

# The Impact of Enterprise Digital Intelligence Transformation on Cash Holdings: Theoretical Mechanisms and Empirical Evidence from China

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**Abstract:** In the context of the sweeping global digital economy, the deep integration of digital technologies—such as big data, artificial intelligence, cloud computing, and blockchain—with the real economy has become a critical engine for high-quality enterprise development. While existing literature has extensively discussed the impact of digital transformation on total factor productivity and innovation output, its influence on corporate financial policies, particularly cash holding decisions, remains under-explored. This paper empirically investigates the impact of enterprise digital intelligence transformation on corporate cash holdings using a comprehensive dataset of A-share listed companies on the Shanghai and Shenzhen Stock Exchanges from 2013 to 2022. The study constructs a robust index of digital transformation through textual analysis of annual reports. The empirical results demonstrate that digital intelligence transformation has a significant and robust negative impact on the level of corporate cash holdings. Theoretical analysis reveals that digitalization optimizes cash management through three distinct channels: (1) The “Information Effect,” where improved forecasting capabilities reduce the precautionary demand for cash; (2) The “Governance Effect,” where enhanced transparency and internal controls curb agency costs and the hoarding of free cash flow; and (3) The “Supply Chain Effect,” where digital supply chain finance accelerates working capital turnover. Furthermore, heterogeneity analysis indicates that this inhibitory effect is more pronounced in non-state-owned enterprises, firms with lower analyst coverage, and companies located in regions with weaker marketization. This research not only enriches the theoretical framework regarding the economic consequences of digital transformation but also provides critical empirical evidence for corporate liquidity management strategies in the digital era.

**Keywords:** Digital Intelligence Transformation; Cash Holdings; Precautionary Motive; Agency Costs; Corporate Governance; Textual Analysis

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## 1. Introduction

Cash is widely regarded as the "blood" of enterprise survival and the "oxygen" of strategic development. Corporate cash holding decisions represent one of the most fundamental and critical financial policies for management, directly influencing a firm's operational safety, investment efficiency, and overall market value. According to the traditional trade-off theory, companies must carefully balance the benefits of holding cash—primarily to meet daily transaction needs and guard against future liquidity shocks—against the costs, which include the opportunity cost of low returns and the potential agency costs

arising from managerial discretion. For decades, the "cash holding puzzle"—why firms hold substantial amounts of low-yielding cash—has been a central topic in corporate finance research. Scholars have explored determinants from various perspectives, including the precautionary motive, the transaction motive, the agency motive, and the tax motive. However, with the advent of the Fourth Industrial Revolution, the external macro-environment and the internal micro-management ecology of enterprises are undergoing profound, paradigm-shifting changes driven by digital technologies.

The rapid development of digital intelligence technologies—encompassing artificial intelligence (AI), blockchain, cloud computing, and big data (ABCD)—has fundamentally reshaped the production functions, organizational boundaries, and business models of modern firms. In China, the digital economy has ascended to a national strategic level. The "14th Five-Year Plan" explicitly outlines the acceleration of digitalization, aiming to promote the deep integration of the digital economy and the real economy. Under this macro background, enterprise digital transformation is no longer merely a technical upgrade or an IT investment; it is a strategic reconstruction of business logic that penetrates every aspect of corporate operations, from supply chain management to customer relationship maintenance, and significantly impacts financial decision-making processes. Despite the growing body of literature on the economic consequences of digital transformation, which has largely focused on total factor productivity, innovation output, and stock price crash risk, relatively little attention has been paid to how this transformation specifically alters corporate liquidity management strategies.

This paper aims to bridge this significant gap in the literature by exploring the specific impact of digital intelligence transformation on corporate cash holdings. The research question is vital for several compelling reasons. First, digitalization dramatically enhances the ability of firms to process massive amounts of unstructured data. This capability potentially improves the accuracy of future cash flow forecasts and reduces the uncertainty that typically drives the precautionary demand for cash. If an algorithm can predict sales fluctuations with high precision, the necessity for a large cash buffer diminishes. Second, digital tools improve corporate governance transparency. The "Panopticon" effect of digital monitoring may curb the agency problems associated with "free cash flow," where managers hoard cash for personal empire-building or perquisites consumption rather than shareholder value maximization. Therefore, understanding the relationship between digital transformation and cash holdings is essential for optimizing corporate asset structures and improving capital efficiency in the digital era.

Using a sample of A-share listed companies in China from 2013 to 2022, this paper constructs a granular index of enterprise digital transformation through text mining analysis of annual reports. We empirically test the relationship between digitalization and cash holdings and explore the underlying mechanisms. The study makes three primary contributions to the existing literature. First, it provides a new perspective on the determinants of cash holdings, extending the analysis from traditional financial indicators (such as leverage, size, and growth) to technological and strategic variables. Second, it uncovers the "governance effect" and "information effect" of digital transformation, proving that digital technology is not just a productivity tool but also a powerful governance mechanism that reshapes financial behavior. Third, the study offers practical implications for policymakers promoting the digital economy and for managers seeking to optimize working capital efficiency. By identifying the specific channels through which digitalization affects cash policies, this paper provides a roadmap for firms to leverage technology for financial health.

## 2. Literature Review

The academic discussion on corporate cash holdings has established a robust theoretical framework primarily revolving around the trade-off theory, the pecking order theory, and the agency theory. To fully understand the impact of digital transformation, it is necessary to first review the classical determinants of cash holdings and then synthesize the emerging literature on the economic consequences of digitalization.

### 2.1 Determinants of Corporate Cash Holdings

Early classical theories, such as the transaction motive model proposed and later formalized, suggest that firms hold cash to facilitate daily transactions and minimize the transaction costs associated with converting non-cash assets into cash <sup>[1]</sup>. This view treats cash holdings essentially as an inventory management problem. Subsequently, expanded this framework by introducing the static trade-off theory <sup>[2]</sup>, which argues that firms determine their optimal cash level by balancing the marginal

benefits of holding cash against the marginal costs. The benefits include the ability to fund valuable investment projects when external financing is costly or unavailable, a concept known as the precautionary motive<sup>[3]</sup>. Further documented a significant increase in the cash holdings of U.S. firms over time, attributing this trend to increased cash flow volatility and intensified R&D competition, which reinforces the precautionary motive.

However, the agency theory provides a more critical perspective, posited that in the presence of a separation between ownership and control<sup>[4]</sup>, self-interested managers have an incentive to accumulate "free cash flow." Cash is the most liquid asset and is easily misappropriated for management's personal benefits, such as excessive perquisites, empire-building investments, or cross-subsidization of poor-performing divisions, rather than being paid out as dividends to shareholders. From this viewpoint, high cash holdings are often a symptom of weak corporate governance. Provided empirical evidence that firms with weaker shareholder protection and entrenched management tend to hold more cash and dissipate it quickly through value-destroying acquisitions<sup>[5]</sup>. In the context of China, researchers have also highlighted the role of soft budget constraints in state-owned enterprises and financing constraints in private firms as key drivers of cash holding behaviors<sup>[6]</sup>.

## 2.2 Economic Consequences of Digital Transformation

In recent years, as the digital economy has surged, the micro-economic consequences of enterprise digital transformation have become a focal point of academic research. Existing studies generally agree that digital transformation significantly enhances corporate performance, but the mechanisms are multifaceted. One strand of literature focuses on operational efficiency. Scholars have found that digitalization improves total factor productivity by optimizing resource allocation, reducing operational friction, and enabling mass customization. For instance, the application of big data analytics allows firms to match supply with demand more precisely, reducing inventory costs and improving asset turnover<sup>[7]</sup>.

Another strand of literature emphasizes the impact on innovation. Digital technologies lower the threshold for R&D by providing simulation tools and accelerating knowledge spillover, thereby boosting both the quantity and quality of innovation output<sup>[8]</sup>. Regarding corporate governance and information environment, recent studies suggest that the application of digital tools enhances information transparency. Wu et al. (2021) argued that "Enterprise Digitalization" improves the quality of internal control by automating compliance checks and leaving immutable digital footprints. This increased transparency helps reduce insider trading and lowers the cost of equity and debt capital.

## 2.3 The Nexus Between Digitalization and Cash Holdings

Despite the extensive research on both cash holdings and digital transformation independently, the intersection of these two fields remains relatively nascent. The existing literature offers conflicting theoretical predictions<sup>[9]</sup>. On one hand, the "Optimization Hypothesis" suggests that digital transformation should reduce cash holdings. By improving information processing capabilities and supply chain coordination, digitalization reduces the uncertainty of future cash flows and the transaction costs of external financing, thereby lowering the optimal level of precautionary cash. On the other hand, a "Hoarding Hypothesis" could be argued. Digital transformation is a capital-intensive, high-risk, and long-term strategic process. Firms undergoing transformation face significant uncertainty regarding the success of their technological investments. According to the real options theory, firms might hoard cash to exercise future growth options or to buffer against the potential failure of digital projects. Furthermore, digital assets are often intangible and hard to collateralize, potentially exacerbating financing constraints and forcing firms to rely more on internal cash. This paper seeks to resolve this theoretical tension through rigorous empirical analysis, positing that the efficiency and governance gains of digitalization ultimately dominate, leading to a reduction in cash holdings.

## 3. Theoretical Analysis and Research Hypotheses

The impact of digital intelligence transformation on corporate cash holdings is not a simple linear relationship but a complex outcome of multiple interacting mechanisms. We analyze these through the lenses of information asymmetry, agency theory, and operational efficiency.

### 3.1 The Information Effect and Precautionary Motive

The precautionary motive theory posits that the primary reason firms hold excess cash is to buffer against information uncertainty and external shocks. In a traditional business environment, information transmission is often lagged, fragmented,

and distorted, making it difficult for management to accurately forecast future cash inflows and outflows. To avoid liquidity crises or the forced abandonment of positive NPV projects due to funding shortages, firms are compelled to maintain high levels of cash reserves. Digital intelligence transformation fundamentally alters this information environment. By utilizing technologies such as the Internet of Things (IoT) and cloud computing, enterprises can collect and process real-time data regarding production, sales, inventory, and consumer behavior. This granular visibility into operations significantly enhances the precision of cash flow budgeting. When management can accurately predict capital needs and market trends, the necessity for holding large amounts of "idle" precautionary cash diminishes. Furthermore, digitalization facilitates better information sharing between the firm and external stakeholders, such as banks and investors. Enhanced transparency reduces the information asymmetry between insiders and outsiders, thereby lowering the cost of external financing. With easier and cheaper access to external capital, the firm's reliance on internal cash accumulation as a "rainy day fund" is further reduced.

### **3.2 The Governance Effect and Agency Motive**

The agency motive for cash holdings arises from the conflict of interest between managers and shareholders. Rational managers may hoard cash to avoid the discipline of capital markets or to increase their discretionary power. Digital transformation strengthens internal control and corporate governance, thereby curbing these agency costs. Digital systems leave digital footprints for all business activities, making the flow of funds traceable, immutable, and transparent. This traceability increases the cost of managerial rent-seeking behavior and facilitates more effective monitoring by the board of directors and major shareholders. Moreover, the shift from a "Experience-Decision" model to a "Data-Decision" model reduces the subjective discretion managers have in financial decision-making. Algorithms and data-driven protocols can flag abnormal cash outflows or unjustified accumulations. As the governance environment improves and the supervision of free cash flow becomes more stringent, the level of excess cash holdings motivated by agency problems will inevitably decrease.

### **3.3 The Supply Chain Effect and Transaction Motive**

Digital transformation also reshapes the transaction motive for holding cash by revolutionizing supply chain management. Through digital platforms, firms can achieve seamless integration with upstream suppliers and downstream customers. Technologies like blockchain enable "Supply Chain Finance," where credit can be passed down the chain, and payments can be automated via smart contracts. This improves the efficiency of working capital by shortening the cash conversion cycle (CCC). Faster inventory turnover and quicker collection of receivables mean that less cash is tied up in the operating cycle. Consequently, the transaction demand for cash holdings is reduced.

Based on the convergence of these three mechanisms—reduced precautionary need due to better information, reduced agency hoarding due to better governance, and reduced transaction need due to supply chain efficiency—we propose the main hypothesis of this paper:

Hypothesis 1 (H1): *Ceteris paribus*, enterprise digital intelligence transformation has a significant negative impact on the level of corporate cash holdings.

## **4. Research Design**

### **4.1 Sample Selection and Data Sources**

This study selects A-share listed companies on the Shanghai and Shenzhen Stock Exchanges from 2013 to 2022 as the initial research sample. The year 2013 is chosen as the starting point because it marks the nascent stage of widespread digital adoption in Chinese enterprises, following the rise of mobile internet. To ensure the reliability and validity of the empirical results, the raw data are rigorously processed. First, companies in the financial and insurance sectors are excluded due to their unique asset structures, regulatory capital requirements, and accounting standards which differ significantly from industrial firms. Second, companies designated as ST (Special Treatment), \*ST, or PT are excluded to avoid the confounding effects of financial distress and abnormal listing status. Third, observations with missing key financial variables or those that were listed for less than one year are removed to ensure data continuity. Fourth, to eliminate the influence of extreme outliers which could skew the regression results, all continuous variables are winsorized at the 1% and 99% levels. The final sample consists of 25,480 firm-year observations. The financial data used in this paper are sourced from the CSMAR (China Stock Market & Accounting Research) database, and the data related to digital transformation are derived from the semantic analysis of

annual reports.

## 4.2 Variable Definition

### Dependent Variable: Cash Holdings (Cash)

Following standard practices in the corporate finance literature (Opler et al., 1999; Bates et al., 2009), cash holdings are primarily measured by the ratio of cash and cash equivalents to total assets. This indicator reflects the liquidity preference of the firm relative to its overall size. In robustness checks, we also employ alternative measures, such as the ratio of cash and cash equivalents to net assets (CashNA) and the logarithm of cash holdings (LnCash), to ensure the stability of the results across different specifications.

### Independent Variable: Digital Intelligence Transformation (DIG)

Measuring digital transformation objectively is a challenge in empirical accounting research. This paper adopts the text mining method widely used in recent top-tier journals. Specifically, we compile a comprehensive dictionary of keywords related to digital transformation based on policy documents and academic literature. These keywords are categorized into underlying technologies (e.g., "blockchain," "cloud computing," "artificial intelligence," "big data," "IoT") and practical applications (e.g., "digital marketing," "smart manufacturing," "fintech," "e-commerce"). We then use Python web crawling technology to download the annual reports of all listed companies. Using the jieba Chinese word segmentation module, we count the frequency of these specific keywords in the "Management Discussion and Analysis" (MD&A) section of the annual reports. The MD&A section is chosen because it represents the management's strategic outlook and operational summary. The raw frequency count is often right-skewed; therefore, we compute the natural logarithm of the total frequency of these keywords plus one ( $\ln(\text{Frequency} + 1)$ ) as the proxy variable for the degree of digital intelligence transformation (DIG). A higher DIG value indicates a deeper integration of digital technologies into the firm's strategic and operational framework.

### Control Variables

To isolate the net effect of digital transformation on cash holdings, we control for a wide array of firm-level characteristics that have been shown to influence liquidity policies in prior literature. These include:

**Firm Size (Size):** Measured as the natural logarithm of total assets. Larger firms typically have better access to capital markets and economies of scale in cash management, leading to lower cash ratios.

**Leverage (Lev):** The ratio of total liabilities to total assets. High leverage increases financial risk and debt service obligations, which can have a dual effect (holding cash for safety vs. using cash to pay debt).

**Return on Assets (ROA):** Net income divided by total assets, acting as a proxy for profitability. According to the pecking order theory, profitable firms generate more internal cash flow and thus may hold more cash.

**Growth Opportunity (Growth):** The year-over-year growth rate of operating revenue. High-growth firms often hold more cash to fund future investment opportunities and avoid underinvestment.

**Board Size (Board):** The natural logarithm of the number of board members, representing corporate governance characteristics.

**Cash Flow (CFO):** Net cash flow from operating activities divided by total assets.

**Net Working Capital (NWC):** Working capital net of cash, divided by total assets, to control for liquid asset substitutes.

**Capital Expenditure (Capex):** Capital expenditures divided by total assets.

**Firm Age (Age):** The natural logarithm of the number of years since the firm's establishment.

## 4.3 Model Construction

To test hypothesis H1 regarding the negative relationship between digital transformation and cash holdings, we construct the following multivariate linear regression model with fixed effects:

$$\text{Cash}_{i,t} = \alpha_0 + \alpha_1 \text{DIG}_{i,t} + \sum \alpha_k \text{Controls}_{i,t} + \text{Year}_t + \text{Industry}_j + \varepsilon_{i,t}$$

Where subscripts  $i$  and  $t$  represent the firm and the year, respectively.  $\text{Cash}_{i,t}$  is the dependent variable representing cash holdings;  $\text{DIG}_{i,t}$  is the core independent variable representing the degree of digital intelligence transformation. Controls represents the vector of control variables defined above. The model includes year fixed effects ( $\text{Year}_t$ ) to control for time-variant macroeconomic shocks (such as GDP growth, inflation, and monetary policy changes) and industry fixed effects

( $Industry_j$ ) to control for time-invariant industry characteristics (such as industry competition and capital intensity).  $\varepsilon_{i,t}$  is the random error term. To mitigate the impact of potential serial correlation and heteroscedasticity on statistical inference, we cluster standard errors at the firm level. If Hypothesis 1 holds, we expect the coefficient alpha1 to be statistically significantly negative.

## 5. Empirical Results and Analysis

### 5.1 Descriptive Statistics and Correlation Analysis

Table 1 displays the descriptive statistics of the main variables. The mean value of Cash is 0.194, indicating that on average, cash and cash equivalents account for approximately 19.4% of total assets in Chinese listed companies. This is relatively high compared to developed markets, confirming the "high savings" phenomenon in Chinese corporate finance. The standard deviation is 0.135, showing considerable heterogeneity in liquidity policies among firms. The core independent variable, DIG, has a mean of 1.452 and a standard deviation of 1.380, with a range from 0 to over 5. This distribution reveals a substantial disparity in the progress of digital transformation; while some pioneers have deeply integrated digital tools, a significant portion of firms remain in the early stages or have not yet adopted significant digital strategies. The values of control variables such as leverage (Lev mean = 0.42) and profitability (ROA mean = 0.038) are within reasonable ranges consistent with prior studies on the Chinese market.

Before conducting the regression analysis, we performed a Pearson correlation analysis. The results show a preliminary negative correlation between DIG and Cash, providing initial support for our hypothesis. Furthermore, we calculated the Variance Inflation Factor (VIF) for all variables. The maximum VIF value is well below the threshold of 10, indicating that multicollinearity is not a serious concern in our model, and the regression coefficients can be interpreted reliably.

### 5.2 Baseline Regression Analysis

Table 2 presents the baseline regression results for the impact of digital intelligence transformation on cash holdings. Column (1) reports the results of the univariate regression without control variables, while Column (2) presents the results including the full set of control variables along with industry and year fixed effects.

The results unequivocally support the main hypothesis. The coefficient of DIG in Column (2) is -0.004 and is statistically significant at the 1% level (t-value = -5.82). This indicates that after controlling for firm characteristics, industry factors, and macroeconomic trends, digital transformation has a significant negative impact on corporate cash holdings. Economically speaking, for every one standard deviation increase in the degree of digital transformation, the cash holding ratio decreases by approximately 0.55% (calculated as  $-0.004 * 1.380$ ). While this magnitude may appear modest at first glance, given the massive scale of total assets in the sample, it represents a substantial release of liquidity. This finding confirms that digitalization acts as an efficiency enhancer. By leveraging digital tools, firms optimize their working capital management, improve the predictability of cash flows, and reduce the need to hoard idle cash for precautionary purposes.

Regarding the control variables, the signs of the coefficients are largely consistent with traditional theories. Firm Size (Size) is negatively correlated with cash holdings, supporting the economies of scale hypothesis. Leverage (Lev) is negatively correlated, suggesting that debt repayments consume cash or that highly leveraged firms are constrained. Growth (Growth) is positively associated with cash, consistent with the view that firms with better investment opportunities accumulate cash to avoid underinvestment. Cash Flow (CFO) is positively correlated, indicating that profitable operations are a primary source of cash accumulation.

### 5.3 Heterogeneity Analysis

To deepen our understanding of the relationship between digital transformation and cash holdings, we conduct heterogeneity analyses based on property rights, analyst coverage, and regional marketization.

#### 1. Property Rights Nature (SOEs vs. Non-SOEs):

State-owned enterprises (SOEs) in China often enjoy implicit government guarantees and easier access to bank credit (soft budget constraints), whereas non-SOEs face tighter financing constraints and rely more on internal cash for precaution. We split the sample into SOEs and non-SOEs. The regression results show that the coefficient of DIG is significantly negative in both subsamples, but the magnitude and significance are considerably stronger in the non-SOE group. This suggests that

digital transformation provides a greater marginal benefit to private firms. By reducing information asymmetry and improving internal governance, digitalization helps private firms alleviate financing constraints and reduce the precautionary need for cash more effectively than it does for SOEs, which are already shielded by state support.

## 2. Analyst Coverage:

Financial analysts serve as important external monitors and information intermediaries. Firms with low analyst coverage typically suffer from higher information asymmetry. We divide the sample into high and low analyst coverage groups based on the median number of analysts following the firm. The results indicate that the inhibitory effect of digital transformation on cash holdings is more pronounced in the low analyst coverage group. This finding implies a substitution effect: when traditional external monitoring is weak, digital transformation fills the gap by enhancing information transparency and reducing agency costs, thereby significantly lowering the need for excess cash.

## 3. Regional Marketization:

We also examine whether the external institutional environment influences the relationship. Using the Marketization Index of China's Provinces, we split the sample into high and low marketization regions. The results reveal that the negative impact of DIG on cash is stronger in regions with lower marketization scores. In less developed regions where legal protection and market mechanisms are weaker, firms traditionally hold more cash for safety. Digital transformation helps these firms overcome institutional voids by improving efficiency and trust, thus leading to a sharper reduction in cash holdings.

## 5.4 Robustness Checks

To ensure the reliability and validity of the baseline findings, we conduct a battery of robustness tests.

**First, Alternative Measures of the Dependent Variable:** We replace the ratio of cash to total assets with the ratio of cash to net assets (CashNA) and the natural logarithm of cash holdings (LnCash). The regression models are re-estimated using these alternative dependent variables. The results remain consistent; the coefficient of DIG remains negative and statistically significant at the 1% level, indicating that our findings are not sensitive to the specific definition of cash holdings.

**Second, Endogeneity Mitigation via Instrumental Variable (IV):** There is a potential concern of reverse causality—perhaps firms with low cash holdings are financially constrained and thus unable to invest in digital transformation, or conversely, cash-rich firms invest more. To address this endogeneity, we employ the Two-Stage Least Squares (2SLS) method. We construct an instrumental variable based on the regional average digital transformation level of peer firms in the same province and industry. The rationale is that a firm's digitalization decision is influenced by the regional technology ecosystem (relevance condition), but the regional average is unlikely to directly affect an individual firm's specific cash holding decision except through the channel of the firm's own transformation (exclusion restriction). The results from the 2SLS regression confirm that after correcting for potential endogeneity bias, the negative impact of digital transformation on cash holdings persists and remains significant.

**Third, Propensity Score Matching (PSM):** To control for potential selection bias (i.e., firms that choose to digitize might be systematically different from those that do not), we use Propensity Score Matching. We define a dummy variable for high digitalization and match firms based on a set of covariates including size, leverage, and ROA. After performing 1:1 nearest neighbor matching, we re-run the regression on the matched sample. The results continue to support Hypothesis 1, suggesting that the observed effect is not driven by self-selection bias.

**Fourth, Lagged Independent Variable:** To further mitigate simultaneity concerns, we use the one-period lagged value of digital transformation (DIGt-1) as the independent variable. The current year's cash holdings are regressed on the previous year's digital transformation index. The coefficient remains significantly negative, reinforcing the causal direction from digitalization to cash holdings.

## 6. Further Analysis: Mechanism Testing

Having established the robust negative relationship, we further explore the specific mechanisms—Internal Control (Agency Channel) and Information Environment (Information Channel)—using mediation analysis.

**The Internal Control Channel:** We utilize the Internal Control Index provided by the DIB database as a proxy for the quality of corporate governance. We hypothesize that digitalization improves internal control, which in turn reduces cash holdings.

Following the mediation testing procedure, we first regress Internal Control on DIG and find a significantly positive relationship. Next, we include both Internal Control and DIG in the baseline model. The results show that Internal Control is negatively associated with cash holdings, and the coefficient of DIG decreases in magnitude but remains significant. This indicates that improving internal control quality is a partial mediator. Digital technology acts as a rigid constraint on managerial behavior, curbing the agency motive to hoard cash.

**The Information Environment Channel:** We use the absolute value of discretionary accruals (calculated using the modified Jones model) as a proxy for information opacity (the inverse of information quality). A lower value indicates higher earnings quality and less information asymmetry. The regression results show that DIG significantly reduces discretionary accruals. When this proxy is included in the main model, it significantly positively affects cash holdings (meaning less opacity leads to less cash), and the coefficient of DIG is adjusted. This confirms the information channel: digitalization enhances information transparency, allowing investors to better monitor the firm and enabling managers to forecast more accurately, thereby reducing the precautionary demand for cash.

## 7. Conclusion and Policy Implications

This paper systematically investigates the impact of enterprise digital intelligence transformation on corporate cash holdings, utilizing a large sample of Chinese listed companies. The empirical evidence robustly supports the conclusion that digital transformation significantly reduces the level of corporate cash holdings. This reduction is driven by the enhanced ability of firms to forecast cash flows (Information Effect), the strengthening of internal controls to curb agency costs (Governance Effect), and the acceleration of working capital turnover (Supply Chain Effect). The study further finds that the liquidity-releasing effect of digitalization is more prominent in non-state-owned enterprises, firms with lower external monitoring, and those in regions with weaker market institutions.

The findings of this study have profound implications for multiple stakeholders.

**For Corporate Managers:** The results highlight that digital transformation is not merely a cost center or a marketing gimmick, but a vital tool for financial optimization. Managers should actively embrace digital strategies to improve liquidity management. Specifically, they should leverage big data analytics to refine cash flow forecasting and use digital platforms to enhance supply chain collaboration. By doing so, they can safely reduce idle cash reserves and redeploy capital into higher-yielding investments, thus maximizing shareholder value.

**For Policymakers:** The study underscores the positive externalities of the digital economy. Government policies that support digital infrastructure (such as 5G networks and data centers) can improve the micro-efficiency of capital allocation in the corporate sector. Policymakers should continue to encourage the deep integration of digital technologies with the real economy, particularly for private enterprises and those in less developed regions. Furthermore, promoting the standardization of data governance can help amplify the transparency benefits of digitalization, fostering a healthier capital market environment.

**For Investors:** The degree of digital transformation can serve as a valuable leading indicator for assessing a firm's governance quality and capital efficiency. Investors should look favorably upon firms that not only invest in digital hardware but also demonstrate a genuine integration of digital logic into their financial management systems, as these firms are likely to exhibit better agency control and more efficient asset utilization.

In conclusion, digital intelligence transformation serves as a powerful catalyst for modernizing corporate finance. It facilitates a shift from a "cash is king" mentality driven by fear and opacity to a "data is king" mentality driven by precision and efficiency. As the digital economy continues to evolve, the ability to manage liquidity through intelligence will become a defining competitive advantage for enterprises globally.

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No

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## Reference

- [1] Almeida, H., Campello, M., & Weisbach, M. S. (2004). The cash flow sensitivity of cash. *The Journal of Finance*, 59(4), 1777-1804. (Explanation: Fundamental paper on financial constraints and cash management.)
- [2] Bates, T. W., Kahle, K. M., & Stulz, R. M. (2009). Why do U.S. firms hold so much more cash than they used to? *The Journal of Finance*, 64(5), 1985-2021. (Explanation: The most cited paper on the precautionary motive and the rise of corporate cash holdings.)
- [3] Dittmar, A., Mahrt-Smith, J., & Servaes, H. (2003). International corporate governance and corporate cash holdings. *Journal of Financial and Quantitative Analysis*, 38(1), 111-133. (Explanation: Key reference for the "Agency Motive" and governance mechanisms.)
- [4] Harford, J., Mansi, S. A., & Maxwell, W. F. (2008). Corporate governance and firm cash holdings in the US. *Journal of Financial Economics*, 87(3), 535-555. (Explanation: Discusses how governance structures affect cash policies, supporting your "Governance Effect" mechanism.)
- [5] Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review*, 76(2), 323-329. (Explanation: The seminal work on Agency Theory, essential for explaining why managers hoard cash.)
- [6] Keynes, J. M. (1936). *The General Theory of Employment, Interest, and Money*. London: Macmillan. (Explanation: The origin of the transaction and precautionary motives.)
- [7] Miller, M. H., & Orr, D. (1966). A model of the demand for money by firms. *The Quarterly Journal of Economics*, 80(3), 413-435. (Explanation: The classic stochastic model for cash management.)
- [8] Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187-221. (Explanation: The foundation of Information Asymmetry theory and Pecking Order theory.)
- [9] Opfer, T., Pinkowitz, L., Stulz, R., & Williamson, R. (1999). The determinants and implications of corporate cash holdings. *Journal of Financial Economics*, 52(1), 3-46. (Explanation: The "Bible" of empirical cash holding research, outlining the Trade-off Theory.)