

Investigation and Research on Intelligent Fitness Service Platform Promoting the Transformation of Traditional Fitness Enterprises

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Abstract

The COVID-19 epidemic has hit various industries in China in all aspects, and the negative effects are especially concentrated in offline traditional industries such as fitness industry. Under the shadow of economic downturn, the trend of "house economy" went against the trend and became a dawn in the dark. During the epidemic, countless fitness brands started a new fitness model through cooperation with the online market. Through the analysis of the development mode of online intelligent fitness platform, combined with the principal component analysis method, this paper will analyze the current business situation of traditional fitness industry in China, and explore the road of transformation of traditional fitness industry.

Keywords

Intelligent Fitness; "Home" Economy; Epidemic.

1. Development of Intelligent Fitness Service Platform

With the rise of e-commerce, the dividend of digital economy has benefited all walks of life. Since the Olympic Games, China's sports industry has been developing continuously. However, due to the weak awareness of fitness among Chinese residents and the low penetration rate of professional gymnasiums, the development of China's sports fitness industry has been in a downturn. Luck pointed out in the paper that, Although China has a large population base and a wide fitness market, the infrastructure and services of the domestic fitness industry can't meet the needs of the broad base. In 2015, there will be 1.2 million sports venues in China to meet the basic spiritual needs of the Chinese people. However, in fact, the per capita fitness area in China is far from the target [1]. However, since the epidemic, long-term home activities have opened a breakthrough for the depressed fitness industry. First of all, the popularity of fitness apps such as keep has passed on the concept of fitness anytime, anywhere to the vast number of users. From another angle, it has alleviated the shortage of fitness venues and equipment in China, and planted the seeds for the development of intelligent fitness. After the concept of fitness anytime and anywhere goes deep into the group of fitness users, how to make traditional fitness companies catch this ride and realize business transformation has become an urgent problem for traditional fitness companies.

This paper will discuss the development path of the current top-ranking fitness and sports companies through the analysis of the operating conditions of the fitness industry companies, which can be used as a reference for the transformation path.

2. Empirical Analysis

The sample mainly selects the A-share listed companies involved in fitness services in China. Select a total of 10 companies. The selected indicators are mainly return on assets, current ratio,

quick ratio, inventory turnover, current assets turnover, total assets turnover, non-current assets turnover, basic earnings per share, operating income, net profit, operating income per share and net assets per share. Sample data are as follows:

Table 1. Sample situation

Numble	Company	A Share Code
1	Rhine Sports Development Co., Ltd.	000558
2	China Sports Industry Group Co., Ltd	600158
3	Shenzhen Xinlong Health Industry Development Co., Ltd.	002105
4	Pathfinder Holding Group Co., Ltd.	300005
5	Rong Healthy Technology Co., Ltd	300247
6	Shenzhen Jiachuang Video Technology Co., Ltd.	300264
7	Shenzhen Lehman Optoelectronic Technology Co., Ltd.	300162
8	Beijing Sanfu Outdoor Products Co., Ltd.	002780
9	Qingdao Yingpaisi Healthy Technology Co., Ltd.	002899
10	Shu Hua Sports Company Limited	605299

2.1. Data Inspection

Before the principal component analysis, the reliability of the data is tested, and the results are as follows:

Table 2. Inspection of KMO and Bartlett

KMO Value		0.640
Bartlett Sphericity Test	Approximate chi-square	622.712
	df	55
	P value	0.000

As shown in the figure, the Cronbach value is $0.640 > 0.5$, which indicates that the template data is highly reliable and can be used for further principal component analysis.

2.2. Principal Component Extraction

Table 3. Variance Explanation Rate table

Numble	Characteristic root			Principal component extraction		
	Characteristic root	Variance explanation rate%	Cumulative%	Characteristic root	Variance explanation rate%	Cumulative%
1	5.874	48.950	48.950	5.874	48.950	48.950
2	2.496	20.802	69.752	2.496	20.802	69.752
3	1.676	13.965	83.718	1.676	13.965	83.718
4	1.055	8.796	92.513	1.055	8.796	92.513
5	0.608	5.063	97.577	-	-	-
6	0.167	1.394	98.970	-	-	-
7	0.094	0.780	99.750	-	-	-
8	0.024	0.196	99.946	-	-	-
9	0.006	0.054	100.000	-	-	-
10	0.000	0.000	100.000	-	-	-
11	-0.000	-0.000	100.000	-	-	-
12	-0.000	-0.000	100.000	-	-	-

According to the table of variance explanation rate, we can see that four principal components are extracted, the variance explanation rate of the four principal components is 48.950%,20.802%,13.965%,8.796%, and the cumulative variance explanation rate is 92.513%. The weighted variance explanation rate or weight corresponding to the four principal components is $48.950/92.513=52.91\%$; $20.802/92.513=22.49\%$; $13.965/92.513=15.10\%$; $8.796/92.513=9.51\%$; Explain that the four components can represent the overall data for analysis.

Table 4. Load Factor table

Name	Coefficient of Load				Common Degree (Common Factor Variance)
	Principal Component 1	Principal Component 2	Principal Component 3	Principal Component 4	
S_ rate of return on assets	0.762	-0.254	0.575	0.068	0.981
S_ current ratio	-0.294	0.855	0.311	0.253	0.979
S_ quick ratio	-0.286	0.846	0.342	0.266	0.984
S_ inventory turnover rate	0.852	0.135	-0.232	0.243	0.856
S_ turnover rate of current assets	0.827	-0.085	-0.404	0.234	0.909
S_ total assets turnover rate	0.873	0.079	-0.444	0.138	0.985
S_ turnover rate of non-current assets	0.658	0.636	-0.230	0.030	0.891
S_ basic earnings per share	0.735	-0.105	0.633	0.052	0.954
S_ operating income	0.712	0.067	0.065	0.325	0.621
S_ net profit	0.759	-0.406	0.477	-0.035	0.970
S_ operating income per share	0.830	0.303	-0.132	-0.444	0.995
S_ net assets per share	0.459	0.525	0.124	-0.690	0.978

From the table, we can see that the common values of all the items are higher than 0.4, which indicates that there is a strong correlation between the factors and principal components of all the studies. The coefficient values of inventory turnover rate, current assets turnover rate and total assets turnover rate in principal component 1 are higher than 0.7, indicating that they can represent principal component 1 as a whole. The flow ratio in that second component, The quick ratio coefficient is higher, which indicates that they can represent the principal component 2 as a whole. In principal component 3, the return on assets and basic earnings per share coefficient are higher, which indicates that they can represent principal component 3. The operating income per share and net assets per share in principal component 4 are higher, indicating that they can mainly represent principal component 4.

Next, the scores of each principal component are calculated by the calculated weights and the values of feature roots, and the comprehensive ranking is carried out:

Table 5. Comprehensive Ranking

Company	A Share Code	Aggregate Score	Composition4	Composition3	Composition2	Composition1
China Sports Industry Group Co., Ltd	600158	2.17	2.32	0.59	2.07	2.64
Pathfinder Holding Group Co., Ltd.	300005	0.44	-0.63	1.99	-3.31	1.78
Shenzhen Xinlong Health Industry Development Co., Ltd.	002105	0.36	-1.89	1.15	2.16	-0.23
Rhine Sports Development Co., Ltd.	000558	0.21	0.01	1.98	-1.10	0.30
Rong Healthy Technology Co., Ltd	300247	0.19	0.15	-4.18	0.57	1.28
Shenzhen Jiachuang Video Technology Co., Ltd.	300264	0.17	-0.19	0.86	-1.75	0.85
Shenzhen Lehman Optoelectronic Technology Co., Ltd.	300162	-0.31	0.96	-0.01	-0.33	-0.62
Beijing Sanfu Outdoor Products Co., Ltd.	002780	-0.48	-1.14	-1.49	-0.12	-0.23
Qingdao Yingpaisi Healthy Technology Co., Ltd.	002899	-1.27	0.54	-0.75	1.62	-2.98
Shu Hua Sports Company Limited	605299	-1.47	-0.14	-0.14	0.19	-2.79

As shown in the figure above, all enterprises mainly involved in the smart fitness industry are Pathfinder Group, Inpais Company, Xinlong Health Co., Ltd. and Rongjie Development Co., Ltd. These four companies are generally at the top of the overall ranking. It can be seen that the layout of intelligent fitness in traditional fitness industry has achieved initial results.

3. Suggestion Summary

Liu Yang pointed out in his paper that the current fitness market has put forward certain requirements for targeted guidance in fitness, entertainment in fitness process, perception and control of fitness steps. Traditional fitness equipment can no longer meet the development

needs of the current fitness market, and it is necessary to develop sensible, controllable and safe fitness equipment. And can also bring some entertainment to the fitness process. For example, Inpais Company has designed a smart runway fitness system in Changzhou, which sets colorful colors for the runway, and has the functions of healthy cloud platform and national physique monitoring, which is deeply connected with big data technology and brings a new service model to residents' fitness. Xinglong Health has also developed intelligent fitness equipment such as smart wheelchairs for the elderly. And the development of intelligent fitness equipment and platform will be the new development direction in the future. Pathfinder also invested in the intelligent interconnected fitness platform Guangpiguan this year, and each platform has launched 15 physical stores in various cities to promote the promotion of the intelligent fitness industry. We look forward to the future in-depth cooperation between traditional fitness companies and online cloud platforms to share databases and fitness systems. Create an online and offline integration model.

Zheng Fang pointed out in the paper that foreign intelligent sports platforms mainly include intelligent chat, intelligent customer demand monitoring, and professional sports. In addition, it also gathers scientific and technological equipment such as global navigation satellite system to obtain athletes' specific sports data and provide professional guidance for coaches. We use smart technology for civilian use in the fitness industry, mainly in wearable devices, VR fitness and other fitness products. Foreign intelligent fitness products mainly include video courses, intelligent hardware, such as virtual sports scenes, applications, smart leg straps and other fitness planning products, diet customization products and information aggregation products. At present, China's keep fitness platform also integrates some intelligent fitness functions, such as fitness planning, diet customization, video courses and so on. However, keep mainly serves the people who only have basic fitness knowledge, and its layout in the advanced fitness market is slightly deficient. Traditional fitness enterprises can promote their intelligent fitness equipment and equipment by cooperating with cloud fitness platforms such as keep. Establishing targeted and scientific fitness programs and guidance plans for keep users can not only strengthen the professionalism of keep platform, but also realize the realization of traffic flow, increase the income of fitness industry and promote the coordination and cooperation between online and offline fitness industry.

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References

- [1] Lucky: Research on the way to realize "internet plus Fitness" in China [D], Chengdu Institute of Physical Education, 2016.
- [2] Liu Yang: Research and application design of intelligent fitness equipment [D], University of Science and Technology of China, 2015.
- [3] Zheng Fang, Xu Weikang: Research on the rise, development and countermeasures of China's intelligent sports [J], Sports Science, 2019,39 (12): 14-24. DOI: 10.16469/J. CSS. 20209. 0000000 0005.