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# Differences in Financial Indicators in the Pharmaceutical Industry ——Wise Healthcare Enterprises VS Traditional Healthcare Enterprises

**Yu Jia[a] and Yuanyuan Zhang[b]**

*School of Management, Shanghai University, Shanghai, China*
*[a]2640897255@qq.com, [b]2903181107@qq.com*

***ABSTRACT.*** *Wise Information Technology of 120 is one of the key measures to promote the reform of medical system. It plays an important role in improving medical efficiency and the allocation of medical resources. Through the analysis of the traditional financial indicators and the new constructed financial indicators of the wise healthcare enterprises and traditional healthcare enterprises, we find that the wise healthcare enterprises are superior to the traditional healthcare enterprises in terms of profitability, operation ability and debt paying ability. At the same time, the research and development ability of the wise healthcare enterprises is obviously higher than that of traditional healthcare enterprises, which also shows that the Wise Information Technology of 120 is the future medical development trends. In addition, by using SPSS software for discriminant analysis, the discriminant model of wise healthcare enterprises and traditional healthcare enterprises is obtained. It is found that the use of "traditional financial indicators + new constructed financial indicators" in discriminant analysis can improve the discriminant accuracy.*

***KEYWORDS:*** *Pharmaceutical Industry, Healthcare Enterprises, Financial Indicators*

## 1. Introduction

Wise Information Technology of 120 is an innovation of the traditional healthcare service mode. Through the design of wise healthcare service, it provides users with online medical treatment, appointment booking, electronic medical record, post-diagnosis tracking and other medical services, spanning the geographical space and time interval, allowing patients to seek medical treatment without limitation of time and place, and reasonably allocating medical resources. With the increasing pursuit of health services, users' demand for medical treatment is not only for treatment, but also for disease prevention. Some Internet medical service products emerge at the right moment, such as spring rain Doctor, Clove Doctor, We Doctor

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Network, Good Doctor Online and so on. Good Doctor Online is an internet medical platform that provides users with services such as registration, online consultation, online drug purchase and online consultation. Patients can communicate with famous doctors face to face through Good Doctor Online. Clove Doctor mainly focuses on providing medical health content and medical health services for users. Clove Doctor provides users with professional medical popular science articles and correct references for medical treatment and medication, and provides professional and intimate offline clinic services.

In recent years, as an important part of Wise Information Technology of 120, China's medical informatization industry has shown rapid growth with an annual growth rate of more than 15%. In 2016, the informatization market size of the medical and health industry reached 33.38 billion RMB with an increase of 10.38% over 2015, which showed a high-speed growth trend. In 2017, China's medical informatization market reached 37.52 billion RMB. The main impetus for the rapid development of medical informatization comes from two aspects. On the one hand, with the introduction of a number of medical informatization policies and the deepening of medical reform, the aging problem has been concerned, promoting the concept of medical management from "treatment-centered" to "patient-centered" transition, so the construction of medical informatization has put forward higher requirements. On the other hand, Big data, mobile Internet and other new information technologies also objectively provides richer possibilities for their deeper application. Therefore, starting from the financial indicators, this paper analyzes the differences between the financial indicators of wise healthcare enterprises and traditional healthcare enterprises to show the financial indicators of wise healthcare enterprises are better than traditional healthcare enterprises and points out that wise healthcare enterprises are the future development direction of China's medical industry, which will accelerate the transformation of traditional healthcare enterprises into wise healthcare enterprises.

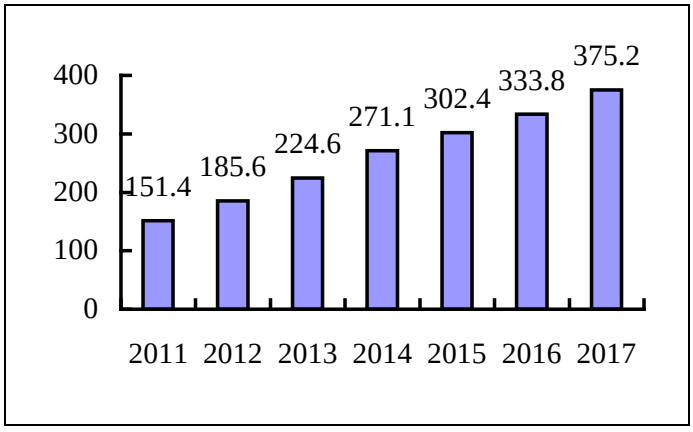


*Figure. 1 Medical informatization market size from 2011 to 2017*

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## 2. China's medical industry development status and existing problems

At present, the overall situation of the domestic medical industry is low efficiency of the medical system, poor quality of medical service, severe situation of poor access to medical services, and serious problems such as the use of medicine to support medical services, excessive medical services, poverty caused by illness, and medical trouble. It mainly reflects the following five aspects. Firstly, drug rebates and over-treatment are frequent. Secondly, the distribution of medical resources is uneven and the layout is unreasonable. Hospitals are classified but patients are not classified, 80% of medical resources are concentrated in big cities, and the insufficient source of disease in grass-roots hospitals makes it difficult for ordinary people to see a doctor. At the same time, large hospitals are overcrowded and their superior resources are not fully utilized. Thirdly, referral system is not effectively implemented and repeated medical treatment is required. Fourthly, the level of medical insurance is low, the fairness is poor, and the management system is not perfect and medical insurance is not fully utilized. Funds are badly wasted. The proportion of people without medical insurance in the countryside is high, and some of the rural patients are more dissatisfied with the society because of poverty caused by illness. Fifthly, inadequate supervision of medical services has resulted in rampant illegal medical practice, the spread of medical corruption, frequent medical accidents, medical disturbances and killings. Some medical institutions have irregularities, and the rights and interests of patients have been infringed and there is no place to complain.

China's medical informationization is still in the initial stage of development, mainly around the business management system, electronic medical record system and clinical application system to do some exploratory work and has not yet established a real sense of the clinical application system CPOE. At present, our country is in the preliminary exploratory stage in the field of Wise Information Technology of 120 mainly including drug management, medical related devices, telemedicine and telemedicine of medical education. On the other hand, there are also two pressures in the management of medical data. Firstly, data decentralization is difficult to manage in a unified way. It mainly refers to the problem that the data of patients' multiple medical visits and different medical business systems cannot be effectively integrated. Secondly, there is an urgent need for massive medical data storage. However, with the increasingly severe aging situation, the rising medical costs, the continuous issuance of health care reform policies and the development of Big data and other related information technology, the development of Wise Information Technology of 120 is also facing the opportunities.

## 3. Analysis of wise healthcare enterprises and traditional healthcare enterprises

### *3.1 Financial analysis*

This paper chooses financial data of 30 wise healthcare enterprises and traditional healthcare enterprises from 2013 to 2017 to analyze the difference of

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financial indicators between wise healthcare enterprises and traditional healthcare enterprises. Data comes from the Wind database. The selected sample companies are shown in Table 1 below.

*Table 1 Selected wise healthcare enterprises and traditional healthcare enterprises sample*

| Wise healthcare enterprises | | Traditional healthcare enterprises | |
|---|---|---|---|
| Code | Name | Code | Name |
| 002223.SZ | Jiangsu Yuyue Medical Equipment & Supply Co., Ltd. | 000150.SZ | Yihua Healthcare Co.,Ltd. |
| 300030.SZ | Guangzhou Improve Medical Instruments Co.,Ltd. | 000788.SZ | PKU HealthCare Corp., Ltd. |
| 002390.SZ | Guizhou Xinbang Pharmaceutical Co.,Ltd | 000919.SZ | Jinling Pharmaceutical Company Limited |
| 600055.SH | Beijing Wandong Medical Technology Co., Ltd. | 002172.SZ | Jiangsu Aoyang Health Industry Co.ltd. |
| 600763.SH | Top Choice Medical Investment Co.,Inc. | 002173.SZ | Innovative Medical Management Co.,Ltd. |
| 002044.SZ | Meinian Onehealth Healthcare Holdings Co., Ltd. | 002219.SZ | Hengkang Medical Group Co.,Ltd. |
| 300206.SZ | Edan Instruments, Inc. | 300015.SZ | Aier Eye Hospital Group Co.,Ltd |
| 600518.SH | Kangmei Pharmaceutical Co.,Ltd | 300086.SZ | Honz Pharmaceutical Co., Ltd. |
| 002432.SZ | Andon Health Co.,Ltd. | 300143.SZ | Starmap medicine & technology Co.,Ltd. |
| 300273.SZ | Zhuhai Hokai Medical Instruments Co., Ltd. | 600079.SH | Humanwell Healthcare (Group) Co.,Ltd. |
| 000566.SZ | Hainan Haiyao Co.,Ltd. | 600196.SH | Shanghai Fosun Pharmaceutical (Group) Co., Ltd. |
| 002424.SZ | Guizhou Bailing Group Pharmaceutical Co.,Ltd. | 600332.SH | Guangzhou Baiyunshan Pharmaceutical Holdings Company Limited |
| 300049.SZ | Inner Mongolia Furui Medical Science Co., Ltd | 600351.SH | Yabao Pharmaceutical Group Co.,Ltd |
| 300244.SZ | Dian Diagnostics Group Co.,Ltd. | 600594.SH | Guizhou Yibai Pharmaceutical Co.,Ltd |
| 300246.SZ | Guangdong Biolight Meditech Co., Ltd. | 600993.SH | Mayinglong Pharmaceutical Group Co.,Ltd |

The financial analysis of traditional indicators mainly analyzes the profitability, operating capacity, debt paying ability and growth ability of enterprises. Based on this, this paper also selects some traditional financial indicators to analyze wise healthcare enterprises and traditional healthcare enterprises. In addition, Wise Information Technology of 120 as emerging wise healthcare service system compares with the traditional healthcare enterprises, the wise healthcare enterprises pay more attention to research and development, innovation, so on the characteristics of the wise healthcare enterprises and traditional healthcare

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enterprises to build three new financial indicators: human return on investment, the ratio of research and development expending and operating income and the proportion of R&D personnel. The selected financial indicators are as follows.

*Table 2 Selected financial indicators*

| Variable | Financial Indicators | Design Formulas | Variable Symbol |
|---|---|---|---|
| Traditional financial indicators | | | |
| Asset structure | Asset-liability ratio | Total liabilities/total assets | LEV |
| Profitability | Return on equity | Net profit/average of equity | ROE |
| | Gross profit margin | Gross profit/operating income | GM |
| Debt-paying capability | Current ratio | Current assets/current liabilities | CR |
| Operational capability | Total asset turnover | Sales revenue/average of assets | TAT |
| Growth capacity | Earnings per share | The current net profit attributable to common shareholders/the weighted average of the outstanding common shares of the current period | EPS |
| New constructed financial indicators | | | |
| R&D capabilities | Research and development expenditure | Research and development expenditure /operating income | RDS |
| | the proportion of R&D personnel | Total number of staff/R&D staff | RDR |
| Profitability | Rate of return on investment per capita | Earnings before interest and taxes/ gross compensation | ROP |

*Table 3 Descriptive statistical results*

| Variable | Type | Obs | Mean | Std.Dev. | Min | Max |
|---|---|---|---|---|---|---|
| LEV | Traditional healthcare enterprise | 75 | 39.49533 | 18.9057 | 4.9547 | 75.428 |
| | Wise healthcare enterprise | 75 | 33.28303 | 13.66505 | 7.2765 | 60.1226 |
| GM | Traditional healthcare enterprise | 75 | 39.07 | 17.25977 | 7.3044 | 82.16 |
| | Wise healthcare enterprise | 75 | 43.26292 | 13.39059 | 17.7193 | 74.2486 |
| ROE | Traditional healthcare enterprise | 75 | 8.368456 | 12.60025 | -64.7315 | 36.3519 |
| | Wise healthcare enterprise | 75 | 9.568044 | 7.939464 | -22.046 | 26.5184 |
| CR | Traditional healthcare enterprise | 75 | 2.307699 | 2.390428 | 0.3813 | 14.6546 |
| | Wise healthcare enterprise | 75 | 3.091437 | 2.31769 | 1.0028 | 16.5412 |
| TAT | Traditional healthcare enterprise | 75 | 0.619672 | 0.366801 | 0.0601 | 1.9052 |
| | Wise healthcare enterprise | 75 | 0.578021 | 0.246627 | 0.1811 | 1.3906 |
| EPS | Traditional healthcare enterprise | 75 | 0.398971 | 0.526349 | -1.99 | 1.6623 |
| | Wise healthcare enterprise | 75 | 0.327301 | 0.27145 | -0.41 | 1.04 |
| ROP | Traditional healthcare enterprise | 75 | 121.7822 | 191.0359 | -359.635 | 1269.548 |
| | Wise healthcare enterprise | 75 | 139.2403 | 183.5808 | -85.8536 | 857.8372 |
| RDS | Traditional healthcare enterprise | 75 | 2.708689 | 2.241177 | 0.05 | 8.3 |
| | Wise healthcare enterprise | 75 | 6.480597 | 6.618915 | 0.06 | 27.58 |
| RDR | Traditional healthcare enterprise | 75 | 7.64 | 7.406233 | 0.1 | 22.91 |
| | Wise healthcare enterprise | 75 | 15.55688 | 11.77485 | 0.1 | 35.76 |

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Stata software was used to collate and process the data of financial indicators related to wise healthcare enterprises and traditional healthcare enterprises from 2013 to 2017, and the descriptive statistical results are as follows.

From the above descriptive statistical results, we can draw the following conclusions.

(1) Profitability. The return on net assets reflects the return on investment of the owner's rights and interests of enterprises. The mean ROE of wise healthcare enterprise is 9.57%, higher than the mean ROE of traditional healthcare enterprises, which indicates that the profitability of wise healthcare enterprise is higher than traditional healthcare enterprises. The gross profit margin is an important operating index of listed companies, which can reflect the competitiveness and profit potential of the company's products. The average gross profit margin of wise healthcare enterprises is 43.26%, which is higher than the average gross profit margin of traditional medical enterprises which is 39.07%, it shows that the products of wise healthcare enterprises have more competitiveness and profit potential. The return rate of human resource investment is the profit return rate of human resource investment, which reflects the difference between enterprise value and employee value. The return rate of human resource investment of wise healthcare enterprises is 139.24%, which is significantly higher than that of traditional healthcare enterprises 121.78%, which indicates that the quality of human resource of wise healthcare enterprises is higher than traditional healthcare enterprises.

(2) Debt-paying capability. The higher the liquidity ratio, the better the short-term solvency of enterprises. The mean liquidity ratio of wise healthcare enterprises is 3.09% is higher than traditional healthcare enterprises'. It shows that the short-term solvency of wise healthcare enterprises is generally greater than traditional healthcare enterprises. The asset-liability ratio reflects the long-term solvency of enterprises. The smaller the ratio of assets to liabilities, the better the long-term solvency of enterprises. The mean ratio of assets to liabilities of wise healthcare enterprises is 33.28%, which is less than 39.50% of the mean ratio of assets to liabilities of traditional healthcare enterprises. This shows that the long-term solvency of wise healthcare enterprises is generally stronger than that of traditional healthcare enterprises.

(3) Growth capacity. Growth capacity refers to the potential ability of an enterprise to expand its scale and strength. From the descriptive statistical results, we can see that there is little difference between the mean EPS of wise healthcare enterprises and traditional healthcare enterprises. This shows that the development potential of traditional healthcare enterprises and wise healthcare enterprises is roughly the same at the present stage, but it also reflects that the transformation from traditional healthcare enterprises to wise healthcare enterprises has tremendous development potential. And our wise healthcare is still in its infancy, traditional healthcare enterprises should actively accelerate the transformation to intelligent medicine.

(4) Operating capacity. Total assets turnover rate is an important index to examine the efficiency of enterprise assets operation, which reflects the speed of all

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assets from input to output and the management quality and utilization efficiency of all assets. The higher the total assets turnover rate, the faster the speed of total assets turnover, the stronger the sales ability and the better the efficiency of assets investment. The mean of total assets turnover rate of wise healthcare enterprises is 0.58 less than that of traditional healthcare enterprises, which indicates that the total assets turnover rate of wise healthcare enterprises is less than that of traditional healthcare enterprises. Traditional healthcare enterprises have perfect production and marketing modes and channels. Compared with traditional healthcare enterprises, wise healthcare enterprises are still in the primary stage of exploration, and the production and marketing modes of products are also in progress. At the exploratory stage, the turnover rate of assets is lower than that of traditional healthcare enterprises.

(5) R&D capability. Enterprise R&D activities are a process of integration of scientific and technological innovation and economic benefits. The ultimate goal of R&D activities is to commercialize knowledge, technology and products and bring new profit growth points to enterprises. The R&D investment of wise healthcare enterprises is obviously higher than that of traditional healthcare enterprises. The mean of RDS of wise healthcare enterprises is 6.48%, the mean of RDS of traditional healthcare enterprises is 2.70%. The mean RDR of wise healthcare enterprises is 15.55%, while the mean RDR of traditional healthcare enterprises is only 7.64%. The RDR of wise healthcare enterprises is nearly twice that of traditional medical enterprises, which indicates that compared with traditional healthcare enterprises, wise healthcare enterprises pay more attention to R&D investment and innovation.

### *3.2 Discriminant Analysis*

This paper adopts Fisher discriminant analysis and uses SPSS software for data processing. Fisher discriminant analysis is a discriminant analysis method based on the principle of variance analysis. There are N samples, each sample has M indexes, and it is known that each sample belongs to K categories G1, G2...By looking for a point $x=(x1, x2..., xm)^T$ is reduced to a one-dimensional function $y(x)=\sum m_j C_j x_j$. Transform the space points belonging to known categories and unknown categories in the m-dimensional space into one-dimensional data, and their distribution functions are y1(x), y2(x)..., yk(x), so that the sample points belonging to different categories can be distinguished as far as possible, and then a new sample with M indexes can be tested, and the classification of this sample can be determined according to the density between the test sample and the known category.

Firstly, the traditional financial indicators are used for discriminant analysis, such as asset-liability ratio, gross profit rate, and return on equity, liquidity ratio, total asset turnover rate and basic earnings per share. Type = 1 is a wise healthcare enterprise and Type = 0 is a traditional healthcare enterprise. From the classification results, we can see that the correct rate is only 59.3% when only using traditional financial indicators for discriminant analysis.

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*Table 4 Classification result* [a]

| | | Type | Member of prediction group | | Total |
|---|---|---|---|---|---|
| | | | .0 | 1.0 | |
| Initial | Count | .0 | 38 | 37 | 75 |
| | | 1.0 | 24 | 51 | 75 |
| | % | .0 | 50.7 | 49.3 | 100.0 |
| | | 1.0 | 32.0 | 68.0 | 100.0 |

a.59.3% of the initial grouping cases has been correctly classified.

Next, using the "traditional financial indicators + new constructed financial indicators" of discriminant analysis, which uses LEV, GM, ROE, CR, TAT, EPS, ROP, RDS, RDR for discriminant analysis. Type=1 is a wise healthcare enterprise, and Type=0 is a traditional healthcare enterprise. From the classification results we can see that when using the "traditional financial indicators + new constructed financial indicators" for discriminant analysis, the accuracy is 81.3%. The discriminant analysis accuracy increased by 22% compared with only using traditional financial indicators for discriminant analysis. This shows that constructed new type of financial indicators ROP, RDS, RDR can be used for discriminant analysis between wise healthcare enterprise and traditional healthcare enterprises.

*Table 5 Classification result* [b]

| | | Type | Member of prediction group | | Total |
|---|---|---|---|---|---|
| | | | .0 | 1.0 | |
| Initial | Count | .0 | 12 | 4 | 16 |
| | | 1.0 | 2 | 14 | 16 |
| | % | .0 | 75.0 | 25.0 | 100.0 |
| | | 1.0 | 12.5 | 87.5 | 100.0 |

b.81.3% of the initial grouping cases has been correctly classified.

*Table 6 Coefficient of classification function*

| Financial Indicators | Type | |
|---|---|---|
| | .0 | 1.0 |
| GM | .532 | .475 |
| LEV | .644 | .685 |
| ROE | -1.218 | -.784 |
| TAT | 35.677 | 31.475 |
| EPS | 7.548 | 1.169 |
| CR | 5.193 | 5.737 |
| ROP | .021 | .027 |
| RDS | -.245 | .074 |
| RDR | .060 | .115 |
| (Constant) | -37.990 | -40.108 |

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Fisher discriminant function is as follows.

$$y_{Type=1} = 0.475GM + 0.685LEV - 0.784ROE + 31.3475TAT + 1.169EPS + 5.737CR + 0.027ROP + 0.074RDS + 0.115RDR - 40.108 \quad (1)$$

$$y_{Type=0} = 0.532GM + 0.644LEV - 1.218ROE + 35.677TAT + 7.548EPS + 5.193CR + 0.021ROP - 0.245RDS + 0.060RDR - 37.990 \quad (2)$$

## 4. Conclusion

Based on the analysis of financial data of wise healthcare enterprise and traditional healthcare enterprises from 2013 to 2017, this paper finds that in terms of profitability, operation ability and debt paying ability, wise healthcare enterprises are stronger than traditional healthcare enterprises. There are obvious differences between wise healthcare enterprise and traditional healthcare enterprises in R&D ability, and the R&D ability of wise healthcare enterprises is obviously higher than traditional healthcare enterprises. Wise Information Technology of 120 is the future trend of medical development, policy-driven and government investment will promote the medical industry to enter a period of vigorous development. Traditional healthcare enterprises should actively accelerate the transformation to wise healthcare enterprise.

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