

The Impact of Digitalization on the Financial Performance of the Baijiu Industry: A Case Study of Wuliangye.

Lingtao He, Yi Hou

School of Management, Sichuan University of Science & Engineering, Zigong 64300, China

Abstract

With the development of information technology and the emergence of new digital technologies such as blockchain, cloud computing, and big data, digitalization has gradually been used by many modern enterprises to promote all-round development. Wuliangye, a leading enterprise in China's baijiu industry, is selected as the research object, and financial data from 2015 to 2024 are used to calculate composite scores for four dimensions under the entropy weight method: profitability, growth capability, solvency, and operating capability. Based on the above evaluation results, this paper will explore how digitalization has affected the financial situation of Wuliangye. Among the above results, profitability and growth potential have risen significantly, but solvency and operating capacity are still fluctuating.

Keywords

Digital Transformation; Wuliangye; Financial Performance; Entropy Weight Method.

1. Introduction

In the 2017 Government Work Report, after introducing the concept of the "digital economy," the CPC Central Committee and the State Council attached significant attention to the digital upgrading of Chinese enterprises and issued a number of important strategic arrangements. At the same time, the 14th Five-Year Plan and the Outline of the Long-Range Objectives Through the Year 2035 have clearly stated that China should actively embrace the digital era, further promote the strategy of building a strong cyber nation, accelerate the development of the digital economy, digital society, and digital government, and drive all-round changes in the mode of production, lifestyle, and governance through digital transformation. China is an industrial powerhouse and urgently needs to promote industrial upgrading through digitalization to build a high-quality development model. Given the reasons mentioned above, the liquor industry is a typical case of traditional manufacturing that has faced several problems, such as changing consumer demands, the rise of young consumers, and the digitalization of marketing channels [1]. Given the characteristics of the liquor industry, we need to be proactive in exploring a feasible path for digitalization and upgrading in response to changes in the market, and strengthen the competitiveness of the industry. Based on the above, this paper takes Wuliangye, a first-class liquor company, as the research object to examine the motives and progress of its digitalization, evaluate its overall performance with the Entropy method, and explore the effect of digitalization on Wuliangye's financial performance.

2. Overview of Wuliangye

2.1. Company Profile

Yibin Wuliangye Co., Ltd. (hereinafter referred to as "Wuliangye") began in 1998. It is a company in China's liquor industry engaged in research and development, production, sales, etc., of alcoholic beverages. It is also a leading company in the field at present. Yibin in Sichuan Province is a long-established city for brewing, and the company is based there. Wuliangye

liquor is a typical example of strong-aroma Baijiu and has long been well-known for this. Over the years, many products have been released under different brands, such as Wuliangye, Wuliangchun, Wuliangong, etc., catering to various consumer groups and market needs. In 2006, its traditional brewing methods were listed as national intangible cultural heritage items, and the company has also made contributions to Baijiu culture and technology.

Recently, the economy of China has entered a new stage of high-quality development, and at present, deep integration of the digital economy and the real economy is a necessary path for industrial upgrading [2]. As a representative of traditional manufacturing, Wuliangye has also been moving in this direction, making high-quality development its top priority, and fostering the development of a modern enterprise that is ecological, high-quality, cultural, digital, and transparent. Based on the above plan, Wuliangye officially began its all-encompassing digital transformation in 2018. According to the "1365" transformation plan, some measures have been taken at different levels of the company: building intelligent brewing workshops at the production stage, developing a data middle platform in management, and introducing online stores and product traceability tools at the marketing stage. Through the above measures, Wuliangye gradually changed its traditional management mode to a data-driven one. The above changes have given new energy to the development of the company and promoted the application of digital technology in product production, supply management, and market promotion, thus helping Wuliangye achieve its goal of becoming a first-class Baijiu enterprise in China.

2.2. Digital Transformation Process

Wuliangye has been advancing digitalization since the beginning of the 21st century. The above process is a gradual change from informatisation to digital transformation and can be divided into the following three stages.

2.2.1. Informationization Stage (2005-2015)

The first two goals of the standardisation of business processes and unified management of basic data at this time were to build a system and data foundation for further digital development. At the beginning of informatisation, Wuliangye only had a management-level business system. It introduced some general business management systems to digitise the traditional business process. The Core ERP System, system integration, and management platform were also listed as essential construction points in the informatisation plan. It helped establish a single-window platform for sharing business and management information and provided all-encompassing management and operational support for the company and its subsidiaries.

2.2.2. Launch Stage of Digital Transformation (2016-2018)

Recently, in accordance with the "Made in China 2025" policy in China, Wuliangye has begun introducing digital technology in its production and operation management since 2016. In 2018, the company officially began its digitalization and released the "1365 Digital Transformation Strategic Blueprint" to promote all-around reforms under the direction of digitalization. Wuliangye also switched from informatisation upgrading to systematic digitalization at this time. According to the new plan, digitalization has been promoted throughout the entire company, covering management, production, and marketing. The company promoted the development of information systems and optimised business processes in its marketing and management activities. Therefore, the above measures will improve coordination among sales activities and the internal management system, and strengthen the digital integration of these business processes. At the same time, Wuliangye has also been expanding its product anti-counterfeiting and traceability system. The company has explored applying new-generation technologies such as blockchain to enhance product traceability and management transparency in the supply chain, and at the same time, a Big Data Center for China's Liquor Industry was

officially established in the same year. Collect, integrate, and analyse industry data to provide data support for monitoring the state of the industry and supporting enterprises in production and operation.

2.2.3. Comprehensive Advancement Stage (2019-Present)

At this time, Wuliangye's digitalization work had begun to shift from building individual systems to integrating the whole-chain development of businesses. In 2019, the company established a coalition with Alibaba, Huawei, and other digital technology enterprises to promote joint digital marketing, channel cooperation, and retail data management, and provided a foundation for the next round of development in digital technology. In terms of production and quality management, Wuliangye launched an all-process product traceability project in 2020. Raw material procurement, warehousing and processing, production and terminal circulation, etc., of the project were all added to a single data-tracking system. Therefore, the quality management process is relatively clear and open to some extent, and the coverage of production supervision and quality supervision has been expanded.

Wuliangye also promoted the digital transformation of its sales channels at the same time. With the development of the online management system and the pilot operation of the smart store, the company gradually introduced digital platforms for its traditional sales process. Improved channel management has enhanced the company's understanding of end-users, and with the development of internal digitalization, Wuliangye has also begun to use digital technology in energy management and environmental governance. A Data Monitoring System for Energy Consumption and Emissions has been established at the company to reduce both energy consumption and emissions, thereby advancing green manufacturing. At the same time, it has expanded the digital system of the supply chain to share data and coordinate upstream suppliers and downstream dealers more efficiently.

3. Impact of Digital Transformation on Corporate Financial Performance

Wuliangye published its plan for digital construction in 2018. Therefore, this paper takes 2018 as the starting point of the changes. Financial data from 2015 to 2024 are used, and 2015–2017 are classified as the pre-transformation period, and 2018–2024 as the transformation implementation period. The four types of analysis are: Profitability, Solvency, Operating Capacity, and Growth Potential. Corresponding financial indicators are selected, and the industry average for horizontal comparison is added. The Entropy Method is used to calculate a general index of corporate performance and determine the impact of digitalization on this index.

3.1. Analysis of Traditional Financial Performance Indicators

3.1.1. Profitability Analysis

Wuliangye has promoted digitalization in production, the supply chain, marketing, and management, and thus has maintained a relatively high level of profitability for a long time. Changes in Return on Equity (ROE) can be used as indicators. ROE reflects the return on a company's own capital and shows how much profit is generated per unit of net assets; therefore, it is directly related to profitability. As shown in Figure 1 of the 2015 – 2024 data, Wuliangye's ROE increased significantly in the early period and then remained at a high level, while the industry average fluctuated considerably. ROE of Wuliangye was 15.01% in 2016, and by 2019, it had risen to 25.26%. After the start of its digitalization in 2018, the company introduced intelligent brewing and smart winery construction. A digital monitoring system for the fermentation process and temperature/humidity will now be used to reduce raw material waste and production fluctuations. At the same time, Wuliangye has introduced an all-encompassing life-cycle product traceability project that has lowered production costs and

increased the gross profit margin. These measures were added to the list of reasons for the increase in ROE, and as digitalization deepened, Wuliangye gradually expanded its digital development from production to the supply chain and marketing starting in 2020. In recent years, the company has added new channels of dissemination, such as e-commerce and short-video platforms, to increase the spread of its brand. As a result, the company's income and profit were still growing at a reasonable pace despite a slower-than-expected expansion of the industry. After 2020, the ROE of Wuliangye has generally been around 25%. Although it fell slightly to 23.35% in 2024, it was still much higher than the industry average; thus, it can be seen that digitalization had played a role in improving the stability of the company's profit.

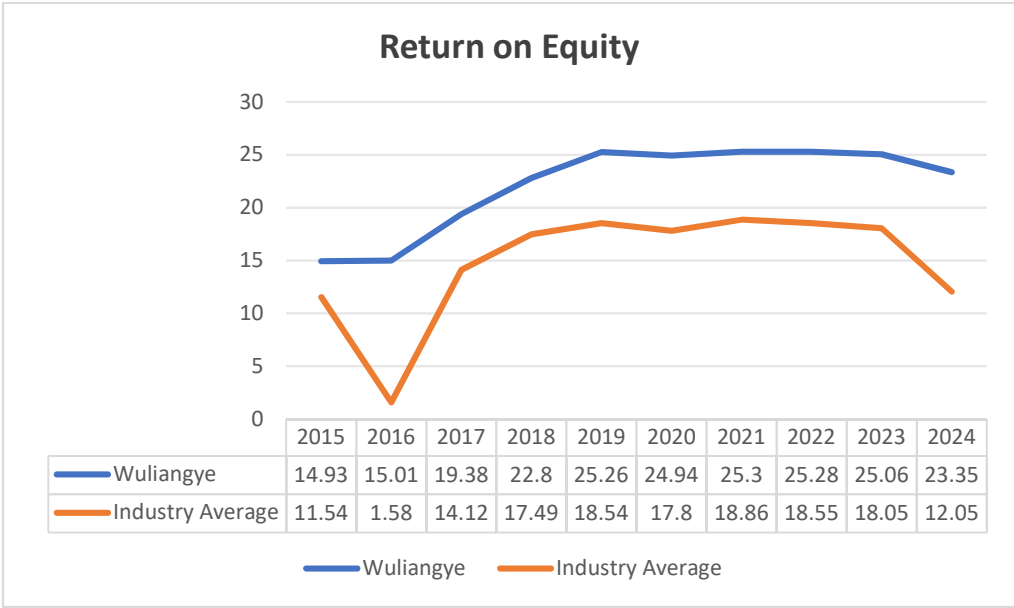


Figure 1. Comparison of Wuliangye's ROE and the Industry Average, 2015-2024

3.1.2. Solvency Analysis

As shown in Table 1, Wuliangye's Current Ratio and Quick Ratio have been relatively high from 2015 to 2024 and well above the industry average, thus exhibiting strong short-term solvency. Both ratios decreased slightly between 2015 and 2017, but they were still in a reasonable range. Therefore, Wuliangye had sufficient current assets before the transformation but exhibited relatively poor capital utilisation efficiency. Since the start of the digital transformation in 2018, the company has continuously increased investment in intelligent brewing equipment, smart wineries, and a digital supply chain. Although the Current Ratio and Quick Ratio fluctuated periodically, they were still relatively stable. Inventory optimisation and an increase in inventory turnover helped the company reduce inventory levels, thus alleviating the financial pressure from digital investment, and its short-term solvency was therefore maintained. The company's asset-liability ratio remained relatively low between 2015 and 2017, with a small amount of debt and a stable capital structure in terms of long-term solvency. After 2017, the proportion was slightly higher than before but still significantly lower than the industry average. The increase was mainly due to the gradual implementation of digital transformation projects and supportive infrastructure; thus, medium- and long-term investments in information systems, intelligent equipment upgrades, and supply chain platforms have been made. However, the Asset-Liability Ratio was still relatively low, and the long-term solvency of the company was not substantially affected.

Table 1. Wuliangye and Industry-Average Solvency Indicators, 2015-2024

	Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Current ratio	Wuliangye	5.60	3.98	3.96	3.77	3.22	3.96	3.63	3.85	4.50	3.25
	Industry avg.	2.47	2.31	2.33	2.38	2.44	2.56	2.3	2.5	2.6	2.43
Quick ratio	Wuliangye	4.46	3.29	3.29	3.19	2.75	3.43	3.21	3.4	3.97	2.88
	Industry avg.	1.14	1.09	1.12	1.13	1.42	1.4	1.31	1.34	1.36	1.14
Debt/assets	Wuliangye	15.61 %	22.47 %	22.91 %	24.36 %	28.48 %	22.95 %	25.24 %	23.59 %	20.00 %	27.55 %
	Industry avg.	35.33 %	38.10 %	38.68 %	41.16 %	36.53 %	34.09 %	37.27 %	35.85 %	34.70 %	34.87 %

3.1.3. Sub-section Headings

In terms of operating ability, the rate at which accounts receivable are realised after sales and other factors affecting cash inflow are also considered. As shown in Figure 2, Wuliangye's accounts receivable turnover increased gradually from 188.4 in 2015 to 382.9 in 2019. At this time, the company had not established a distribution system; therefore, its knowledge of the final sales and collections was based on manual statistics and experience. Accounts receivable management was relatively uncentralized and thus had a slower improvement in turnover efficiency. Starting in 2020, with the introduction of "one product, one code," the product-traceability system and gradually improved distributor management and order management platforms, by 2024, the ratio of faster collections had risen significantly from 651.6 to 2,230. At the same time, the whole industry has been focusing more on channel management and collection efficiency. The rise in Wuliangye was relatively stable; therefore, the company strengthened its collection management and maintained stable channels and operations.

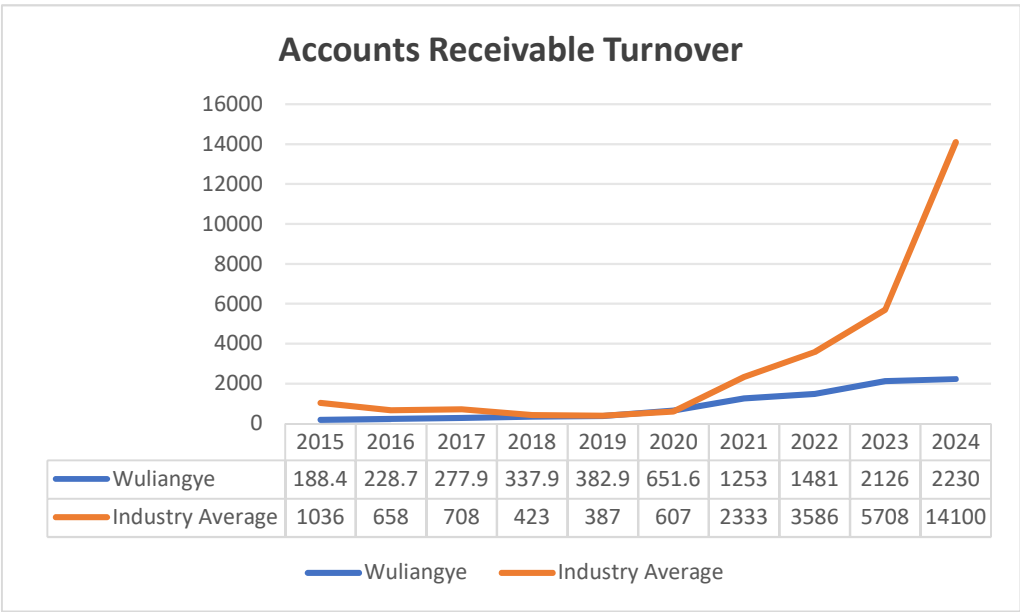


Figure 2. Accounts Receivable Turnover: Wuliangye vs. Industry Average, 2015-2024

3.1.4. Growth Capability Analysis

Revenue and net profit have risen, so the company has increased its scale and improved operating profit. As shown in Figures 3 and 4, both indicators for Wuliangye increased substantially from 2015 to 2017. The company's growth was generally in line with the industry's and slightly above in some years. Both indicators were relatively high around 2017 due to the recovery of the industry and an increased demand for high-end baijiu; at that time, Wuliangye experienced rapid growth driven by brand influence and channel construction.

Compared with other companies in the industry, Wuliangye's development at that time was in line with the whole industry. The reasons for the growth were mainly favourable changes in the external environment and a traditional operating model, so the increase was relatively unstable. When the entire industry declined in 2018-2019, Wuliangye's revenue and net profit growth also slowed but was relatively high; it showed smaller fluctuations than those of the industry. With the continuous progress of digitalization and adjustments to the management and production system at the company, its growth has been more stable and less susceptible to fluctuations in the industry.

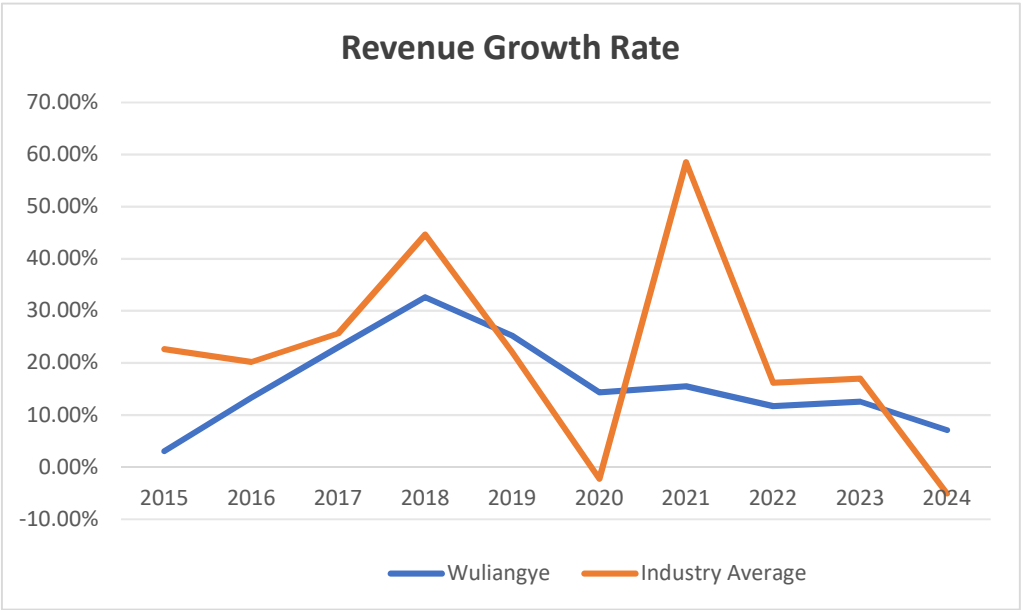


Figure 3. Comparison of Wuliangye's Revenue Growth and the Industry Average, 2015-2024

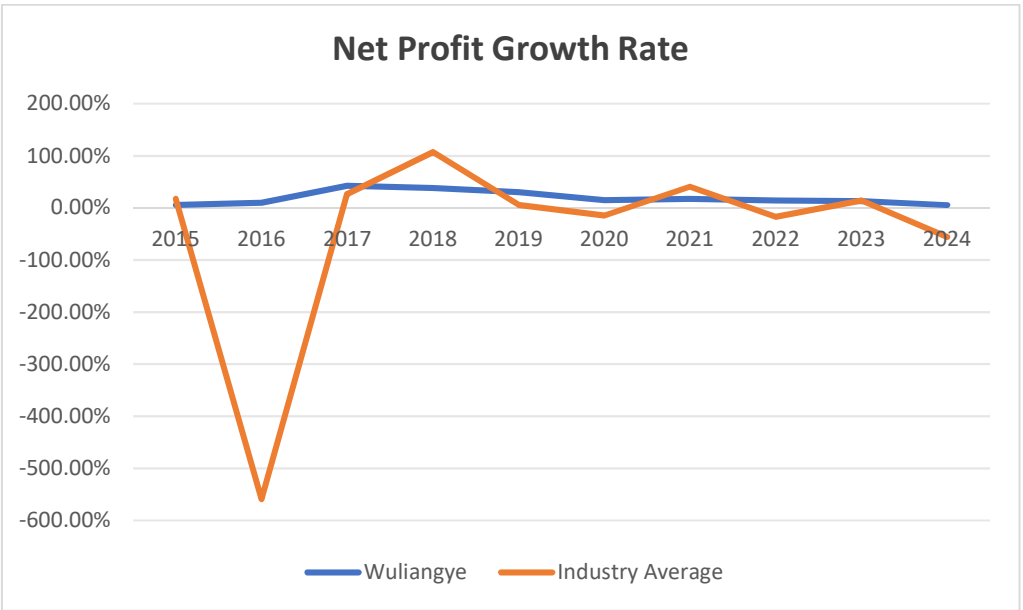


Figure 4. Comparison of Wuliangye's Net Profit Growth and the Industry Average, 2015-2024

After 2020, the average revenue and net profit growth rates of the baijiu industry have been uneven; in some years, due to the impact of the COVID-19 pandemic, slow macroeconomic development, and a shift in baijiu consumption from an expanding market to a mature, stock-based market, both figures have shown a decline. The increase in Wuliangye's revenue and net

profit has also slowed. Relative stability was due to continuous digitalization at the company. Digital Marketing and Channel Management Systems have increased the analysis of terminal sales and consumer data, improved market response and product-portfolio adjustments, and kept revenue growth at a moderate pace despite fluctuating demand. At the same time, the digital supply-chain system and intelligent manufacturing improved operating efficiency, reduced cost pressure, and lessened the impact of changes in the external environment on earnings growth.

3.2. All-encompassing Performance Assessment with the Entropy Weight Method

3.2.1. Construction of the Evaluation Indicator System

According to the principles of comprehensiveness, balance, and operability in indicator design [3], this study references the Operational Rules for Enterprise Performance Evaluation (Revised) issued by the State-owned Assets Supervision and Administration Commission in 2024, considers the characteristics of listed baijiu companies, and draws on previous research. The four indices are: Profitability, Operating Capacity, Solvency, and Development Potential. Based on this, 12 secondary indicators have been constructed, including ROE, operating net profit margin, cost and expense profit margin, and return on total assets [4]. The resulting financial-performance evaluation system for Wuliangye is shown in Table 2.

Table 2. Financial Performance Evaluation Indicator System

Primary indicator	Secondary indicator	Indicator type
Profitability	Return on equity	Positive indicator
	Operating net profit margin	Positive indicator
	Cost and expense profit margin	Positive indicator
	Return on total assets	Positive indicator
Operating capability	Total asset turnover	Positive indicator
	Accounts receivable turnover	Positive indicator
	Inventory turnover	Positive indicator
Solvency	Debt-to-asset ratio	Moderate indicator
	Quick ratio	Moderate indicator
	Current ratio	Moderate indicator
Development capability	Revenue growth rate	Positive indicator
	Net profit growth rate	Positive indicator

3.2.2. Calculation Procedures

(1) Standardisation and Positive Transformation

Indicators with different attributes can significantly affect the analysis results, so Min-Max normalisation is used to standardise the data in this study. As shown in the table, the debt-to-asset ratio, quick ratio, and current ratio are all in the moderate range, and all other indicators are positive. Given their special features and the demands of this analysis, the current ratio and quick ratio are displayed as positive indicators, while the debt-to-asset ratio has been inverted to a negative indicator. This way better reflects the company's solvency and provides strong support for the following analysis and decisions [5]. All the data fall within the range [0, 1] after normalisation. Since logarithms are needed in the following entropy calculations and logarithms of zero are undefined, all normalised values have been shifted to the right by 0.0001. The indicator-processing formulae are as follows:

Standardization of Positive Indicators:

$$x'_{ij} = \frac{x_{ij} - x_{ij\min}}{x_{ij\max} - x_{ij\min}} \quad (1)$$

Standardization of negative indicators:

$$x'_{ij} = \frac{x_{ij\max} - x_{ij}}{x_{ij\max} - x_{ij\min}} \quad (2)$$

Standardisation of medium indicators:

$$x'_{ij} = \begin{cases} \frac{x_{ij} - x_{ij\min}}{x_0 - x_{ij\min}}, & x_{ij} < x_0 \\ \frac{x_{ij\max} - x_{ij}}{x_{ij\max} - x_0}, & x_{ij} \geq x_0 \end{cases} \quad (3)$$

where x_{ij} is the value of the j -th evaluation indicator in year i , y_{ij} is the standardised value, and $\max(x_j)$ and $\min(x_j)$ are the maximum and minimum values of indicator j across all years.

(2) Calculation of Proportions

$$y_{ij} = \frac{x'_{ij}}{\sum_{i=1}^m x'_{ij}} \quad (4)$$

(3) Calculation of Entropy Weights

The Information Entropy of Indicator j is as follows:

$$e_j = -\frac{1}{\ln m} \sum_{i=1}^m y_{ij} \ln y_{ij} \quad (5)$$

A Coefficient of Variation (CV) is given by:

$$g_j = 1 - e_j \quad (6)$$

The weights of these indices are set as follows:

$$w_j = \frac{g_j}{\sum_{j=1}^n g_j} \quad (7)$$

(4) Calculation of Composite Scores

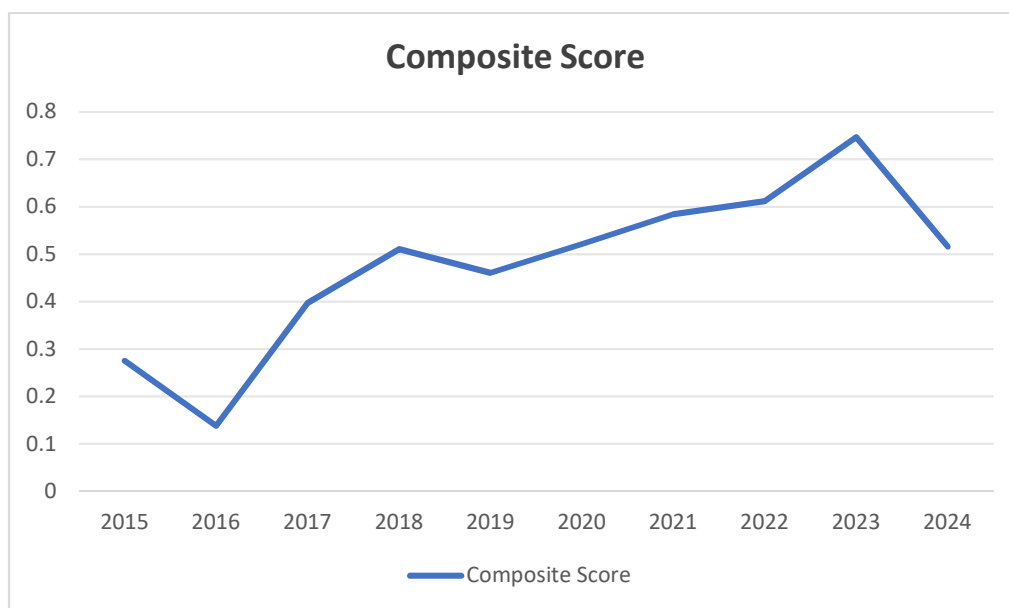
The composite financial-performance score for each year is as follows:

$$S_i = \sum_{j=1}^n x_j w_j \quad (8)$$

The formulas for the information entropy, information utility, and weight coefficients are presented in Table 3.

Table 3. Information Entropy, Information Utility, and Weight Coefficients

Indicator	Information entropy (e)	Information utility (d)	Weight coefficient (w)
Return on equity	0.8944	0.1056	6.7868%
Operating net profit margin	0.9144	0.0856	5.5011%
Cost and expense profit margin	0.897	0.103	6.6139%
Return on total assets	0.9093	0.0907	5.8244%
Total asset turnover	0.9031	0.0969	6.2248%
Accounts receivable turnover	0.7526	0.2474	15.8969%
Inventory turnover	0.8663	0.1337	8.5883%
Debt-to-asset ratio	0.8877	0.1123	7.2145%
Quick ratio	0.8746	0.1254	8.0556%
Current ratio	0.8398	0.1602	10.2940%
Revenue growth rate	0.8948	0.1052	6.7586%
Net profit growth rate	0.8095	0.1905	12.2410%

**Figure 5.** Composite Financial Performance Scores (2015-2024)

From 2015 to 2024, the general level of Wuliangye has been shown by the entropy-weight method. As shown in Figure 5, the combined scores before and after digitalization are quite different. In 2015 and 2016, the reform had not yet been rolled out systematically, and the company's composite score was relatively low. Since 2017, the company has proposed to build an intelligent winery and started a pilot project for brewing process monitoring and channel digitalization. With the development of projects such as "hundred cities, thousands of counties, thousands of stores," the overall score has risen to 0.3972, and it can be seen that digitalization has started to improve the operating efficiency of the company. Digitalization then entered its full-scale development, and the performance score rose to 0.4610 in 2019. Between 2020 and 2023, due to the impact of the epidemic and changes in the macro-environment, both the scenario of liquor consumption and terminal demand have been unstable. Enterprises are still adding to the digital construction and increasing investment in brewing process monitoring, intelligent winery management, and channel marketing platforms. The overall score has risen

from 0.5214 to 0.7468 and is generally on the rise. In 2024, due to the economic downturn, industrial demand and inventory pressure rose simultaneously, and the overall performance score fell back to 0.5162. However, it is still at a relatively high level compared with the early stage of transformation, and thus the initial digital construction has increased the stability of the operation to some extent.

4. Conclusion and Recommendations

4.1. Summary

Wuliangye is a first-class company in the baijiu industry and the subject of this study. The four contents of the financial-performance assessment system are: profitability, operating capacity, solvency, and growth potential. The entropy method is used to assign weights to all indicators, and then the impact of digitalization on the company's financial performance will be examined; it was found that this effect has particular stage-specific characteristics and is generally positive. At the beginning of the reform, Wuliangye had been adding investments in intelligent brewing equipment, smart wine warehouses, and supply chain systems, and a marketing information system based on the "1365" Strategic Plan. Therefore, capital expenditure and operating expenses were higher than expected, and thus the other indicators fluctuated. As digital applications have gradually covered production and other parts of the business, their positive effects on financial performance have been gradually manifesting. The all-around performance score rose from 0.5214 in 2020 to 0.7468 in 2023; however, due to the economic downturn and weak demand for Baijiu in 2024, it fell. However, it was still much higher than in the early days of the reform. Therefore, the earlier digital transformation efforts at Wuliangye have provided some stability to the company's business operations in the face of an unstable external environment.

4.2. Recommendations

4.2.1. Promote Coordinated Digitalization Across the Business Chain

The Digital Foundation and Level of Application Vary by Business Area. Production is still based on the old way, so digitalization is not easily achieved; at the same time, many areas of finance and management have already been digitised. With the spread of digital technology in production, the supply chain, marketing, and other parts of Wuliangye's business have also been performing well in recent years.

Therefore, in the future development of digitalization, Wuliangye should gradually shift from using information systems to support individual business activities to fostering coordination across the entire business cycle. The company needs to improve the collection and sharing of production, inventory, and terminal sales data, and coordinate the work of all business departments. The capacity of the information system to support production planning, inventory management, and market decisions also needs to be enhanced. It will help optimise the entire business process and increase the proportion of digital development in operating efficiency.

4.2.2. Strengthen Channel and Digital Marketing

Based on the analysis of operating capacity and growth prospects, the channels through which digitalization will affect Wuliangye's financial performance are expected to be channel management and sales data utilisation. Based on the existing "one product, one code" system and dealer management platform and online sales channel, Wuliangye can further promote online and offline coordination. The company will gradually move away from a dealer-centric, single-channel model to an all-channel model based on data sharing and offer customers standardised product displays, transactions, and services online and offline. Wuliangye can use digital means to raise brand awareness and engage the public online through short-video platforms, live-streaming, online communities, etc., as a marketing channel. Using a

membership system and QR code scanning, create an all-encompassing profile of the users. Based on the above, the company will integrate and analyse terminal sales data, channel inventory data, and consumer behaviour information further. The information will help support the placement, inventory distribution, and price setting of the product more effectively in the future, reducing reliance on experience. The above measures will help Wuliangye adapt to changes in the market more flexibly and stabilise channel operations.

4.2.3. Coordinate the Management of Digital Investment

The foundation of automation and digitalization differs in various parts of the business, so digitalization is not uniform. At this time, the system development and equipment upgrades will require a large sum of money and thus harm the company's finances for some time. Therefore, the company needs to organise its investment plan and implementation path more reasonably to avoid excessive capital investment in a short period and the resulting pressure on business operations. Digitalization should be carried out in stages according to the existing digital infrastructure and the actual requirements of all business divisions. At the same time, continuously assess and improve the operating efficiency of the digital system. Thus, resource utilisation efficiency can be improved and the long-term stability and operating capacity of the digital era developed under cost constraints are strengthened.

4.2.4. Improve Organizational Support for Digital Transformation

Strengthening organisational capacity and enhancing the general ability of staff are also required for the construction of a digital-era enterprise. Wuliangye should strengthen its training system and optimise the talent structure to promote the integration of digital development in management. This will improve the actual effect of information systems and provide organisational support for the continuous progress of digitalization. Hire well-rounded professionals who are experienced in both business and information technology for key positions at the company. Strengthen communication and cooperation between the technical department and the business department to reduce the risk of the system not meeting actual business requirements. Strengthen the data application ability of staff in production, marketing, and management departments at Wuliangye. Gradually foster employees' skills in operating information systems and the habit of data-driven analysis and decision-making to enhance their sense of understanding and application of digital tools.

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