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A Study on the Value Creation Pathways of Management Accounting in the Context of Digital Transformation: A Case Study of Midea Group

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Abstract

Within the background of the digital economy, digital transformation has driven the accounting function to extend from traditional external financial disclosure to internal operational decision-making, making management accounting a pivotal tool for manufacturing enterprises to achieve value creation. The home appliance industry is highly competitive, with significant pressure on cost and inventory control; the effectiveness of digital management accounting practices directly impacts the operational quality of home appliance enterprises. This research selects Midea Group, a digital benchmark in the home appliance industry, for case analysis. With the theory of technology empowerment, drawing on core literature on digital management accounting and combining the TOE framework, this paper examines Midea Group's implementation path for management accounting tools during its digital transformation, analyzes the effectiveness of these implementations and existing shortcomings, and proposes optimization recommendations based on these findings. Meanwhile, this paper aims to provide practical guidance for domestic manufacturing enterprises of a similar nature in implementing digital management accounting. It also contributes to the body of case study evidence on digital management accounting in the home appliance industry.

Keywords

digital transformation, management accounting, value creation, Midea Group

1. Introduction

Due to the popularization of digital technologies, the combination of management accounting and digitization has slowly become one of the important research directions in the sphere of corporate management [5]. The history of management accounting began with the necessity to control costs internally in organizations; initial studies were conducted on conventional methods, including standard costing and comprehensive budgeting, which aimed to maximize corporate production and operational decisions. Over time and with the development of information technology, management accounting studies have slowly moved away from the use of isolated tools towards the creation of an integrated business-finance system, focusing on how to integrate business and financial information in order to facilitate the implementation of company strategies [5]. In the national context, a number of planning outlines and guiding opinions have been released that offer the highest-level guidance concerning the digital transformation of accounting and the creation of intelligent and smart

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management accounting, and thus, management accounting goes beyond system-building and approaches more profound practical implementation [7].

At present, digital transformation has become a buzzword in the research of domestic manufacturing. Researchers typically assume that management accounting work models will be reshaped by big data and smart manufacturing; nonetheless, it is observed that the effects of implementation differ greatly across companies. The progress of digital management accounting varies greatly between various manufacturing enterprises, with some even experiencing practical issues, including the separation between tools and business processes, and the lack of adequate use of information [2]. The current literature on the subject can be divided into two broad groups: the first one consists of large-sample empirical experiments on how digitalization affects the corporate management accounting and business performance; the second one consists of case analyses of representative enterprises to explore the ways of implementing management accounting [3]. The digital transformation is not the only change in cost control methods; it also facilitates the iteration and upgrade of management accounting reports and increases the requirements of a company in terms of its capability to facilitate internal decision making [4].

The home appliance industry is an intensely competitive manufacturing industry with high levels of inventories and costs, digital management accounting becomes a major driver of cost reduction, efficiency enhancement, and value addition in the home appliance companies. Nonetheless, most of the available case studies have been carried out on industries like biopharmaceuticals and state-owned heavy industry companies, whereas in-depth case studies of the value creation process using management accounting within the leading home appliance companies are not numerous [3, 6]. Since Midea Group was chosen as a digital transformation model in the Chinese home appliance industry, it developed a finance shared service center and adopted the "T+3" model, which can be considered a typical example of the concept of digital management accounting. This paper will hence use Midea Group as the case study of the present research.

The current case studies of digital management accounting tend to focus more on the central state-owned enterprises and biopharmaceutical manufacturing sectors [3, 6]. The present paper is an application of theories concerning digital transformation and integrating business and finance into the home appliance manufacturing environment and thus adds more to the literature on management accounting case studies in the home appliance sector; the forthcoming case analysis to be performed through the use of the TOE framework will also contribute to the practical uses of this theory within the sphere of management accounting of the home appliances companies [5].

Although most manufacturing companies have started using digital management accounting systems, there are often practical issues, including a gap in the relationship between business and finance functions and ineffective results of digital tool implementations [2]. The present paper discusses the practical experience and the flaws of the Midea Group to offer practical advice to home appliance and other similar manufacturing companies that want to make the accounting role move away from external disclosure towards inside operational decision making and create value [10].

2. Literature Review

2.1 Current State of Domestic Research

The Ministry of Finance has produced a number of documents at the policy level to encourage accounting digitalization and, in particular, stated the need to increase accounting functionality to meet the two goals of meeting external regulatory standards and assisting with internal management decisions [7]. Luo Junhui suggests that in the digital era, companies need to enhance their data governance, develop financial shared service centers transformation and upgrading, and enhance the integration of business and finance [5].

In the light of corporate practice studies, there have been a lot of case studies conducted by domestic researchers on the application of management accounting tools in a digital context, with emphasis on the examples provided by manufacturing companies. Deng Jie et al. examined the use of new management accounting tools including budgeting and cost management in a digital setting through the case study of China Biologics Chengdu Company [3]; Cheng Yuqing et al. explored the experience of Jihua 3502 Company, which

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proved that digital systems could facilitate collecting and sharing of business data both at the beginning and throughout the entire process, thus increasing the area of management accounting control [6].

Meanwhile, local studies have noted that the digitalization of management accounting is a systemic innovation as opposed to a mere adoption of technical systems. Other researchers believe that digitalization cannot be implemented entirely based on technical equipment but that it must be supported by organisational changes, reforming performance, and a flexible approach to management [8, 9]. Xuanyuan Shi'ang suggests that companies need to develop a sophisticated management accounting platform to shift the financial accounting processes into strategic finance and business finance [10]. Some other research indicates that most companies have a real problem with the disconnection of business and finance regarding their digital efforts, which complicates the implementation of management accounting instruments [2]. Pan Jie emphasizes management accounting reports and states that digital transformation needs to transform the management accounting reporting system so that it can effectively respond to the requirements of multi-level business decision-making [4]. Chen Xinmin believes that the development of a digital mindset and multi-stakeholder coordination are necessary preconditions to achieve the development of the digital transformation of accounting [1].

The review of the previous domestic research shows that the studies conducted in China are based on a multi-dimensional approach to the digitalization of accounting, such as macro-policies, corporate cases, and practical issues. Although the majority of the case samples are focused on central state-owned companies, heavy industries, and biopharmaceutical manufacturers, there is still little discussion on the topic of digital management accounting cases of companies operating in the competitive home appliance sector.

2.2 Current State of International Research

The relationship between digitalization and management accounting, as well as strategic management accounting, was studied by foreign researchers quite early. An empirical investigation of the financial services industry of India was performed by Chotia et al. (2025) under the contingency theory, and it was concluded that strategic management accounting is an important instrument that enterprises can use to develop competitive advantage, but digital transformation and cybersecurity are constantly mediating factors. Strategic management accounting value creation potential can only be achieved through the synergy of management accounting practices, digital technologies, and information security governance [11]. The paper also indicates that there is no one-size-fits-all model of management accounting practices; the efficacy of a company-specific set of management accounting instruments should be customized to the particular industry, technology base, and internal and external environment, emphasizing the importance of the contingency strategy [11].

The bibliometric cluster analysis of Teixeira et al. (2025) was performed to review the available literature in the area of accounting digitization. It is suggested that digital technologies will streamline the business process in accounting, that automation will minimize the mistakes in accounting, and that such a transition may lead to changing the nature of the accountancy role as a transactional bookkeeping to an analyst and decision-maker [12]. At the same time, the research points out that the digitalization of accounting is not just about updating technology or changing the iteration of technology, but rather the change in organizational culture, the digital literacy of finance workers, and the amount of attention by management are all important issues that should not be ignored. Easy introduction of software and hardware systems but lack of organization and human capital development can quickly result in digital transformation results being lower than the expected ones [12]. Nevertheless, the sample discussed in the current paper is mainly focused on the sphere of the public accounting, which also implies that it can be extended with regard to the topic of the digital transformation of the management accounting in the environment of the privately owned manufacturing companies.

Moreover, researchers abroad have also performed more focused investigations concerning digital transformation, management accounting, and the TOE framework. Zheng (2025), by means of a mixed-methods analysis, indicated that digital technologies could be used to facilitate efficient integration of business data with ESG information, enhance the quality of information disclosure, and push the management accounting function toward the creation of value and sustainable governance [13]; Zhao et al. (2025) carried out a configuration analysis of electric vehicle manufacturers under the TOE framework and discovered that a combination of various factors, such as digital technology, organizational capabilities, and the external

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environment, is the essential way to make manufacturing companies realize performance gains with the help of digital transformation [14]; Li et al. (2026), with the help of data related to Chinese listed companies, verified that applying artificial intelligence may contribute to increasing the degree of supply chain digitization, and organizational-level digital investment, data integration, and innovation capabilities are of paramount importance as mediators [15]. The aforementioned researches further imply that the combined effect of technological, organizational, and environmental factors is an important factor in determining the success of the corporate digital transformation, which supports the analysis made in this paper of the value creation of Midea Group's digital management accounting in the context of the TOE framework both theoretically and empirically.

In general, international research has acknowledged the intermediary function of digitalization in achieving the value of management accounting and has also differentiated between various technological and organisational influencing factors, which is why it can be referred to as an international theoretical background of the TOE analytical framework. Nevertheless, most of the empirical samples are focused on financial and public services sectors, whereas case studies of home appliance manufacturers working in the fully competitive market are quite infrequent.

2.3 Commentary

To sum up, the body of theoretical and case-oriented literature on digital transformation and management accounting has been well developed by domestic scholars with detailed coverage of policy orientation, tool use, and practical issues [3, 7]. The international literature also supports the fact that digitalization acts as a mediator in the value creation of management accounting and underlines the fact that technological and organizational contexts are both determinants of the results of transformation. Nevertheless, the current case studies have a tendency to concentrate on heavy industries, biopharmaceuticals, and state-owned companies. The analysis of the pathways of management accounting value creation in the highly competitive home appliances industry, namely, using Midea Group as the object of research and utilizing the TOE framework, is quite sparse, and it becomes the research entry point of the paper.

The research scope is as follows: Firstly, theories related to digital management accounting will be discussed; secondly, a corporate profile of Midea Group will be presented, as well as the history of its digital transformation; thirdly, using the TOE model, the digital management accounting activities of Midea and the results of the value creation will be examined (by us) through a technological, organizational, and environmental point of view; lastly, the current problems are summarized and some optimization suggestions are given. In research methodology, the author uses the methods of literature review and case study: the literature on digital transformation and value creation in management accounting is reviewed and an analytical framework is developed; Midea Group is used as the case object, and the case data are obtained through publicly available annual reports and published literature, but not through surveys conducted within the company [1, 3]. Figure 1 represents the research framework.

The novelties of this paper are as follows: Firstly, the research is based on Midea Group which is a leader in the home appliance industry and thus it enriches the existing empirical literature on digital management accounting in the home appliance manufacturing industry; secondly, it adopts the TOE framework to examine digital management accounting practice in three aspects i.e., technology, organization, and environment, which differentiates it from case studies that just illustrate how tools were used. Limitations are: all analysis is based on publicly available secondary sources; it has not been possible to gain access to the non-public operational data of Midea; and some internal management accounting information had to be derived through the use of publicly available information, which limited the depth of the research.

3. Introduction to the Midea Group Case Study

3.1 Overview of Midea Group

Midea Group was formed in 1968 as an initial stage of a small-scale plastic products processor in Shunde, Guangdong, and has developed into a multinational home appliance technology company. Its portfolio includes consumer appliances, heating, ventilation, and air conditioning (HVAC), robotics and automation, and digital services. The products of the company are distributed in over 200 countries and territories around

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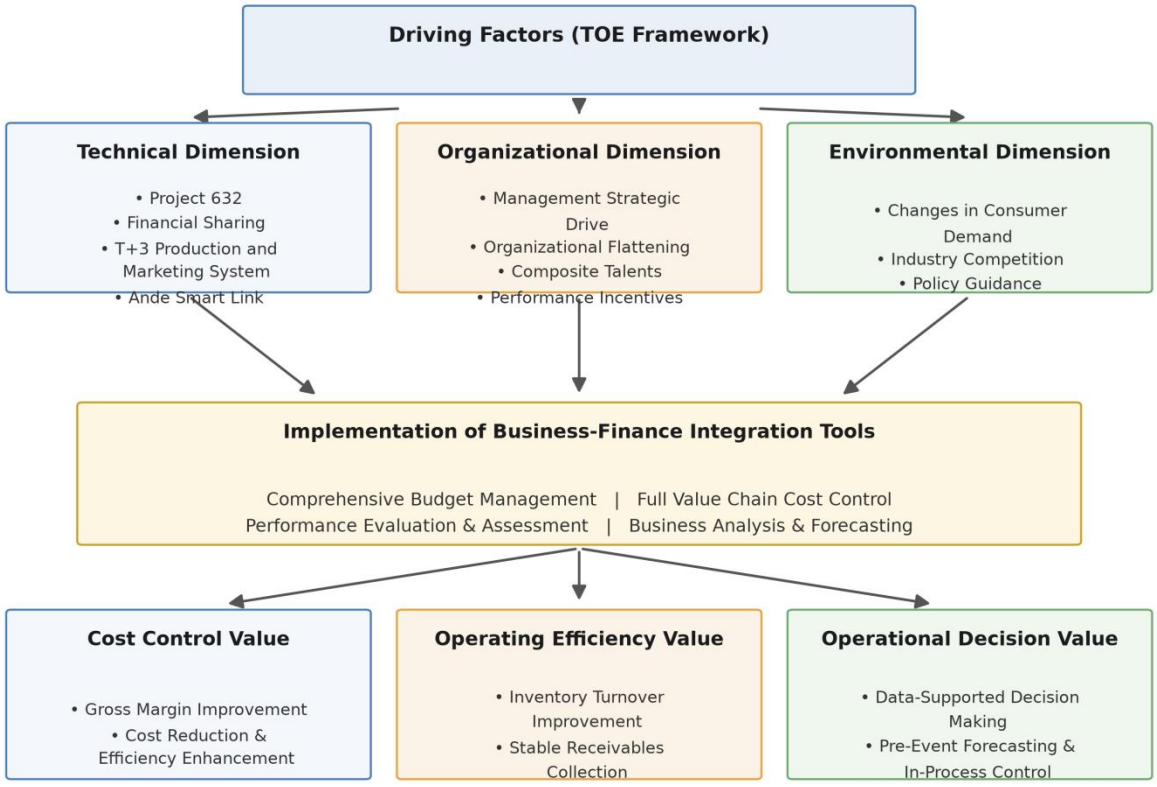
the world, and the company has set up many R&D centers and production facilities in the country and abroad, thus becoming a major player in the home appliance manufacturing sector in China [19].

In the context of the market of home appliances moving into the stage of competition within a mature market, and the fast-changing demands of customers, Midea Group announced a mass digitalization program in 2012. It has created a digital business platform and enhanced financial and business integration and is an example of great importance concerning digital management accounting practices in manufacturing companies [19].

Based on the disclosure on the Midea Group official website and its published annual reports, Midea Group earned an overall operating revenue of 409.084 billion yuan and a net profit for shareholders of the company of 38.5 billion yuan in 2024. The company has some 190,000 global employees and has featured on the *Fortune* Global 500 list in recent years, a leading company in the home appliance sector of China that is also among the largest and most digitally equipped companies in the home appliance sector. The Group has several brands, such as Midea, Little Swan, Huiling, Toshiba, COLMO, and KUKA, with the business extending to smart home, industrial technology, building technology, robotics and automation, new energy, as well as digital innovation. It has very illustrative digital management accounting that provides useful information.

Figure 1: Research Framework of Midea Group's Digital Management Accounting Value Creation



Data Source: Prepared by the author based on the TOE theory and case study materials.

3.2 Overview of Midea Group's Digital Transformation

The digital transformation of Midea is segmented into four evolutionary steps, in which the company has been gradually implementing the process of digital transformation and improvement of the business processes, organizational structure, and financial systems.

The first stage (1.0) (2012-2015) was aimed at the unification of the infrastructure and the implementation of the so-called "632 Project." As of 2012, the individual business entities of the Midea Group worked independently in the departments; the information systems of departments did not match, the standards of business processes varied, and silos of data were a significant problem [19]. Fang Hongbo suggested three strategic pillars of Product Leadership, Efficiency-Driven, and Global Operations, initiated the 632 Project, and created six main business systems, three management systems, and two technology platforms. It united

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the IT systems, business processes, and data standards of the Group into one, making it "One Midea, One System, One Standard" and providing a good technical basis for the future growth of the financial shared services center and introduction of digital management accounting [19].

In the period of digitalization 2.0 (2016- 2017), Midea applied the concept of the"T+3" model, which changed the way Midea produced goods on the basis of sales. The old model of production based on sales, which forced dealers to store too much product, gave way to the new model of orders, called "T+3" [19]. T means that the client has placed an order; "T+1" means that materials are being prepared; "T+2" means that production is being organized; and "T+3" means that logistics and shipment have been completed, shortening the entire order delivery process to 12 days. The company used the Midea Cloud Sales Platform to combine terminal business information of dealers to establish C2M (Consumer-to-Manufacturer) flexible manufacturing to provide small-batch customization production, reducing the stress of excess inventory. At the same time, the company also launched the VMI (Vendor-Managed Inventory) model to reorganize the coordination mechanism between procurement and raw material inventory [19].

In the Digitalization 3.0 period (2018-2020), Midea promoted the progress of the Industrial Internet in order to realize cooperation between the ecosystem of the supply chain. The enterprise created the M.IoT and Meiyun Zhishu Industrial Internet platform; the Nansha Smart Factory integrated a large number of IoT devices, interconnected manufacturing machines, and facilitated real-time data gathering and supervision of the manufacturing processes [19]. Its branch, Ande Smart Link, constructed a one-stop smart logistics network that allowed it to digitally manage and control the process throughout the warehouse and transport chain, thus enhancing the logistics cost-management capabilities of the Group. The digitalization of the company also went beyond internal production to the scope of upstream and downstream supply chain cooperation [19].

During the Digitalization 4.0 stage (2021-present), Midea has improved the overall intelligent transformation and introduced the DTC (Direct to Consumer) reform. The pillars of strategy are revised as Technology Leadership, Direct-to-Consumer, Data and Intelligence-driven, and Global Breakthroughs [19]. Improving the DTC (Direct-to-Consumer) channel transformation, Midea has adopted a uniform "single inventory" management model, made use of big data technology to predict market demand, and increased its overseas business footprint. Since the development of digitalized production sites abroad and the increase in business complexity coincide with each other, management accounting is increasingly required to assist in making operational decisions [19].

3.3 Internal and External Environment for Midea's Advancement of Digital Management Accounting

3.3.1 Internal Conditions

By adopting the so-called 632 Project, Midea has developed an integrated organization-wide IT infrastructure base [19]. The leadership team in the company has raised digital transformation to become a central group strategy with continued allocation of financial and project resources to it. At the same time, the company has introduced organizational flattening reforms and streamlined its workforce structure, and thus created the organizational framework that will enable management accounting to shift its functions within the traditional accounting to those of business analysis and budget control [17].

3.3.2 External Environment

The domestic appliance sector is an extremely competitive and mature market that is dominated by high levels of product homogeneity and erratic changes in the price of raw materials. Cost control and inventory-driven capital are typical operational challenges in manufacturing companies, forcing them to use digital tools to lower their costs and enhance their efficiency [19]. The government has released policy papers regarding supply-side structural reform and digitization of accounting, prompting manufacturing companies to come up with smart manufacturing and enhance the process of integration between business and finance, which gives macro-level policy directions to the implementation of digital management accounting [20]. Meanwhile, the demand in the consumer market is becoming more diverse, and the risks of the conventional mass-production model of standardized production are growing, and the companies need to depend on business data to act fast to market conditions [19].

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4. Case Analysis and Discussion

4.1 Explanation of Data and Source Materials

The information concerning the case analysis of this paper is based on the annual reports that were published by Midea Group, published theses, and publicly accessible materials on corporate transformation [19]. Since the paper could not get access to the internal management accounting source ledgers and undiscovered internal operation data of Midea Group, the case analysis is mainly based on the qualitative analysis of the available public information; quantitative analyses of operations and costs will be filled in and improved after organization of the annual report data.

4.2 Midea's Digital Management Accounting Implementation Pathway from the Perspective of the TOE Framework

This part discusses the process of implementation of digital management accounting in Midea using the TOE model. The TOE framework, which was proposed by Tornatzky and Fleischer in 1990, asserts that the effectiveness of new technology implementation in an enterprise is determined by the joint influence of three factors, namely: technology, organization, and environment [16]. The technology dimension refers to hardware and software systems and data resources of the enterprise; the organizational dimension refers to the organizational structure of the enterprise, management support, talent pool, and performance evaluation mechanisms; the environmental dimension refers to external market competition, policy trends, and changes in consumer demand. At the same time, the theory of technology empowerment claims that digital platforms improve corporate capabilities in three ways, i.e., resource empowerment, structural empowerment, and data empowerment [18]; digital management accounting has developed over time as a result of the integration of digital technology with traditional management accounting, which is based on the idea of integrating both business and financial information, which allows implementing the tools of comprehensive budgeting, cost control, and performance evaluation digitally [5]. In the subsequent paragraphs, a thorough analysis will be given in the sequence of three dimensions: technology, organization, and environment.

The technological aspect refers to digital resources accessible to the enterprise, including hardware and software systems and information platforms. Midea uses several digital business systems to support the implementation and functioning of different management accounting tools [16].

To start with, based on the development of the 632 Project and the later M.IoT industrial internet platform, the Group has completed the unified deployment of various systems, such as ERP, PLM, and BI to unify business data in R&D, procurement, production, and sales [19]. With this as a basis of technology, the Finance Shared Service Centre of Midea centralizes the handling of repetitive accounting work, and thus allows the financial employees to concentrate more on management accounting responsibilities like preparing budgets, analyzing costs, and assessing performance of operations which makes it possible to aggregate and streamline business-side information to finance side [19].

The second is the digital production and sales system that supports the order model of the "T+3". Dealers place their orders in the form of an online request to the Midea Cloud Sales platform and the system takes care of reviewing orders, scheduling production of materials, and reconciling inventories [19]. The real-time order information can be accessed directly by management accounting personnel at the point of sale to perform sales forecast and inventory cost analysis. It moves out of the conventional approach of preparing the budget based on estimated sales volumes of the dealer channel and allows controlling costs and production-sales budgeting according to actual orders [19].

Finally, the VMI (Vendor-Managed Inventory) system and the Ande Smart Logistics Platform. In the VMI scheme, suppliers keep supplies of raw materials near Midea warehouses that settle only upon consumption of raw materials. It integrates raw material stock levels in real-time, which assists management accountants in determining purchasing expenses and raw material capitalization costs [19]. The Ande Smart Logistics Platform combines information on all stages of the supply chain, starting with warehousing up to transportation, serving as a source of operational data to conduct accounts of logistics cost and expenditure control during the sales process [19].

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The organizational dimension is concerned with the organizational structure within a company, management support, talent pool, and performance evaluation systems; despite having sophisticated digital systems, digital management accounting will fail to provide any practical benefit without organizational change [17]. First of all, the strategic leadership by management and organizational restructuring. The upper management of Midea Group has defined digital transformation as one of the central strategies of the company, and over the years, it has continued to allocate funds to develop critical projects such as the finance shared service center and the "T + 3" system [19]. At the same time, the company has introduced changes to make the organizational structure flatter, reduce the number of management levels, eliminate the silos between business units, and remove the barriers to communication between the business and finance functions so that there would be no organizational barriers to the execution of management accounting aimed at business-finance integration [17]. Secondly, the growth and optimization of the talent pool. Midea shifted the structure of its workforce to raise the percentage of employees who have a bachelor's degree, master's degree, or doctorate degree, with emphasis on developing multidisciplinary talent that is capable of operating home appliances, financial knowledge, and digital tools [19]. The company has provided business education to finance staff to help in the transfer of traditional accountant-focused finance workers to business finance and operational analysis positions that are aligned with the demands of digital management accounting posts [17]. Thirdly, creation of performance incentive mechanisms. Midea has put in place business partner programs and stock option incentive schemes and incorporated cost minimization, efficiency enhancement, and successful implementation of digital initiatives in each business unit's performance evaluation systems. It means that management accounting control requirements are pushed to the bottom-level of operations, and business units are forced to comply with management accounting efforts like shared services and budget control [19].

Environmental dimension means the external market competition and macroeconomic policy environment experienced by the enterprises; the external market may either facilitate or restrict the implementation of new technologies [16]. Initially, market competition pressure in the home appliance sector. The internal market of home appliances is approaching saturation, with high levels of competition because of product homogenization and high levels of raw materials price fluctuations. Excessive stock locks a huge amount of operating capital of the company. Ex post financial accounting alone cannot be used to reduce operational risks, thus Midea must use digital management accounting to perform ex ante forecasting and real time cost control to achieve the savings on costs and efficiency and gain a competitive advantage in the market [19]. Secondly, the direction provided by national macroeconomic policies. The supporters of supply-side structural reforms suggest that manufacturing companies should cut the costs and increase their efficiency, and it is supported by the corresponding policy documents issued by the Ministry of Finance (they encourage a shift towards digital transformation of accounting and the combination of business and finance) - the scope of accounting needs to be increased in order to influence the internal operational decision-making processes. These policy guidelines have pushed Midea to come up with a digital management accounting system and streamline the internal operational management of the Group [20]. Thirdly, shifts in the consumer market demand. With the increase in diversity and personalization of consumer demand, the risks of operational failures of the traditional mass production models have increased. Market and business data should be used to make demand trend analysis and support flexible production and customized business operations. Changing external markets have put greater practical requirements on the ability of management accounting to make decisions based on its data [19].

Due to the synergetic effect of technological, organizational, and environmental factors, Midea is implementing digital solutions into the use of various management accounting instruments in practice [16]. Comprehensive Budget Management: The production and sales budget are done using the past actual and supply chain operations data on the basis of "T + 3" instead of the earlier experience-driven form of budgeting. It combines business data and allows monitoring the budget execution dynamically [19]. Cost Control: Through the information systems, the company performs full value chain cost analysis by aggregating the business data across the entire chain, i.e., R&D, procurement, production, and logistics, to determine where the company can optimize and reduce costs [19]. Performance Appraisal: The company applies the performance evaluation role of management accounting by integrating business unit measures like inventory turnover, cost indicators, and operating profitability into the performance appraisals [19].

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4.3 Analysis of Value Creation Outcomes from Midea Group's Digital Management Accounting

4.3.1 Compilation of Key Indicators

Operating indicators and financial ratios of the company were compiled by gathering information from the annual reports of Midea Group (2013–2019), and important indicators were extracted; the particular data are presented in Tables 1 and 2.

Table 1: Midea Group's Key Operating Indicators, 2013–2019

Year	Revenue (100 million yuan)	Cost of Sales (100 million yuan)	Selling Expenses (100 million yuan)	Administrative Expenses (100 million yuan)	Research and Development Expenses (100 million yuan)	Net Income (100 million yuan)
2013	1,209.75	928.18	124.32	67.33	—	82.97
2014	1,416.68	1,056.70	147.34	74.98	—	116.46
2015	1,384.41	1,026.63	148.00	74.42	—	136.25
2016	1,590.44	1,156.15	176.78	96.21	—	158.62
2017	2,407.12	1,804.61	267.39	75.10	72.70	186.11
2018	2,596.65	1,881.65	310.86	95.72	83.77	216.50
2019	2,782.16	1,979.14	346.11	95.31	96.38	252.77

Note: (1) Starting in 2017, the company began reporting R&D expenses separately from administrative expenses in accordance with new accounting standards. For 2013–2016, R&D expenses were not disclosed separately (they were included in administrative expenses); therefore, there are slight discrepancies in the calculation of administrative expenses and R&D expenses across these periods. (2) Data source: Midea Group Annual Reports, 2013–2019 [21].

Table 2: Midea Group's Key Financial Ratios, 2013–2019

Year	Gross Profit Margin (%)	Net Profit Margin (%)	Inventory Turnover Ratio (times)	Accounts Receivable Turnover Ratio (times)
2013	23.28	6.86	6.50	13.60
2014	25.41	8.22	6.99	16.39
2015	25.84	9.84	8.06	14.03
2016	27.31	9.97	8.87	13.35
2017	25.03	7.73	8.01	15.54
2018	27.54	8.34	6.37	14.07
2019	28.86	9.09	6.38	14.62

Note: (1) Gross Profit Margin = (Revenue – Cost of Goods Sold) ÷ Revenue; Net Profit Margin = Net Income ÷ Revenue; Inventory Turnover Ratio = Cost of Goods Sold ÷ Average Inventory; Accounts Receivable Turnover Ratio = Revenue ÷ Average Accounts Receivable; (2) Data Source: Midea Group Annual Reports, 2013–2019 [21].

4.3.2 Value Creation Through Cost Control

With regard to profitability indicators (Figure 2), the gross profit margin of Midea Group had an upward trend between 23.28 percent in 2013 and 28.86 percent in 2019, whereas its net profit margin increased between 6.86 percent and 9.09 percent, which is an indication of general improvement of profit quality. It could be explained mainly by the ongoing cost control supported by digital management accounting tools: using the order system of the "T+3" model and VMI (Vendor-Managed Inventory) management of supplier inventories, the company organized production according to sales, which reduced the inventory of raw materials and finished goods; through the use of the M.IoT platform to integrate all the data of R&D, procurement, production, and logistics, the company performed the full-value-chain cost analysis, determined the areas of cost reduction, and obtained fine-grained cost control [19]. Simultaneously, the product mix upgrade, high-end product transition, and multi-category strategy combined to push the growth in the gross profit margin. Digital management accounting gives information to analyze the profitability of products and it has become one of the main pillars of the better profitability of the company [21].

Also, it is useful to note that in 2017, there was a short-term decrease in gross profit margin and net profit margin (25.03% and 7.73%, respectively), which was largely determined by a range of factors, including the merger of the Kuka Group after its purchase in 2017, increasing prices of raw materials, and currency movements. The changes in these indicators indicate that the results of operations are affected by other factors,

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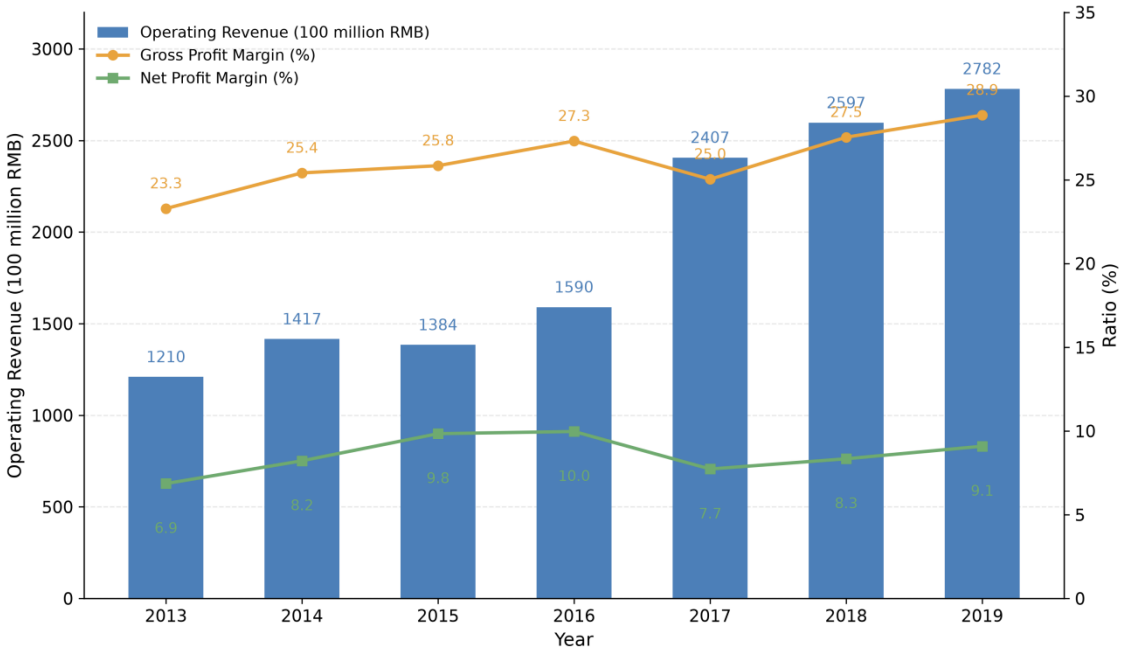
such as the macroeconomic situation and the integration of M&As; thus, transformations in the profitability indicators should not be simply related to the introduction of digital management accounting [19].

Figure 2: Changes in Midea Group's Operating Revenue and Profitability, 2013–2019

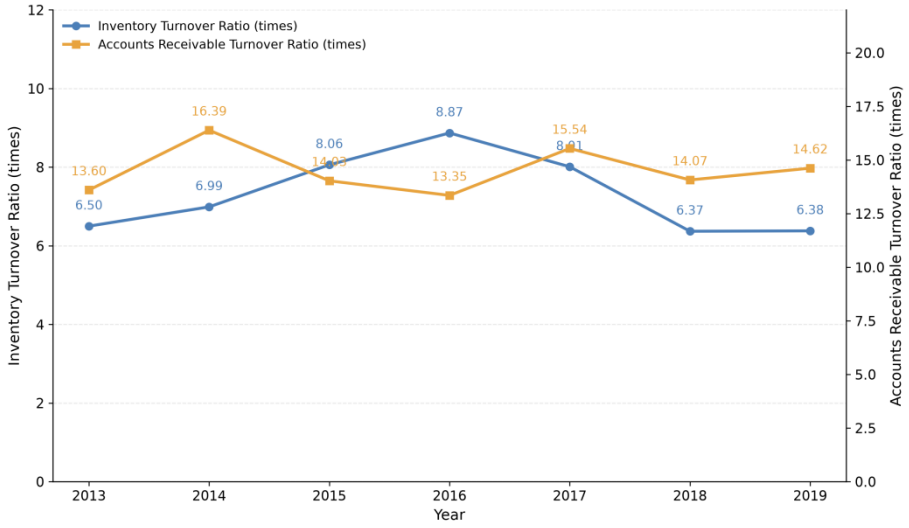


Data Source: Midea Group Annual Reports, 2013–2019.

4.3.3 Value Creation at the Operational Turnover Level

The inventory turnover (Figure 3) has shown an increase in the ratio from 6.50 times to 8.87 times over the years 2013-2016, where the highest increment was made during 2015-2016. This is consistent with the introduction of the entire "T+3" model and VMI strategies in about 2016, the consequent decrease in the amount of capital invested in the inventories, which demonstrates the beneficial effect of the system of digital production and sales on inventory control. Due to the consolidation of KUKA and the growth of foreign markets in 2017, the inventory levels were very high, and the inventory turnover ratio fell to 8.01 times. Between 2018 and 2019 it remained relatively constant at approximately 6.4 times, which means that the efficiency of operations has reached a plateau stage [21].

Figure 3: Changes in Midea Group's Operating Efficiency, 2013–2019



Data Source: Midea Group Annual Reports, 2013–2019

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With respect to accounts receivable turnover, the ratio was mostly within 13-16 times during 2013-19 with the ratio standing at 14.62 times in 2019 which means that the collection efficiency has been steady. It is well connected to Midea trying to reinforce dealer order and receivable management using digital channel systems like Meiyunxiao and to develop DTC channel transformation; digital solutions have offered a data basis for sales receivables management [19].

4.3.4 Value Creation at the Operational Decision-Making Level

In the context of decision-making, digital management accounting has forced Midea to replace traditional post-event accounting with pre-event forecasting and in-process control of its finance function. Combining the business and financial information will enable management to have multidimensional information, which could be used in making some key decisions, i.e., product pricing, channel strategy, supply chain plan, and R&D investment to achieve the benefits of management accounting in terms of decision support [18]. The trends are also supported by changes in the expense structure: the sales expense ratio increased from 10.28 percent in 2013 to 12.44 percent in 2019, attributable to the growth in sales investments due to channel transformation and foreign market development; the R&D expense ratio was up by 3.02 percent in 2017 and up by 3.46 percent in 2019, which is consistent with the continuous investment of the company in digitalization and smart technologies, which forms the basis of long-term value creation [21].

4.3.5 Summary of This Section

On balance, the results of value creation of digitized management accounting of Midea Group have largely been favorable: profit rates have been gradually growing, the efficiency of operations has greatly increased in the course of the implementation of the program called the “T+3” stage, and the use of data to support business decisions has become more solid. Nevertheless, the objective viewpoint should be kept in mind that alterations in these indicators can be affected by various factors such as macroeconomic conditions, cost of raw materials, mergers and acquisitions consolidation, and business growth. Of these, digital management accounting is one of the major contributors, but not the only reason [19].

4.4 Analysis of Existing Issues in Midea’s Digital Management Accounting

This section provides a qualitative overview of the practical limitations in the application of Midea digital management accounting practices by summarizing the literature that is already in the open domain. All the conclusions are based on publicly available sources and contain no non-disclosed information of the corporation [19]. Initially, the impediments to the integration of business, finance, and technology remain. Even though Midea has implemented various digital business platforms, there is still weakness in the integration of certain business systems and financial systems. The needs of the IT team differ from the needs of the business and finance teams, with some digital projects focusing more on technical development rather than adapting to real-life management accounting problems and thus the business information value is not maximized [19]. Secondly, the asymmetry between the digital maturity of upstream and downstream suppliers constrains the effectiveness of management accounting. Many of the upstream suppliers are small and medium enterprises with low levels of digitalization and with no standardized digital solutions, complicating to integrate upstream business data in Midea information systems fully. This leads to gaps in data at the end of the supply chain which impacts the validity of the cost forecasts and operational risks evaluation [19]. Thirdly, there is a lack of multidisciplinary talent. There are not enough people skilled in the home appliance business processes, management accounting knowledge, and data analysis software. Also, there are some employees on the front line who cannot be very proficient in the use of the digital management accounting systems, which makes it difficult to use these systems in the operational environment [17]. Fourthly, the measurement of hidden costs is challenging to determine. Hidden costs, including those associated with R&D trial-and-error expenses and channel maintenance expenses, cannot be measured accurately under the current system, and management accounting has limited capability to analyze and control them [19].

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5. Research Implications and Recommendations

5.1 Recommendations for Optimization and Improvement at Midea Group

5.1.1 Further Develop the Integration of Business and Financial Systems and Enhance the Framework of Data Governance

Midea has implemented various digital business systems, but some business systems and the financial system remain separated by barriers to integration. The differences in priorities between the IT team and business and finance teams have resulted in some digital projects being focused more on technical development than business adaptation, which has failed to completely maximize the value of data [19]. As a countermeasure, Midea must be based on the business environment needs of management accounting to continue integrating data connections between R&D, purchasing, manufacturing, sales, and financial systems; implement uniform data standards and a master data management system; and define data interfaces and responsibility across systems. Meanwhile, the company needs to encourage joint project start-ups of IT, business, and finance teams and consider the principle of whether or not a digital project actually enhances operational decisions and saves money as a part of project evaluation criteria to avoid the lack of alignment between digital innovation and value generation in business [19].

5.1.2 Strengthen Digital Collaboration in the Supply Chain and Improve the Supplier Management System

The level of digital maturity among many small and medium-sized enterprise (SME) suppliers that belong to the upstream sector is highly diverse, and data standards are not uniform, which leads to fragmented supply chain data and impacts the precision of cost projection and risk evaluation [19]. Midea needs to streamline its hierarchical and classified supplier assessment system, include digital coordination features in the list of supplier performance indicators, and offer supportive assistance in the form of system integration and information on data standards to key suppliers in order to create a coordinated digital transformation of the upstream and downstream companies. Simultaneously, the company must set up an early warning system for the risk of raw material price volatility and use big data to track the trends in commodity prices and increase the predictability of procurement cost control [20].

5.1.3 Enhance the Growth of Multidisciplinary Business and Finance Talent as a Way of Consolidating the Talent Base

The lack of hybrid talent, that is, people who can comprehend the home appliance business process as well as management accounting and data analysis, constrains the efficiency of management accounting tools in business operations [17]. The company needs to further optimize its employee structure and put more effort into hiring professionals who combine business and finance knowledge and have the ability to use digital finance tools; educate the current employees on business knowledge and the capacity to analyze the data, and train them on financial and digital literacy, so that the finance employees can be transformed into business finance and operational analysis positions; at the same time, the effectiveness of digital management accounting tools should be incorporated into performance assessments as one of the components of the closed loop system of development-utilization-incentives [19].

5.1.4 Improving the Accounting for Hidden Costs and Risk Early Warning Mechanism

The implicit expenditures, including R&D trial-and-error and channel maintenance, are not easy to evaluate precisely with the available systems, and the management accounting capability to assess and manage these expenditures is quite inadequate [19]. The adoption of activity-based costing in the detailed aggregation and allocation of resource consumption in various aspects like R&D, channels, and services could be explored by Midea to make hidden costs explicit; simultaneously, incorporating such with full-scale budget management would allow the firm to develop dynamic monitoring and early warning systems on R&D investments, channel expenditures, and others to give more holistic cost data to management to help them make better decisions [19].

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5.2 Implications for Domestic Home Appliance Manufacturers

5.2.1 Strategic Level: Elevating Digital Management Accounting to a Core Corporate Strategy

Digital transformation has become a central strategy in the group, according to Midea. Only with a persistent push by management and a long-term investment in resources was it possible to implement large-scale projects like a financial shared service center and "T+3" and achieve desirable outcomes [19]. Meanwhile, the first step in achieving this uniformity was the unification of the information systems, data, and business process standards of the Group under the banner of the 632 project, and subsequently expanding those standards to other application areas, including "T+3", M.IoT, and smart logistics, with the aim of overcoming the challenges of system proliferation and data silos [19]. The rest of the companies in the home appliance industry must also consider implementing the development of digital management accounting in their strategic plans and make sure that it becomes a top-priority initiative. During the first stage, they need to focus on integrating the internal information system and unifying the standard of data, then introduce the implementation of business applications over time. This strategy eliminates redundant development and wastage of resources, and makes sure that the digital initiatives are not limited to the IT department and do not lack overall coordination.

5.2.2 Breaking Down Barriers to Business-Finance Integration and Strengthening the Foundation of Data Governance

In order to overcome the obstacles in business-finance system integration that have been discussed previously, manufacturers of home appliances must not prioritize technology over organization. While implementing digital transformation, they need to also create data connections between business and financial systems, align data standards, and implement a master data management system. They ought to foster collaborative project initiation of IT, business, and finance teams, and consider the acceptance criteria of digital projects to include whether or not they actually enhance decision-making in businesses and lower costs, so that the digital projects do not become separated out of the process of creating business value [16, 19].

5.2.3 Promoting Digital Collaboration in the Supply Chain to Drive Joint Development with Upstream and Downstream Partners

To overcome the problem of non-uniform digital maturity in the upstream and downstream suppliers as stated before, the home appliance companies are required to improve their supplier grading and classification assessment models, include digital collaboration tools in the supplier performance indicators, and implement enabling support, including system integration and data standards training, to core suppliers in order to achieve synchronized digital transformation throughout the supply chain. Meanwhile, they need to develop a mechanism of early warning on the risks of volatilization of raw material prices to ensure greater predictability in managing the costs of procurement [19, 20].

5.2.4 Strengthening the Development of Multidisciplinary Business-Finance Talent and Performance Incentives

In order to resolve the problem of lack of multidisciplinary talent indicated previously, home appliance companies need to put more pressure on recruiting individuals who have combined business and finance skills and also those who have digital finance skills. They are supposed to offer training in business and data analysis to the finance staff, and training in financial and digital literacy to the business staff, and include the effectiveness of digital management accounting tools in performance evaluations to create a closed-loop system of development-utilization-incentives [17, 19].

5.2.5 Improving the Accounting for Hidden Costs and Risk Early-Warning Mechanisms

In order to handle the challenge of properly quantifying hidden costs discussed previously, the home appliance companies may consider implementing activity-based costing to perform a specific analysis and allocation of resources consumption both in terms of R&D, distribution channels, and services so that hidden costs are made explicit. Simultaneously, with the help of this strategy coupled with an overall budget control system, they can put in place dynamic monitoring and early warning systems and give management more holistic cost information on which to base their decisions [19].

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6. Research Conclusions

6.1 Key Research Conclusions

With the help of the example of the Midea Group and depending on the TOE framework and the concept of technology empowerment, this paper will examine the value creation avenues of Midea management accounting within the digitalization paradigm systematically. It looks at the efficacy of value creation with data drawn out of Midea Group's annual reports over the years 2013 to 2019 [21]. The primary findings of the research are:

Firstly, the synergistic effect of three kinds of factors, technology, organization, and environment—is an essential condition of value creation in digital management accounting. In terms of technology, Midea created a digital base for the management accounting process with the help of the 632 Project, the M.IoT platform, the "T+3" production and sales system, VMI, and smart logistics systems; in the aspect of organization, it ensured organizational security of management accounting change with the help of strategic leadership, organizational flattening reforms, developing multidisciplinary talent, and performance incentive systems; in the aspect of environment, this has been caused by industry competition, government policies, and changes in consumers demands, which have resulted in the emergence of external momentum towards digital transformation [17, 19]. The three dimensions go together and none can be dispensed.

Secondly, the value creation of digital management accounting is done by using the concept of data integration-tool enabling-decision support. At the level of data integration, Midea combines and consolidates business data with financial information; at the level of tool empowerment, management accounting tools are realized using actual business data, including complete budgeting, control over costs, and evaluations of performance; at the level of decision-making support, management accounting moves towards post-event calculation, but instead, it becomes pre-event prediction and in-process monitoring, which provides the foundation for making a business decision and brings about the transformation between the role of accounting and that of value-creation [18, 19].

Thirdly, the outcome of value creation has been mostly positive, although it was affected by various factors. In terms of financial figures, Midea's gross profit margin increased (23.28% in 2013) to (28.86% in 2019), whereas its net profit margin went up (6.86%) to (9.09%), and inventory turnover saw a great improvement in 2015-2016 because of the introduction of the T+3 model, and the turnover of accounts receivable typically stood high at around 13-16 times [21]. Nevertheless, in 2017, there were several indicators that declined temporarily, owing to the consolidation of the acquired companies and increased cost of raw materials. It is shown that digital management accounting is a significant element of value creation but not the only cause; these indicator changes should be viewed holistically in view of the macroeconomic situation, state of the industry, and company operations [19].

Fourthly, it is evident that Midea has a lot of potential in improving its digital management accounting procedures. It can be seen above all in the obstacles of integrating the business and financial systems, lack of adequate digital interaction within the supply chain, and lack of multidisciplinary expertise, as well as low capability to account for hidden costs. Such improvements should be made in the form of increasing the level of system integration, boosting the cooperation of the supply chains, developing talent, and improving the cost accounting methods [19].

6.2 Research Limitations and Future Prospects

6.2.1 Research Limitations

The limitations of this study are the following: Firstly, the paper uses a single case study method, and the results of the research cannot be generalized until they are tested with other case studies; secondly, the data used is all secondary data that includes publicly available annual reports and published literature; the raw data of Midea's internal management accounting was inaccessible, which led to some assumptions about the analysis of specific internal management information; thirdly, the research is mostly qualitative in nature, whereas quantitative analysis depends largely on the changes in financial indicators, and it is challenging to determine accurately the independent contribution of digital management accounting; Fourthly, the data

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pertains to the period before 2019 and the latest transformation developments in Midea are not reflected in the data [19, 21].

6.2.2 Future Prospects

Future research can be extended into the following directions: first, it is possible to carry out a comparative multi-case study by choosing a number of manufacturing companies that are engaged in different kinds of activities to check the generalizability of the research findings; second, if the data is available, apply empirical approaches to measure the effect of digital management accounting on the performance of an organization and consequently improve the rigor of causal inferences; third, prolong the research duration to determine the recent trends and changes in the implementation of Midea digital management accounting; fourth, integrate corporate surveys and interviews as sources of internal management information in order to enhance our insight into the working principles of digital management accounting.

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