

The Impact of Digital Transformation on the Financial Value of Manufacturing Enterprises—A Case Study of Huawei and Sany

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Abstract: The paper takes two manufacturing enterprises, Huawei and Sany Heavy Industry, as the research objects, takes the financial reports and relevant data of companies from 2017 to 2021 as the data sources, and studies the impact of digital transformation on the performance of the company's. The research found that digital transformation improves the innovation ability of the company. To some extent, it improves the operation efficiency of the enterprise, expands the income source channel of the enterprise, and improves the business performance of the enterprise. However, it is also found that leading enterprises do not perform in some financial indicators, especially when the external operating environment deteriorated, and the benefits brought by digital transformation cannot completely offset the losses caused by these uncertain factors.

1. Introduction

In today's world, a new round of scientific and technological revolution and industrial transformation led by the Internet, big data, cloud computing, artificial intelligence, block chain, and other technologies is sweeping the world, and the value of data is accelerating. In 2019, the American information technology and innovation foundation (ITIF) released a report, entitled "Seizing the New Wave of Digital Technology to Enhance European Growth, Productivity and Competitiveness", pointing out that the EU needs to broaden the concept of "industrial 4.0", and that all physical systems, except manufacturing, should be integrated into the EU. Including agriculture, construction, infrastructure, logistics, and transportation all need to achieve digital transformation. Domestically, the party's 20th report specifically emphasizes the need to "promote the high-end, intelligent, and green development of the manufacturing industry" and "accelerate the development of the digital economy and promote the deep integration of the digital economy and the real economy". "Spring River Water Warm Duck Prophet", in the process of promoting data value, as the main body of the market, enterprises is the most important participants in industrial digitalization and in digital industrialization. According to the "2022 Enterprise Digital

Transformation Index" issued by Accenture Consulting Company, Nearly 60% (59%) of the executives surveyed in China said that they would increase investment in digitalization in the next one to two years, and digital transformation has become a "necessary option" for more and more Chinese enterprises.

According to research in the relevant literature, the digital transformation of enterprises helps reduce operating costs and provide development power for operation and production [1]. Digital transformation uses digital technology to fundamentally improve the performance of companies, and the use of digital technology can eliminate data barriers within the industry and improve operational efficiency [2]. The digital transformation causes the management reform of manufacturing companies and promotes the change of the business model, organizational mode, and the concept of companies [3]. Digital transformation has a significant positive effect on improving enterprise value, and enterprise innovation has a significant partial intermediary effect on this impact [4] [5] [6] [7]. In practice, some leading enterprises, such as Huawei, Alibaba, and JD, have started to comprehensively promote digital transformation and achieved some robust performance, but there are still some problems in the process of digital transformation of enterprises. According to the report of Accenture's China Enterprise Digital Transformation Index for nearly five years to 2022, the effectiveness index of digital transformation of Chinese enterprises is 7%, 9%, 11%, 16% and 17%, respectively. In the process of digital transformation, although remarkable achievements were made, but the index is still low, quite a number of enterprises have not yet started, or the digital transformation is not enough, this with scholars Yanchao Zhang and etc. (2023), through empirical research found that "the digital degree between different listed companies" [8]. The conclusion happens to be the same. The existing empirical literature on the relationship between digital transformation and enterprise performance mostly uses data from listed companies. However, from the data of literature sorting and practice, the degree of digital transformation of different listed companies is different, and it is not suitable for the object of research. Taking Huawei and Sany Heavy Industry as examples, this paper uses the case study method to study the impact of the digital transformation of manufacturing enterprises on asset turnover speed, revenue added, profit increase and so on. Then discusses whether the digital transformation has truly realized the business performance of the enterprise.

2. Concept definitions and Assumptions

2.1 Definitions of concepts

2.1.1 Digital transformation

Chen Jin et al. (2019) believe that digital transformation is a high-level transformation based on digital transformation (digitization) and digital upgrade (digitalization), and further touch on the core business of the company, with the goal of building a new business model [9]. According to Gardner (Gartner), digital transformation is the process of developing digital technology and support capabilities to build a new dynamic digital business model. Accenture (2020): The digital transformation is to improve operational efficiency through digital applications. The purpose of digital transformation is to help companies solve practical problems and create value [10]. Huawei, the Company believes that digital transformation is a process in which enterprises use advanced technologies to optimize or create new business models, take the customer-centered approach, data-driven, break the traditional organizational efficiency and industry boundary, enhance the competitiveness of the enterprise, and create new value for enterprises [11]. It can be seen from the above point of view that although the digital transformation has not yet formed a unified concept, there are some common characteristics between different expressions:

- ① the purpose of digital transformation is to establish a new business model;
- ② Digital transformation is the digitalization process and the reshaping process of enterprises for their business, process, and information;
- ③ Digital transformation can enhance the competitiveness of enterprises and create new value for enterprises.

2.1.2 Business performance and evaluation

The goal of financial management is to realize the appreciation of the value of the enterprise. From the perspective of financial management, if the increase of shareholders' equity is brought by investor investment, it does not mean that the business performance of the enterprise is improved, and only those economic benefits brought by business activities flow in. Therefore, this valuation method is not applicable when discussing the enterprise value of non-listed companies. EVA (Economic Value Added) as a measure of enterprise value management and performance appraisal tool, since the 20s 80s, has developed into a mature enterprise value management theory, the index can evaluate the effective use of capital, and the ability to create value for shareholders, is an important tool of enterprise performance appraisal. The EVA calculation requires a series of adjustments based on the accounting statement data, which is more complex. In this paper, the simplified algorithm of Shizhong Huang (2020) is used; the formula is as follows [12]

$$\text{EVA} = \text{net profit} - \text{cost of equity capital} = \text{Net profit} - (\text{shareholder equity at the end} - \text{after-tax profit of the year}) \times \text{equity capital cost ratio} \quad (1)$$

In addition, when judging whether enterprise digital transformation improves business performance, DEA (Data Envelopment Analysis) data envelope analysis method is a tool method based on linear planning, which is mainly used for production efficiency evaluation under the condition of multi-input and multi-output.

2.2 Assumptions

When enterprises want to promote digital transformation, they first need to introduce digital technology, establish a digital management platform, review and sort out their business processes with the help of third-party data platforms, and complete the process and information construction. Second, organizational reform and management mode reform improve the efficiency of enterprises in supply, production, circulation, finance, and other aspects.

Proposition 1: Digital transformation improves the overall operational efficiency of the enterprise

Digital transformation is the reshaping of the business model of enterprises, which expands sales channels. Enterprises respond quickly to customer needs through digital platforms, do a good job in after-sales service to customers, increase revenue and have relatively stable customer stickiness.

Proposition 2: Digital transformation increases the company's sales revenue and changes the business revenue structure.

The improvement of production efficiency and the increase of the sales revenue scale bring about the improvement of the overall business performance of the company and the value of the company.

Proposition 3: Digital transformation has increased the value of the company.

3. Overview of Case Enterprises

Huawei, founded in 1987, is the world's leading ICT (Information and Communication)

infrastructure and smart terminal provider. The company is fully owned and is a private company. In 2016, the Huawei Corporate Change and Decision Committee took "digital transformation" as the only change theme of the five-year plan and officially launched the company's digital transformation work. Huawei The digital transformation framework is to build digital capabilities, support business restructuring, and realize enterprise strategy, aiming at customer satisfaction, efficiency improvement, and continuous business growth [13]. In the specific implementation process, according to the principle of "Technology-driven, platform-first", build a unified Information and Communication Technology infrastructure and cloud platform, build a one-stop enterprise-level digital platform, by together the various data of information technology and operational technology, implementing effective management.

Sany is the world's leading construction machinery manufacturer and the world's largest concrete machinery manufacturer. The pioneering "Excavator Index" is a vane, reflecting economic changes such as infrastructure and fixed asset investment. Sany was listed on A-share shares in July 2003. In 2008, Sany Group issued the Sany Group Manufacturing Technology Scheme outline and started the construction of a digital factory; in 2012, it shortened the product development cycle by 20%, increased the production efficiency by 20%, and reduced the overall operating cost by 24%. It is known as the "smartest plant" in the industry and is the first national intelligent manufacturing demonstration company in the construction machinery industry [14]. Since 2016, Sany Heavy Industry, comprehensively promoted digital management, took digital transformation as the main direction of the enterprise, promoted the digitalization and intelligence of marketing service, manufacturing, operation management and other value activities, from the internal process informationization to the big data management of the industrial chain.

4. Proof Procedure

4.1 Verify Hypothesis 1

As shown in Table 1, In terms of inventory turnover speed, Sany's inventory turnover is significantly faster than Huawei; In terms of the accounts receivable turnover rate, Huawei The company's accounts receivable turnover period is about 40% shorter than that of Sany Heavy Industry; In terms of the turnover rate of current assets, Huawei The annual turnover days of the Company and Sany Heavy Industry in 2018-2020 are basically the same, but in 2021, Huawei The turnover rate of the company's current assets is significantly slower than that of Sany Heavy Industry; In terms of the turnover rate of noncurrent assets, Sany's noncurrent asset turnover days have a significant decline process, and Huawei company this index is relatively stable. In 2021, due to the impact of the decline in operating revenue; From the sales and administrative expense ratio, The index of both companies basically showed a downward trend.

Table 1: Operational capability indicators (days)

year	Huawei					Sany Heavy				
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021
Inventory Turnover Rate	71	77	114	107	176	93	89	91	86	86
Accounts receivable turnover rate	63	70	58	52	41	174	126	103	80	71
Current asset turnover rate	242	265	295	279	435	350	283	286	298	313
Fixed assets turnover rate	60	68	65	75	121	126	79	53	39	41
Sales and administrative expense ratio (%)	15.40	14.60	13.30	12.70	16.40	14.59	11.63	9.96	7.58	8.92

Through the above analysis, it is found that the financial data performance of Sany can better

verify Proposition 1; some indicators of Huawei Company can verify Proposition 1, but some operational efficiency indicators are not obvious.

4.2 Verify Hypothesis 2

From 2017 to 2020, Huawei Company's operating revenue showed a continuous growth trend, as shown in Figure 1. However, in 2021, due to the decline in consumer Business, annual revenue was 636,807 million, down 28.6% year-on-year. In terms of the net profit index, although operating income in 2021 declined sharply, net profit increased from 64,649 million to 113,718 million, 75.90% higher than last year.

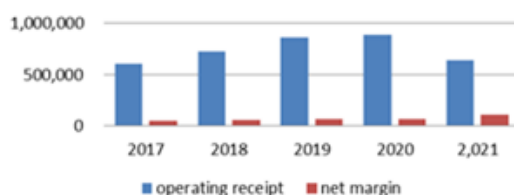


Figure 1: Huawei Operating Income and net profit Unit: one million



Figure 2: Huawei Proportion of sales of main business

Huawei The main business has three modules, which are operator business, enterprise business, and consumer business (terminal business). Both the operation business and the enterprise business are related to the digital transformation of enterprises. As can be seen from Figure 2, although the enterprise business accounts for a relatively small proportion of the three main business revenues, it shows an overall growth trend. In the past five years, enterprise business revenue increased from 60 billion in 2017 to more than 100 billion, with an increase of 70.48%.

From 2017 to 2021, the operating income in 2021 was 106113.35 million, 2.76 times that of 2017; the net profit was 12325.68 million 5.53 times that of 5 years ago see, Figure 3. From the perspective of income structure, mining machinery accounts for the highest proportion of income, followed by concrete machinery, which accounts for more than 65% of the main business income, which is the main source of its income. Additionally, the income of the lifting machinery business has increased rapidly in recent years, accounting for 20% of total income. In terms of the gross profit generated by the main products (Figure 4), the gross profit of mining machinery is the highest, followed by concrete machinery; in 2021, international sales revenue will reach 24.8 billion, up 76% year-on-year.

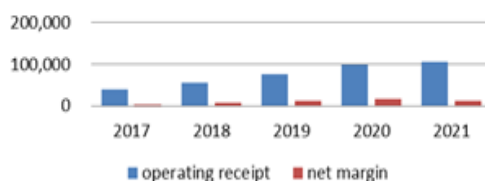


Figure 3: Operating Income and net profit of Sany Unit: one million

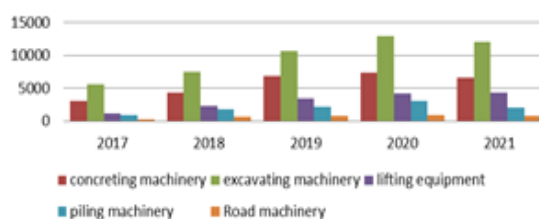


Figure 4: Gross profit margin of the main products of Sany Unit: one million

Through the above analysis, digital transformation increases the income source of enterprises, expands the income source channels of enterprises, and improves the levels of profits.

4.3 Verify Hypothesis 3

4.3.1 Verify with EVA

The calculation of the EVA index of the Company is shown in Table 2 and Table 3 below. It shows that the EVA indicators of the two companies are significantly greater than zero, indicating that the profits generated by the two companies in the operation process are surplus in addition to the total capital cost, that is, to create additional value for the company. In Table 2, Huawei's EVA index in 2021 is twice as high as that of the previous year. After analysing the relevant factors, it is found that, the disposal of subsidiaries and business net income increased significantly, resulting the income statement "other net income and expenditure" items from 692 million to 60.797 billion, growth of more than 80 times. Excluding the impact, the EVA index in 2021 is slightly higher than that in the previous year.

Table 2: Huawei 2017-2021 EVA unit: one million

year	2017	2018	2019	2020	2021
shareholders' equity	175,616	233,065	295,537	330,408	414,652
After-tax profits for that year	47,455	59,345	62,656	64,649	113,718
Occupying the shareholders' funds in that year	128,161	173,720	232,881	265,759	300,934
Equity capital cost ratio	6%	6%	6%	6%	6%
EVA	39,765	48,922	48,683	48,703	95,662

Table 3: Sany's 2017-2021 EVA unit: one million

year	2017	2018	2019	2020	2021
shareholders' equity	26,373	32,502	45,527	58,397	65,095
After-tax profits for that year	2,227	6,303	11,494	15,865	12,326
Occupying the shareholders' funds in that year	24,146	26,199	34,032	42,532	52,769
Equity capital cost ratio	9%	9%	9%	9%	9%
EVA	54	3,946	8,432	12,037	7,576

In Table 3, the EVA index of Sany Heavy Industry increased significantly from 2017 to 2020, especially from 2017 to 2018, and the EVA index increased more than 70 times. From the perspective of relevant financial data, the operating income of Sany has increased significantly in the past five years, and the after-tax profit has decreased in 2021, mainly due to the increase of research and development expenses and sales expenses. In general, after accelerating the digital transformation, the performance of the two enterprises is good, the quality of the profit of the enterprises has been further improved, and the ability to create value of the enterprises has also been continuously strengthened.

4.3.2 Verify with DEA

Table 4: Summary of input and output indicators

Enter the index		Related asset investment	research and development expenditure
Output indicators	Debt solvency indicators	current ratio	quick ratio
	Operating capacity indicators	average accounts receivable turnover ratio	fixed asset turnover
	Profitability indicators	Operating profit margin	rate of return on total assets
	Development capacity indicators	increase rate of business revenue	Net asset growth rate
	Innovation ability index	The cumulative number of patents	

Table 5: Efficiency evaluation table of output indicators from 2017-2021

Huawei					Sany			
Comprehensive efficiency of innovation ability					Comprehensive efficiency of innovation ability			
year	overall efficiency	pure technical efficiency	Scale efficiency	return of scale	overall efficiency	pure technical efficiency	Scale efficiency	return of scale
2017	0.956	1.000	0.956	+	1.000	1.000	1.000	—
2018	0.998	1.000	0.998	+	1.000	1.000	1.000	—
2019	0.912	0.913	0.999	+	0.981	1.000	0.981	+
2020	0.921	0.927	0.993	+	1.000	1.000	1.000	—
2021	1.000	1.000	1.000	—	0.941	1.000	0.941	—
Comprehensive efficiency of the solvency					Comprehensive efficiency of the solvency			
2017	1.000	1.000	1.000	—	1.000	1.000	1.000	—
2018	0.932	0.950	0.981	—	0.988	1.000	0.988	+
2019	0.866	0.866	1.000	—	1.000	1.000	1.000	—
2020	0.890	0.891	0.999	—	1.000	1.000	1.000	—
2021	0.999	1.000	0.999	—	0.745	0.790	0.944	—
Comprehensive efficiency of operating capacity					Comprehensive efficiency of operating capacity			
2017	1.000	1.000	1.000	—	1.000	1.000	1.000	—
2018	0.797	0.888	0.898	+	1.000	1.000	1.000	—
2019	0.822	1.000	0.822	—	0.932	1.000	0.932	+
2020	0.823	0.823	1.000	—	1.000	1.000	1.000	—
2021	1.000	1.000	1.000	—	0.839	1.000	0.839	—
Comprehensive efficiency of profitability					Comprehensive efficiency of profitability			
2017	1.000	1.000	1.000	—	1.000	1.000	1.000	—
2018	0.922	0.931	0.990	+	1.000	1.000	1.000	—
2019	0.674	0.773	0.872	+	1.000	1.000	1.000	—
2020	0.563	0.713	0.789	+	1.000	1.000	1.000	—
2021	1.000	1.000	1.000	—	0.505	0.720	0.701	—
Comprehensive efficiency of development capacity					Comprehensive efficiency of development capacity			
2017	0.914	1.000	0.914	+	1.000	1.000	1.000	—
2018	1.000	1.000	1.000	—	1.000	1.000	1.000	—
2019	0.852	0.860	0.991	+	1.000	1.000	1.000	—
2020	0.290	0.713	0.406	+	1.000	1.000	1.000	—
2021	0.631	0.721	0.876	+	0.267	0.720	0.370	+

Select the input-output indicators. In terms of the selection of input indicators, the total amount of "software", "patent right" and "generic technology" in the report assets in the digital transformation the output index is selected from five aspects: debt-paying ability, operation ability, profitability, development ability, and innovation ability. See Table 4 for the specific input and output indicators.

The DMU decision unit is determined to be each year of the company from 2017 to 2021. The BCC (variable return to scale) model is used to import relevant input and output data into DEAP 2.1 Software to obtain the model operation results, as shown in Table 5.

When the comprehensive efficiency is equal to 1 and the scale reward is unchanged, the DEA is effective, i. e., the input-output reaches the optimal state. As shown in Table 5, the comprehensive efficiency of Huawei Company decreased from 2017 to 2021. By 2021, its debt repayment, operation, profit and innovation ability; from 2017 to 2020, innovation efficiency, solvency, comprehensive efficiency, pure technical efficiency and scale efficiency; in 2021, the growth rate slowed down, and its scale reward was mostly in decreasing state, which represents the decline of output efficiency, and the marginal effect brought by digital transformation is declining. In general, Sany's DEA was significantly more effective than Huawei.

In conclusion, the EVA and DEA analysis of Huawei and Sany can determine that argument 3 is basically effective.

5. Conclusion and revelation

5.1 Conclusions

This paper takes Huawei and Sany Heavy Industry as research objects and takes the data from the 2017-2021 financial report as the main data source to examine the impact of digital transformation of companies on business performance. Research shows that: (1) although leading companies have mediocre performance in some financial indicators, in general, digital transformation helps improve operational efficiency and reduce costs. Especially in accounts receivable management, enterprises use information technology to timely grasp customer credit status and use models to estimate risks, adjust credit policies to reduce bad debt losses; (2) leading enterprises not only implement digital transformation, but also actively drive and participate in the digital transformation of other enterprises, broadening the income sources of enterprises; (3) digital transformation helps the enterprise to improve competitiveness and business performance, and then bring the appreciation of enterprise value.

5.2 Revelation

(1) Enterprise digital transformation in line with the current trend of "high quality development" and requirements, leading enterprises tend to have more deep research foundation and financial support, but for small and medium-sized enterprises, to achieve digital transformation, in addition to need large enterprises to lead, also need the government level, industry association of support and coordination.(2) For small and medium-sized enterprises, to realize digital transformation is more efficient than self-built information platform; (3) Although the two leading enterprises have achieved some so-called "robust performance" through digital transformation, some indicators are not obvious, indicating that there is still room for further improvement in the integration of digital technology and business operation.

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References

- [1] A dli Abouzeedan, Magnus Klofsten, Thomas Hedner *Internetization Management as a Facilitator for Managing Innovation in High-technology Smaller Firms*[J].*Global Business Review* ,2013(1):121-136.
- [2] Henner Gimpel, Daniel Rau, Maximilian Röglinger .*Understanding Fin-Tech start -ups - a taxonomy of Consumer-oriented service offerings* [J]. *Electronic Markets*, 2017(4):1-20.
- [3] Shi Jiawei, Lin Xinxin. *The Impact of Digital Transformation on the Management Reform of Manufacturing Companies—Based on the case study of Midea and Haier* [J]. *Jinyang Academic Journal*, 2022 (05): 106-116.
- [4] Huang Dayu, Xie Jiabao, Meng Xiangyu, Zhang Qiuyan. *Digital Transformation and Enterprise Value— Empirical evidence based on text analysis methods* [J]. *The Economist*, 2021 (12): 41-51.
- [5] Lou Runping, Mai Shishi, Zhang Hao. *Test of the effect of enterprise digital investment on enterprise value—Based on the demonstration of listed manufacturing companies* [J]. *Statistics and Decision-making*, 2023, 39 (01): 177-182.
- [6] Dai Fei, Zhong Yunbiao, Xu Fengju. *Digital Transformation, Enterprise Innovation, and Value Enhancement* [J]. *Accounting Monthly*, 2023, 44 (01): 36-45
- [7] Duan Huayou, Yang Xingliu, Dong Feng. *Digital Transformation, Financing Constraints and Enterprise Innovation* [J]. *Statistics and Decision-making*, 2023, 39 (05): 164-168.
- [8] Zhang Yanchao, Bu Jun. *Will the enterprise digital transformation affect the comparability of accounting information?* [J/OL]. *Journal of Zhongnan University of Economics and Law*: 1-13 [2023-03-22].
- [9] Chen Jin, Yang Wenchi, Yu Fei. *Ecological collaborative innovation strategy in digital transformation—Based on the strategic discussion of Huawei Enterprise Business Group (EBG) in China* [J]. *Tsinghua Management Review*, 2019 (06): 22-26.
- [10] Accenture. *Accenture on digital Transformation* [J]. *China Casting Equipment and Technology*, 2020, 55 (01): 2-4.
- [11] Guo Ping, Tao Jingwen. *Enterprise Digital Transformation at Huawei* [M]. *China Machine Press*, 2022.
- [12] Huang Shizhong. *Decoding Huawei's Knowledge-based Doctrine — — from the perspective of financial analysis* [J]. *Accounting Monthly*, 2020 (09): 3-7.
- [13] Zhao Bo. *Huawei Digital Transformation and Business Practice* [J]. *Management of Construction Enterprise*, 2023 (01): 104-107
- [14] Zhou Chunlin, Yu Jing. *Trinity plan to change* [J]. *Chinese Entrepreneur*, 2021 (07): 58-67.