyze the performance of the informatization construction of automobile manufacturing enterprises, analyze whether the informatization resource input of automobile manufacturing enterprises has been fully utilized, and find its own shortcomings compared with excellent enterprises in the same industry, so the model C^2RS^2 is selected. Through the comparative analysis of different years by informationization enterprise benefit to analyze in the case of a change of informatization performance, but the need to consider to get rid of the effects of management level to improve, so in this paper, based on the analysis of the plan in C^2RS^2 model, combining management effectiveness evaluation model of DEA, the model solves the other performance evaluation methods and makes it difficult to manage performance Based on the defect of condition separation and the interactive calculation between the reference index and the current index, we can conclude that the performance of the enterprise is entirely due to the management level, that is, the performance of the enterprise's subjective efforts.

Keywords: DEA, C^2RS^2 model, Enterprise, Performance management.

1. Introduction

Since its appearance in 1978, DEA model has been widely used at home and abroad. DEA method has two general models: c^2R model and c^2RS^2 model. C^2R is a model of scale effectiveness and technology effectiveness for judging and evaluating DMU-Decision Making Unit. The so-called "scale efficiency" refers to the best effect and income that can be achieved with limited scale of resource investment. The so-called "technology efficiency" means that the role of management technology can be fully released so that all inputs can be fully used [1]. C^2RS^2 is a pure model to evaluate the effectiveness of DMU technology, which includes two aspects, namely management level and technical performance level. It mainly evaluates and analyzes DMU which is invalid through DEA analysis, and examines whether its management technology has been fully displayed and released and how much it has been released. That is, under the condition of the current scale, whether each resource gets its due output. Therefore, the effective conclusion after evaluation of relevant decision making units by c^2RS^2 model is also called "effective management technology" [2].

This paper intends to analyze the performance of the informatization construction of automobile manufacturing enterprises, analyze whether the informatization resource input of automobile manufacturing enterprises has been fully utilized, and find its own shortcomings compared with excellent enterprises in the same industry, so the c2RS2 model is selected. The production input factors of enterprises include labor, capital and technology (including management level). However, it is a problem to be solved whether to take informatization as a separate factor independent of labor, capital and technology or integrate it into the other three factors when evaluating the performance of enterprise informatization. If informatization is taken as a separate factor, it is difficult or even impossible to completely separate the contribution of informatization factor to enterprise benefit in evaluation. If informatization is integrated into other factors, its benefits cannot be evaluated objectively and accurately. Therefore, the informatization performance is analyzed by comparing and analyzing the changes of informatization factors in different years on enterprises' effects and benefits. However, the influence brought by the improvement of management level needs to be removed at this time. Therefore, this paper plans to combine the management effectiveness evaluation model of DEA with the CRS2

model analysis. The model solves the defect that other performance evaluation methods are difficult to separate management performance from objective conditions. Through the interactive calculation of the reference index and the current index, it is concluded that the performance of the enterprise is entirely due to the management level, that is, the performance of the enterprise's subjective efforts. Therefore, through the comprehensive analysis of the two models, the performance affected by management level is removed, and the performance of enterprise informatization construction is obtained.

2. Construction and analysis of dea evaluation

2.1. Data sources and statistical description

Through factor analysis of each enterprise parameter values of the past and present, this paper established the index system of the output index) is calculated, the past or the previous year's operating performance indicators score as a basis to reflect the business objective conditions of measurement, called the reference index, to reflect the current operating performance indicators to score as the current performance measurement, is called the current index. The data set produced by combining the reference index with the current index is the index state of the evaluation unit, and the index state set is formed by combining the index states of all evaluation units. In understanding, on the basis of state index set can through the management effectiveness model is analyzed, the evaluation unit of the index of different years state input to the management effectiveness evaluation software the index of state may set the boundary, namely the automobile manufacturing enterprise of the production frontier, because this article studies the performance of enterprise information, choice of indicators are also aspects of informationization Index, the impact of subjective and effective efforts on enterprise informatization performance can be measured by the gap between enterprises' deviation from the frontier, as shown in the figure 1 below.[3]

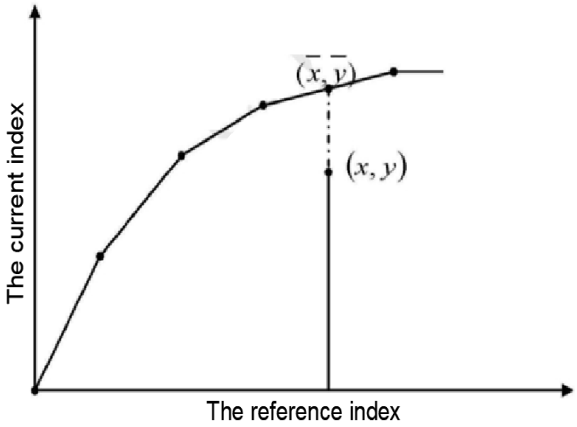

Figure 1. Graphical interpretation of the leading edge of the possible set of exponential states

The exponential state (x,y) of any evaluation unit is located between two evaluated enterprises whose basic conditions are worse or better than it, the current index of the enterprise), and the projection on the frontier is denoted as Y), and the ratio of n can be regarded as a quantitative reflection of the subjective effective effort degree. N =y/S'× 100% is the quadratic relative benefit value of the evaluated enterprise.[4-6]

The DEA model to calculate the quadratic relative efficiency value of enterprises is as follows:

$$\begin{aligned} &MaxZ \\ &s.t\sum_{j=0}^{n}\lambda_j x_j \le x_{j0} \\ &\sum_{j=0}^{n}\lambda_j y_j \le x_{j0} \\ &\sum_{j=0}^{n}\lambda_j = 1, \lambda_j \ge 0,\ j = 0,1,2,...,n \end{aligned} \tag{1}$$

Where, y_j is the current index of the JTH enterprise; X_j is the reference exponent

2.2. C2RS2 evaluation model

$$\begin{aligned} &\min\left[\theta - \varepsilon\left(\sum_{r=1} S_r^- + \sum_{c=1} S_e^+\right)\right] \\ &s.t.\sum_{j=1}^{l} X_j\lambda_j + S^- = \theta X_{j0} \\ &\sum_{j=1}^{l} Y_j\lambda_j - S^+ = Y_{j0} \\ &\sum_{j=1}^{l}\lambda_j = 1 \end{aligned} \tag{2}$$

Assuming that the informatization performance evaluation of an automobile manufacturing enterprise is comparable, all enterprises are processed and calculated using the c^2RS^2 model. Where, each enterprise (evaluation object) is defined as a DMU, that is, DMU_j j=1, 2… 1. The evaluation indicator system consists of R input indicators and C output indicators, among which the input vector and output vector of DML_j are X_j and Y_j respectively.

According to the above calculation and analysis, the difference between the input and output values of non-DEA effective evaluation units and the optimal state can be quantitatively obtained, so that we can purposefully analyze the causes of this phenomenon, so as to point out the direction for the evaluation object to improve informatization performance.[7-8]

Through the statistical analysis of the adjustment vector, the key factors affecting the effectiveness of DMU can be found. Specifically in terms of informatization performance evaluation, DEA effectiveness means that under the current informatization resource input situation, the input amount of each input index has been at the forefront of relative efficiency, that is, compared with the whole evaluation collective, the minimum informatization cost input has been realized. The reason for inefficiency lies in the redundancy of one or several input indicators. [9-10]Input factors can be determined by the decision making unit, while output factors cannot be determined. Therefore, the redundancy at this time is not too much input in an absolute sense, but the input may not be given full play. According to the results of the model and their own reality, enterprise decision-makers can "suit the case" by reducing the invalid input or temporarily not needed input, and maintaining the input and improving the utilization rate of those factors that are beneficial to the future development of the enterprise. Enterprises can also find out whether they have the opportunity to introduce some kind of input from the horizontal comparison with other enterprises to ensure the balanced input-output effect.

3. Sample selection and index system establishment

3.1. Sample selection

The industry studied in this paper has been determined, and the research direction is the performance evaluation of enterprise informatization, which is to evaluate the performance of automobile manufacturing enterprises that apply informatization. The selected automobile

manufacturing enterprises should have applied informatization in the research period. At the same time, considering the availability of financial data, the sample of this paper selects listed enterprises in the automotive industry and informatization has been applied. Listed by the end of the year, China's automobile manufacturing enterprises have much more than 50, will these enterprises as a whole are random sampling, choose the 23 samples are as follows: jiangling motors co., LTD. (hereinafter referred to as jiangling automobile), faw car co., LTD. (hereinafter referred to as faw car), the hippocampus investment group co., LTD. (hereinafter referred to as the hippocampus shares), changan automobile group co., LTD. (Changan for short), the Shanghai aerospace automobile electromechanical co., LTD. (hereinafter referred to as aerospace mechanical and electrical), anhui nk automobile co., LTD. (hereinafter referred to as nk passenger cars), anhui jianghuai automobile co., LTD. (hereinafter referred to as jianghuai auto), tianjin faw xiali automobile co., LTD. (hereinafter referred to as faw xiali), Inner Mongolia north heavy automobile co., LTD. (hereinafter referred to as the north), Sinotruk jinan truck group co., LTD. (hereinafter referred to as sinotruk), zhongtong bus holding co., LTD. (hereinafter referred to as zhongtong coach), dongfeng motor co., LTD. (hereinafter referred to as dongfeng), zhengzhou yutong bus co., LTD. (hereinafter referred to as yutong buses), Shanghai automotive group co., LTD. (hereinafter referred to as Shanghai automotive), jinbei automobile co., LTD. (hereinafter referred to as Jinbei automobile), foton motor co., LTD. (hereinafter referred to as foton), the state yaxing bus co., LTD. (hereinafter referred to as yaxing coach), liaoning sg automotive group co., LTD. (hereinafter referred to as the dawn), anhui star automobile co., LTD. (hereinafter referred to as the horse car), xiamen golden dragon auto group co., LTD. (hereinafter referred to as jinlong bus), Harbin east Anglia Automobile Power Co., LTD. (referred to as Dong 'an Power), Jiangsu Yueda Investment Co., LTD. (referred to as Yueda Investment), and GAC Changfeng Automobile Co., LTD. (referred to as GAC Changfeng).

3.2. Establishment of index system

Eleven input indicators, such as X1 to X11, and seven output indicators, such as Y1-Y7, were selected for correlation analysis. The results are shown in the table I. Seen from the results, there are certain correlation among the indexes, this is common sense, especially for enterprise will limit to the evaluation of a particular field, there must be relationship between the various indicators, we need to do is on the one hand, as far as possible in order to keep the model scientific and reliable, and the other aspects in combination with the specific needs to select the indexes for evaluation of enterprise, therefore, through comprehensive comparison The input indicators, such as current assets, proportion of employees with bachelor degree or above, employee satisfaction and telephone ownership rate per 100 people, are highly correlated with other indicators, so the indicators are further adjusted. Among the output indicators, the correlation is reasonable, the number is relatively simplified and all the indicators are concerned by enterprises, so no further adjustment will be made.

Table 1. Correlation coefficient of output index

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}
X_1	1.00	0.75	0.66	0.52	0.02	0.71	0.42	0.35	0.18	0.59	0.96
X_2	0.75	1.00	0.92	0.82	0.21	0.89	0.14	0.61	0.29	0.73	0.24
X_3	0.66	0.92	1.00	0.86	0.11	0.88	0.42	0.11	0.40	0.19	0.13
X_4	0.52	0.82	0.86	1.00	0.24	0.90	0.45	0.06	0.55	0.77	0.49
X_5	0.02	0.21	0.11	0.24	1.00	0.23	0.76	0.04	0.56	0.40	0.85
X_6	0.71	0.89	0.88	0.90	0.23	1.00	0.30	0.58	0.90	0.69	0.84

X_7	0.76	0.86	0.86	0.87	0.19	0.94	0.50	0.63	0.01	0.70	0.30
X_8	0.83	0.87	0.87	0.75	-0.06	0.85	0.10	0.21	0.817	0.832	0.998
X_9	0.99	0.75	0.65	0.51	0.02	0.70	0.19	0.12	0.37	0.51	0.86
X_{10}	0.79	0.94	0.89	0.8	0.23	0.93	0.23	0.6	0.70	0.74	0.23
X_{11}	0.72	0.90	0.88	0.8	0.19	0.98	0.28	0.9	0.79	0.20	0.34

Input indexes include the proportion of total assets and information-based investment in fixed assets, which have comprehensively represented the overall situation of enterprise assets and information-based asset investment. On the other hand, current assets mostly refer to monetary capital. Short-term investment, accounts receivable, etc., reflect the overall asset flow of the enterprise, which is slightly related to the informatization of the paper, so this variable is deleted. Bachelor degree or above in proportion to the employee on behalf of the enterprise of high-quality staff, from a certain level to reflect the enterprise's technical level and technology level, but because of the limitation of professional on degree alone cannot reflect the relationship with the informatization, and set up the information in the input index proportion of professionals, the informationization training worker proportion, so delete the variable; For today's companies, the telephone has become a necessity, and the number of computers per 100 people has been set in the index of informatization research in this paper, which is closer to the need, so this variable is deleted.

After the adjustment, the input index of stay is total assets (X1), information technology investment accounted for the proportion of fixed assets (X2), the proportion of information technology professionals (X3), attaches great importance to the degree of informatization (X4), : the proportion of senior leaders to use office automation), the production process automation control (X5), degree of office automation applications (X6: Computer ownership per 100 people), e-commerce utilization rate (X7,), proportion of employees trained in information technology (X8), The output indexes are net profit margin (Y1), market share (Y2), average financial settlement time (Y3), inventory turnover days (YO), product lead time (Y5), new product development cycle ((6), customer tracking ability of information system (Y7).

Because there are both forward and backward indexes in the above indexes, the inverse indexes can be treated by the formula without polarization.

$$X_{ij} = \frac{\min xj}{xij} \tag{3}$$

Where, min (xj) is the minimum value of evaluation unit of each indicator species in the original data set.

3.3. Sample data source

The sample enterprises selected in this paper are all listed companies, and their financial data mainly come from the annual reports of each company, data sources include: Juchao Information Network, Shanghai Stock Exchange website, Shenzhen Stock Exchange website, annual reports disclosed by Securities Com, duPont analysis table data, etc. Non financial data is divided into quantitative and qualitative data and quantitative data, including market share, number of employees, etc., these are available in China's auto statistical yearbook, China automotive statistical yearbook and China association of automobile manufacturers access to statistics and qualitative data only leadership attaches great importance to the degree of this measure, the partial data has been treated with similar nature of the quantitative indicators available data generation On behalf of. In order to

understand the situation of automobile enterprise informatization, this paper also collects some questionnaires. Of course, some questions in the questionnaire also cover quantitative data in financial data and non-financial data, which can be used as data supplement and accuracy verification of the questionnaire. The questionnaire and sample data are in the appendix.

4. Sample empirical analysis

As of 2009, there are more than 130 automobile manufacturers in China, including more than 50 listed companies. This paper selects 23 listed companies to form empirical samples through the principle of random sampling. The empirical research period is from 2008 to 2009, and the original index data of the samples are shown in the appendix. When DEA method is used, the number of decision units is required to be more than twice the number of indicators. Eight input indicators and seven output indicators are selected in this paper, and two years' data of 23 automobile manufacturing enterprises are selected, with a total of 46 decision units, which meet the requirements of DEA.

4.1. Data processing and result analysis

Since DEA requires a positive number for input and output data, negative numbers are replaced by 0.001 in the actual operation process, and data are brought into two DEA model software for processing respectively. The results of DEA management effectiveness evaluation are shown in the following tableII.

Benefit generally high value (greater than 0.7), in 2008 ~ 2009), the car company subjective effort degree is higher, the reason is known, the financial crisis in 2008, the car companies have different degrees of affected, in order to get rid of the influence of the economic downturn, the company's managers to react to, showed a higher relative benefit. The CRS2 model was processed by DEAP2.1 software. Among them, the results of C2RS2 models of automobile enterprises in 2008 are shown below Table III, Table IV and Table V.

Table 2. Results of management effectiveness of 23 listed automobile manufacturing enterprises

Name of the entity	Reference index	Current index	Leading edge index	Quadratic relative benefit	ranking
Jiangling motors	0.744	0.625	0.611	0.835	1
Faw car	0.798	0.707	0.434	0.259	5
The hippocampus shares	0.938	0.459	0.675	0.530	3
Changan automobile	0.012	0.828	0.821	0.734	4
Aerospace avionics	0.430	0.240	0.739	0.535	23
Nk bus	0.590	0.630	0.757	0.042	2
Jianghuai auto	0.877	0.767	0.324	0.008	10
Faw xiali	0.497	0.146	0.307	0.692	9
The northern shares	0.298	0.222	0.819	0.886	16
sinotruk	0.605	0.126	0.550	0.136	15
Zhongtong coach	0.628	0.275	1.000	0.937	17
Dongfeng	0.172	0.260	0.960	0.511	6

motor					
Yutong bus	0.881	0.828	0.997	0.180	14
Shanghai automotive	0.646	0.076	0.783	0.279	11
Dongan power	0.901	0.326	0.753	0.420	13
Mr Fukuda car	0.024	0.568	0.006	0.758	18
Yaxing coach	0.330	0.409	0.313	0.532	12
Dawn shares	0.531	0.047	0.195	0.441	19
Jinbei automobile	0.085	0.856	0.961	0.267	20
Star horse car	0.493	0.280	0.739	0.273	7
Jinlong bus	0.283	0.676	0.257	0.098	21
Yueda investment	0.680	0.906	0.313	0.148	8
Gac changfeng	0.427	0.736	0.671	0.851	22

Table 3. Evaluate the efficiency value of the object

Firm	Crstc	Vrste	Scale
1	0.218	0.340	0.826
2	0.392	0.603	0.595
3	0.379	0.434	0.241
4	0.434	0.651	0.064
5	0.840	0.391	0.072
6	0.263	0.135	0.290
7	0.074	0.918	0.745
8	0.205	0.344	0.284
9	0.257	0.961	0.451
10	0.602	0.230	0.436
11	0.181	0.171	0.084
12	0.551	0.270	0.703
13	0.759	0.765	0.567
14	0.528	0.443	0.118
15	0.669	0.873	0.959
16	0.141	0.361	0.218
17	0.797	0.136	0.867
18	0.828	0.841	0.357
19	0.129	0.375	0.431
20	0.236	0.467	0.882
21	0.202	0.740	0.369
22	0.303	0.827	0.017
23	0.777	0.076	0.689
Mean	0.951	0.447	0.007

Table 4. The target value of output indicators

	Index 1	Index 2	Index 3	Index 4	Index 5	Index 6	Index 7
1	0.319	0.594	0.602	0.230	0.436	0.915	0.587
2	0.267	0.029	0.181	0.171	0.084	0.528	0.647
3	0.047	0.066	0.551	0.270	0.703	0.800	0.324
4	0.365	0.902	0.759	0.765	0.567	0.542	0.467
5	0.136	0.016	0.528	0.443	0.118	0.025	0.443
6	0.425	0.719	0.669	0.873	0.959	0.543	0.954
7	0.635	0.130	0.141	0.361	0.218	0.770	0.221
8	0.437	0.841	0.797	0.136	0.867	0.803	0.980
9	0.907	0.575	0.828	0.841	0.357	0.031	0.191
10	0.047	0.704	0.129	0.375	0.431	0.297	0.867
11	0.125	0.346	0.236	0.467	0.882	0.372	0.019
12	0.571	0.067	0.202	0.740	0.369	0.040	0.984
13	0.874	0.857	0.303	0.827	0.017	0.614	0.465
14	0.695	0.850	0.777	0.076	0.689	0.583	0.409
15	0.118	0.707	0.951	0.447	0.007	0.494	0.082
16	0.688	0.824	0.746	0.277	0.435	0.286	0.517
17	0.192	0.404	0.810	0.899	0.914	0.924	0.536
18	0.928	0.526	0.900	0.438	0.851	0.018	0.332
19	0.290	0.377	0.750	0.553	0.396	0.560	0.142
20	0.613	0.544	0.878	0.635	0.174	0.367	0.131
21	0.287	0.518	0.209	0.674	0.094	0.604	0.610
22	0.320	0.893	0.850	0.400	0.624	0.421	0.852
23	0.768	0.407	0.654	0.693	0.918	0.674	0.244

Table 5. Enter the target value of the indicator

	Index 1	Index 2	Index 3	Index 4	Index 5	Index 6	Index 7	Index8
1	0.251	0.727	0.993	0.477	0.585	0.865	0.862	0.900
2	0.945	0.863	0.938	0.044	0.767	0.889	0.906	0.434
3	0.174	0.156	0.170	0.370	0.187	0.551	0.306	0.107
4	0.930	0.240	0.114	0.677	0.152	0.570	0.270	0.361
5	0.787	0.678	0.062	0.703	0.004	0.126	0.091	0.468
6	0.609	0.450	0.436	0.783	0.837	0.868	0.240	0.088
7	0.256	0.735	0.943	0.539	0.123	0.681	0.316	0.254
8	0.320	0.827	0.031	0.034	0.312	0.715	0.006	0.512
9	0.537	0.358	0.982	0.793	0.986	0.012	0.159	0.413
10	0.853	0.100	0.124	0.472	0.523	0.512	0.331	0.378
11	0.395	0.838	0.975	0.730	0.754	0.963	0.556	0.436
12	0.913	0.710	0.890	0.494	0.172	0.400	0.236	0.735
13	0.519	0.037	0.478	0.467	0.185	0.626	0.063	0.321
14	0.490	0.977	0.178	0.065	0.022	0.546	0.542	0.095
15	0.299	0.382	0.882	0.497	0.725	0.067	0.716	0.972
16	0.441	0.907	0.465	0.729	0.211	0.178	0.818	0.418
17	0.347	0.985	0.909	0.647	0.340	0.729	0.087	0.140
18	0.302	0.297	0.797	0.954	0.695	0.778	0.279	0.029
19	0.430	0.751	0.691	0.689	0.165	0.054	0.763	0.019

20	0.012	0.955	0.083	0.452	0.708	0.474	0.214	0.458
21	0.542	0.913	0.814	0.189	0.960	0.061	0.709	0.841
22	0.840	0.778	0.193	0.870	0.736	0.961	0.775	0.503
23	0.276	0.358	0.052	0.216	0.289	0.954	0.077	0.533

Automobile manufacturing companies in 2020 compared with 2021 performance is balanced, that everyone has to realize the importance of informationization to the automobile manufacturing enterprise, are conscious in enterprise production and management of each link increased investment in information technology and it is in a relatively stable, it also suggests that, compared with other industry, automobile manufacturing industry informatization construction is relatively mature and stable, The longitudinal changes between new years are not great. Financial: the timeliness and accuracy of financial data are stable and the index value is high. Data changes are carried out through the system. Internal operation: informatization has combed the business well, the application degree of office automation and the automation degree of the production process are higher, the logicality of the process has been improved, and the business management is more refined. In terms of enterprise development, it is more reflected in the strong support for the development strategy of the enterprise, and the effective management and control of business and the continuous expansion of the market through integration and integration.

Through the horizontal comparison of the same year, it can be found that there is still a big gap between enterprises in the automotive industry. DFAP2.1 software gives relatively effective decision units in 23 companies. Meanwhile, for non-effective companies, input and output values can be adjusted to make them effective. For example, the model result of foton automobile is the first sample in 2020 , as shown in Table VI.

Table 6. Input-output analysis of a single evaluation object

Results Variable	Original value	Radial movement	Slack movement	Project value
Output1	0.786	0.204	0.943	0.078
Output2	0.196	0.052	0.705	0.763
Output3	0.389	0.869	0.763	0.464
Output4	0.167	0.527	0.300	0.356
Output5	0.693	0.989	0.241	0.721
Output6	0.266	0.831	0.254	0.911
Output7	0.772	0.944	0.111	0.953
Input1	0.095	0.293	0.592	0.987
Input2	0.569	0.238	0.063	0.938
Input3	0.731	0.463	0.278	0.060
Input4	0.025	0.553	0.218	0.747
Input5	0.442	0.195	0.209	0.730
Input6	0.030	0.130	0.298	0.307
Input7	0.196	0.273	0.900	0.054
Input8	0.764	0.512	0.119	0.783

It may be because of the small scale of the enterprise, which makes the informatization investment appear more, but if the enterprise wants long-term development, the informatization investment cannot be reduced: The redundancy of the third input should be 0.581 +1.013=1.594, the redundancy of the fourth input factor should be 5.887+1.466=7.353, the redundancy of the fifth input factor should be 5.66, the redundancy of the sixth input factor should be 2.77+5.555=7.325. The seventh input factor has input redundancy of 3.444+2.833=6.277, and the eighth input factor has input redundancy of 0.901 10 1.933=2.834. This means that according to the current output of information professionals, there is l594% redundancy, and the value of information has 7.353% redundancy. The redundancy of

office automation application degree is 5·6, the redundancy of production process automation control rate is 8.325‰, the redundancy of e-commerce utilization rate is 6.277%, and the redundancy of employees trained by information technology is 2.834%. The redundancy data of these indicators does not simply tell the enterprise that more people are invested in these aspects and should be reduced. That means some resources into utilization has not been fully play, at the same time, some index proves that informatization benefit people hysteresis characteristics, especially the proportion of the similar information professionals and the informationization training worker proportion these items, can't be staff training effect immediately after the show, this is a process of absorbing, What the model reflects is that there is input redundancy according to the current output. This part of redundancy is not really redundant, but the input of informatization to the future output. According to the results of the model and the actual situation of the enterprise, the enterprise decides which inputs are unnecessary inputs to reduce, and which are inputs for future output, but are not reflected through output now. Every enterprise (decision making unit) can conduct input-output analysis based on the results of model data, so as to find its own shortcomings and clarify the direction and goal of improvement. Every enterprise (decision making unit) can conduct input-output analysis based on the results of model data, so as to find its own shortcomings and clarify the direction and goal of improvement.

4.2. Analysis of Typical Enterprises

Anhui jianghuai automobile group co., LTD., using informationization booster management to keep pace with The Times, innovation in obtained prominent achievements, jianghuai automobile since the 1990 s used to open the administrative affairs, office automation system, open a journey of informatization construction, the enterprises try to application with MRPII system as the core of information resources, And innovative use of "two-way displacement" way, achieved remarkable results. The so-called "two-way displacement" means selective treatment, understanding and accepting advanced management concepts, simplifying and adapting some management structure frameworks in the software, and making appropriate "negative displacement" downward. At the same time, analyzing the current situation of the enterprise and making overall adjustment in accordance with the technical requirements of the management software. It includes sorting out and restructuring business flow, information flow, capital flow and logistics, and making the level of control upward "forward displacement". The concept of "two-way displacement" enables JAC Automobile Group to successfully complete the information reform and boost the enterprise to continue to grow in the fierce market competition. The idea of "two-way displacement" enables JAC Automobile Group to successfully introduce and implement MRPII when the management foundation is not perfect, which improves the management level of the company. After the success of MRPII, JAC Automobile also puts forward the idea of positive improvement when implementing ERP, combing the business process according to the requirements of ERP. The key is to manage the level of positive displacement. In 2002, with the support of provincial information engineering, JAC carried out cutting-edge ERP information construction. On the one hand, it introduced comprehensive enterprise information solutions, including manufacturing management, accounting, procurement management, warehouse management, trade and after-sales service management, quality control and human resources management and other major functional modules. · In this solution, it also includes customer relationship management software, whose functions in product configuration, marketing and sales management can be used as an effective tool to assist the work of distribution channels and sales teams. With the assistance of the information resource system, enterprises continue to implement management and control innovation, which systematically promotes the overall progress of enterprises and makes rapid progress in the development of enterprises.

5. Conclusion

This paper is the core part of the whole paper. It mainly conducts empirical analysis on the relevant data of 23 automobile companies in 2020 and 2021. The empirical analysis is divided into two stages. Then, the C'RS model of DEA is used to analyze the informatization performance of automobile manufacturing enterprises, find out the effective and invalid values of DEA, and analyze the model results of several typical enterprises in detail through horizontal and vertical comparison.

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