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PRICED BUT NOT PRODUCTIVE? DIGITAL-TRANSFORMATION DISCLOSURE, CEO POWER AND FIRM VALUE

[1]Dr. Uttiya Misra, [2]Archisman Misra

[1]Business Strategist & Transformation Catalyst, M. Tech, MBA, DBA, PhD, New Delhi, India, Email: uttiyamisra@gmail.com
[2]Tech Maverick & Paradigm Shifter, B.Tech, MBA, New Delhi, India, Email: info@archismanmisra.com

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Abstract
Investors reward firms that describe themselves as digital, but it is unclear whether the reward reflects operating gains. This study replicates and extends recent evidence on the valuation of digital disclosure by asking whether it is matched by operating performance, whether it reflects persistent firm differences or within-firm change, whether chief executive officer (CEO) power conditions it, and whether it is driven by frontier technology language such as artificial intelligence. Using 388 non-financial S&P 500 firms over fiscal years 2015–2024 (3,645 firm-years), we measure digital-transformation disclosure intensity in the business section of each 10-K and relate it to Tobin's q, return on assets, operating margin and asset turnover. Market value is measured from year-end share prices and shares outstanding. In pre-specified within-firm models, changes in disclosure are not associated with any outcome (Tobin's q: $b = -0.0008$, $p = .920$), and CEO duality, CEO tenure and science-based climate commitments do not moderate the relationship. Across firms in the same sector and year, more digitally oriented firms trade at higher valuations ($b = 0.0206$, $p = .015$; about 8% of mean q per standard deviation) without higher overall profitability or efficiency, and a between–within decomposition shows that the premium arises between firms rather than within them (difference $p = .045$). Contrary to concerns about technology hype, the valuation premium is not concentrated in frontier terms, and firms using frontier language are, if anything, more profitable and efficient. The results indicate that markets price digital orientation as a firm attribute rather than rewarding firms for becoming more digital, and they caution against treating changes in digital narratives as evidence of operating improvement.

Keywords: *digital transformation, firm value, Tobin's q, operating performance, CEO power, CEO duality, corporate disclosure*

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1. Introduction

The business jargon concerning AI, cloud platforms, analytics and digitisation has become commonplace in the business description. The proportion of non-financial S&P 500 companies in this study that refer to at least one digital technology in the 10-K business section grew from one-third of the companies in 2015 to nearly two-thirds in 2024. Investors seem to be paying attention: As with the "com" suffix to firm names (Cooper et al., 2001), digital disclosure is correlated with firm market value (Chen & Srinivasan, 2024); and a recent paper looks at "AI washing," in which firms overstate their capabilities in AI, and its capital-market implications (Liu et al., 2026; Song et al., 2026). Whether the valuations are appropriate given the results of operations is another matter. The productivity gains from information-technology investments only come with complementary organisational change (Brynjolfsson & Hitt, 2000) and the benefits of general-purpose technologies are not experienced quickly or evenly (Brynjolfsson et al., 2021).

This paper aims to investigate the disconnect between the claims of digital transformation and the results it promises and does it as a replication and extension. Studies re-visiting popular results using pre-specified tests and transparently collected data are valuable, given the potential for false positives and selective reporting in finance and management research (Harvey, 2017), and the fact that many of the popular results reported in the literature do not withstand independent replication (Hou et al., 2020). We ask the following four questions. First, is disclosure of digital transformation related to firm value and operating performance after the disclosure, and does it vary across firms that persistently are more digital and firms that improve over time? Second, are the powers of the chief executive officer, which determine the speed at which and the methods by which, the company evolves quickly enough?

Is there a way to reward any strategy that is performed forcibly? (Adams et al., 2005) Third, how does science-based climate commitments align with digital transformation from an investors' point of view? Fourth, does a valuation premium exist for frontier technology (language) e.g., artificial intelligence and machine learning, as opposed to proven digital technologies? These questions are answered by a panel of 388 non-financial S&P 500 companies that cover the fiscal years 2015–2024 (3,645 firm-years). The amount of disclosure that companies include about digital technologies in Item 1 of each 10-K can be quantified by the number of digital-technology terms in that section, as measured using the dictionary of Chen and Srinivasan (2024). Firm value is Tobin's q computed using the market value of equity at each fiscal year end from the daily share prices, plus the shares outstanding reported on the cover page of the 10-K; a robustness check is based on the public float reported on the 10-K cover page. Operating performance is indicated by return on assets, operating margin and asset turnover. CEO duality and CEO tenure are derived from 10-K signature pages and Sarbanes–Oxley certifications. Our main specifications include firm and year fixed effects, with the firm-specific effects reflecting the impact of a firm's disclosure. The between- and within-firm components of the association are estimated in supplementary specifications which compare firms in the same industry and the same year and decompose the association into between- and within-firm effects (Mundlak, 1978).

The results are in line with the price of digital disclosure, without the productivity. The results for the pre-specified within-firm models are consistent with the finding that there is no association between changes in disclosure intensity and Tobin's q, profitability, or efficiency in either the current or subsequent year, and this finding does not change when CEO power or climate commitments are considered. Then, across firms, the valuation premium is realized on firms that are more digitally oriented, while the premiums are not necessarily greater in profitability or efficiency (within-firm disclosures are less significant and more similar across digitally oriented firms); and the premium is driven by the between-firm disclosures, but not by the within-firm disclosures. The valuation premium is distributed across frontier and established technology language: companies with frontier language are less profitable and less asset efficient, companies with established technology language are more profitable and more asset efficient. Firms with a CEO that chairs the board, on the other hand, have higher operating margins separately.

There are four contributions to the study. First, the publication replicates the valuation of digital disclosure that Chen and Srinivasan found in an independent sample of firms, and demonstrates that this effect is absent in the context of within-firm change in disclosure and operating performance. Second, it integrates the corporate-governance literature on CEO power with the study of digital transformation and does not find that CEO duality or tenure have a negative impact on the financial benefits. Thirdly, it reflects the contemporary discussion on the hype surrounding technology and AI washing – as it demonstrates that the value of digital language is not defined by the latest in frontier technology in the largest companies in the United States. Fourth, by establishing hypotheses prior to the estimation and separating them from supplemental analysis, it provides a clear blueprint for testing measures of strategic change based on a narrative. The paper is an elaboration of a previous work that investigates the leadership antecedents of digital and climate

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transformation (results omitted for review) with the same sample, different outcomes and estimators, and different results.
The literature review is provided in Section 2 and the hypotheses developed in Section 3. The data and research design are described, the results reported, implications discussed, and conclusion drawn in Sections 4, 5, 6 and 7 respectively.

2.Literature review
The review groups previous research by four questions: How do investors value technology narratives, does digital technology add to operational performance, does the power of the CEO influence the returns on strategic change, and does digital and climate strategies fit together? Table 1 summarizes some representative studies.

2.1Technology narratives and firm value
Narrative disclosure affects the investor's beliefs regarding future cash flows. Textual measures derived from the annual reports hold information beyond that contained in the financial statements (Loughran and McDonald 2016), while investors' attention is limited and may be focused more on the economic content of the salient labels than what they signify (Hirshleifer and Teoh 2003). The example of technology labels is instructive: businesses with ".com" names made big abnormal returns in 1998–1999, even if their operations had little to do with technology (Cooper et al., 2001). A recent study has found that the adults who were exposed to digital and artificial intelligence showed positive valuations. In their 10-K business sections, firms with language in their descriptions of digital technologies have higher market valuations (Chen and Srinivasan, 2024); the market returns of AI-skilled firms rose after the release of ChatGPT (Eisfeldt et al., 2023); and AI workforce investments are linked to increased growth and product innovation (Babina et al., 2024). There is an existing parallel literature on strategic overstatement of AI capabilities, known as AI washing and their consequences for capital markets (Liu et al., 2026; Song et al., 2026). These studies together imply that tech language is a valuation, but not necessarily one which helps the operation.

2.2Digital technology and operating performance
The resource-based view says that advantage is achieved with the use of information-technology capability that is unique to the firm and difficult to imitate (Bharadwaj, 2000). There is empirical evidence that confirms a positive, but conditional, relationship. Information technology boosts productivity primarily when paired with complementary investments in organisation and skills (Aral & Weill, 2007; Brynjolfsson & Hitt, 2000); U.S. multinationals seem to gain more productivity from information technology than do other firms, a difference that is related to how these firms manage their people (Bloom et al., 2012); data-analytics capabilities increase productivity in firms that are concerned about process improvement (Wu et al., 2020); and the productivity impact of big data analytics is industry-specific (Müller et al., 2018). Digital transformation is an organisational change rather than a technology investment (Hanelt et al., 2021; Vial, 2019), and the benefits of general-purpose technologies are realised with a lag time as complementary intangible investments need to be made (Brynjolfsson et al., 2021). This investment is intangible, and is underrepresented by book assets, which is one reason why measured q varies from firm to firm depending upon firm intangible intensity (Peters & Taylor, 2017; Saunders & Brynjolfsson, 2016; Tambe, 2014).

2.3CEO power and the returns to strategic change
The upper echelons theory suggests that leaders of a transformation have a major impact on the results of the transformation (Hambrick & Mason, 1984). The dimension that is associated with execution is the power of the CEO. The unity of command inherent in having the CEO chair the board can help speed up complex change (Boyd, 1995; Finkelstein & D'Aveni, 1994), but it undermines the ability of the board to monitor and can lead to the continued existence of a "symbolic or costly project" (Boyd, 1995; Finkelstein & D'Aveni, 1994). The performance of firms with powerful CEOs is more variable, which is consistent with a reduction in checks on the CEO's judgement (Adams et al., 2005). The literature review and meta-analysis results indicate that there are no consistent average relationships between duality and performance (Dalton et al., 1998; Krause et al., 2014), and a systematic review of 314 studies suggests that the mixed findings are due to variations in performance measurement, research design and handling of endogeneity (Yu, 2023). Tenure of the CEO also represents an aspect of power: the longer a CEO remains in the position, the more power he or she gains, but also the more likely he or she is to endorse current models (Hambrick & Fukutomi, 1991), and the poorer the performance of long-term CEOs is in dynamic industries (Henderson et al., 2006). Digital

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transformation also reshape the business governance, including the link between executive compensation and performance (Li et al., 2024).

2.4 Digital and climate strategies

Now, investors increasingly take climate risk into account when valuing assets (Bolton & Kacperczyk, 2021; Krueger et al., 2020) and company social responsibility through binding procedures can enhance financial performance. (Flammer, 2015). Digital competences support a more precise and efficient approach to measuring and managing emissions, and recent studies have shown that digital and green transformation contribute to better environmental, social and governance performance (Zhang et al., 2025). This has not been tested for large investors, however, whether they appreciate the blend of digital and credible climate commitment has not been evaluated.

2.5Research gaps

Three gaps follow. First, much research on the value of digital disclosure is cross-sectional, and thus is unable to separate out value premiums for digital companies from value premiums for making the firm more digital. Second, research on digital transformation is usually conducted independently of the measurement of market value, and of operating performance, which are critical to determining if the stories being told are of value. Third, there is no literature in the corporate-governance field that links up with the measurement of digital disclosure and the new literature on the hype of technology. This study aims to close these gaps through a within-firm panel, side-by-side value and operating outcomes, moderation of CEO-power, and by splitting digital language into frontier and established technologies.

Table 1. Representative studies

Study	Setting	Measure	Main finding
Cooper et al. (2001)	U.S. firms, 1998–1999	Corporate name change to ".com"	Large abnormal returns regardless of the underlying business
Brynjolfsson & Hitt (2000)	Review of firm-level studies	Information-technology investment	Returns depend on complementary organisational change
Bloom et al. (2012)	Establishments in the United Kingdom	Information-technology capital	U.S. multinationals gain more productivity from IT, linked to management practices
Adams et al. (2005)	Fortune 500 firms	CEO power	Powerful CEOs are associated with more variable performance
Wu et al. (2020)	U.S. firms	Data-analytics skills	Analytics raises productivity in firms focused on process improvement
Eisfeldt et al. (2023)	U.S. listed firms	Workforce exposure to generative AI	More exposed firms earned higher returns after ChatGPT's release
Yu (2023)	314 empirical studies	CEO duality	Mixed findings reflect measures, designs and treatment of endogeneity
Chen & Srinivasan (2024)	U.S. listed firms	Digital terms in 10-K Item 1	Digital disclosure is positively related to firm value
Babina et al. (2024)	U.S. firms	AI-skilled workforce	AI investment is associated with growth and product innovation
This study	388 S&P 500 firms, 2015–2024	Digital terms in 10-K Item 1; CEO power	Valuation premium between firms, no within-firm or operating payoff

3.Hypotheses

Saunders & Brynjolfsson (2016) and Tambe (2014) have found that if digital disclosure is increasing and accounting disclosure is not, a firm's value should increase. Thus, we hypothesize the following within-firm form:

&H1. The greater the level of digital-transformation disclosure, the higher is the firm value. The impacts of the revealed technologies should also be evident in profitability and asset efficiency, perhaps with a lag (Brynjolfsson & Hitt, 2000; Brynjolfsson et al., 2021)

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&H2. The operating performance of the firms (return on assets, operating margin, and asset turnover) is positively related to digital-transformation disclosure intensity.
The CEO duality could be a source of unity of command, aiding the firm to achieve results from digital initiatives, or it might be a source of lack of monitoring, which could hinder the firm in its efforts (Boyd, 1995; Finkelstein & D'Aveni, 1994). We therefore propose alternative explanations:
&H3a. The positive relationship between the intensity of digital-transformation disclosures and firm outcomes becomes stronger with CEO duality.
&H3b. The positive relationship between digital-transformation disclosure intensity and firm outcomes is lower in firms with dual officers.
Long-tenured CEOs more strongly adhere to and are less sensitive to change (Hambrick & Fukutomi, 1991; Henderson et al., 2006):
&H4. The positive relationship between the intensity of disclosure of digital transformations and the firm outcomes is reduced due to CEO tenure.
The higher valuation should be given to firms with digital orientation and science based climate commitment if investors see digital capability as an enabler for credible climate action (Zhang et al., 2025):
&H5. The positive linkage between digital-transformation disclosure intensity and firm value is further reinforced by a science-based climate commitment.
Lastly, if the value of digital language is related to the importance of the fashion-bowl labels for technology (Cooper et al., 2001; Hirshleifer & Teoh, 2003), the premium should be focused on the frontier terms, rather than the operating gains. H1-H5 were fixed prior to the estimation of the main results while the within-firm specification was fixed before the test of the main results, and H6 was formulated after the main results but before the main results were tested.
&H6. The correlation of disclosure with firm value is stronger in frontier technology terms (AI, machine learning and big data) than in terms that are more established (analytics, cloud and digitisation) and neither of these is correlated with operating performance.
Figure 1 summarises the hypotheses.

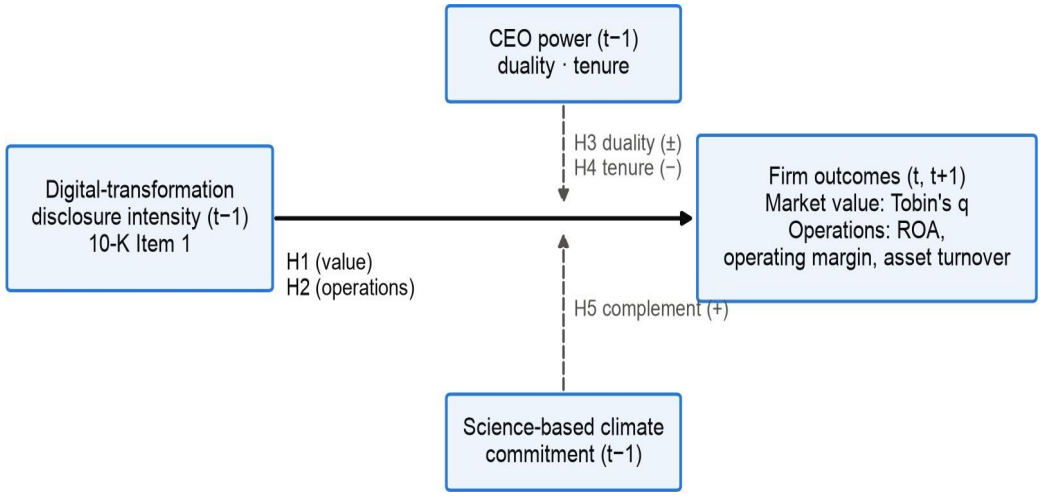


Figure 1. Conceptual model. Market value and operating performance (H1, H2); CEO power (H3, H4); science-based climate commitment (H5); and frontier and established technology language (H6) are studied.

4.Data and research design

4.1Sample

The sample frame includes the non-financial firms included in the S&P 500 as of October 6, 2026 (Wikipedia contributors, 2026) with the exception of the two GICS sectors—Financials and Real Estate—for which their balance sheets are not comparable to those of operating companies. We download all the original 10-Ks from the SEC EDGAR for fiscal years 2014–2024, resulting in 3,645 firm-years for 388 firms. fiscal years 2015–2024 after one year is used to construct lagged regressors. Each of the values is the same value as the corresponding XBRL fact that is first reported in the firm's 10-K (U.S. Securities and Exchange Commission,

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2026). The index excludes firms that withdrew from the index prior to 2026, and the results are limited to large firms that survived.

4.2Measures

Firm value. The sum of the market value of equity and total liabilities divided by total assets (Chung & Pruitt, 1994) is Tobin's q. Market value of equity equals the as-traded closing share price of the last trading day of each fiscal year (2026) multiplied by the number of shares outstanding as reported in the 10-K (dei:EntityCommonStockSharesOutstanding) with the number of shares adjusted according to stock splits that occurred between the two trading days. For a subset of firms, prices were compared with an independent source of prices (Tiingo, 2026) and the median absolute difference was 0.00% over approximately 14,000 trading days. All market values have been checked against the SEC-reported public float at the date the firm-years report the market value, and firm-years with a ratio that is outside the range implied by the insider ownership ratio (0.3-1.1), which indicates share-unit or share-class errors in the market value filing, have been coded as missing. 94% of firm-years have valid market values, and the median ratio of public float to market value is 0.99. One version of q that is based on the public float itself is used as a robustness check.

Operating performance. ROA (net income/total assets), operating margin (operating income/revenue), asset turnover (revenue/total assets). All ratios are winsorised at 1st and 99th percentile.

Digital-transformation disclosure intensity. Similar to Chen and Srinivasan (2024), we measure the number of terms for each of six categories (artificial intelligence, big data, cloud, analytics, machine learning, and digitisation) in Item 1 of each 10-K and normalise it by the number of terms per 10,000 words to reflect the proportion of each category in the item. The measure reflects the level of business model description of digital technology in a firm's narrative; it is zero in 48% of firm-years. Robustness tests are based on ln(1 + intensity) and a 0-3 scoring system that takes all firms with any digital terms and assigns them to annual terciles. The six groups are divided between frontier terms (artificial intelligence, machine learning and big data) and established terms (analytics, cloud and digitisation) and both are scaled the same way in the H6.

CEO power. CEO duality is equal to one if the CEO signs the 10-K as the CEO and the CEO is also the chair. CEO tenure reflects the period of time the CEO has served in the same role in the company's fiscal year, measured in fiscal years. All of the filings were double coded to validate both measures, and CEO duality was coded correctly in all cases examined.

Climate commitment. SBTi listing: This represents a combination of the current Target Dashboard and the archived versions of the list, from the Internet Archive (2015-2021) and the Science Based Targets initiative (2026) respectively.

Controls. All models control for firm size (measured as ln total assets), leverage, cash, capital expenditure and research and development (R&D) intensity (both assets and sales) with sales growth and ln firm age. R&D is forced to zero when it is not reported (Koh & Reeb, 2015). The models of Tobin's q also adjust for lagged return on assets. One year lag of all regressors.

4.3Empirical strategy

The primary specification is the relationship between the outcomes and the lagged disclosure intensity at the firm level:

$$Y_{it} = \beta_1 DT_{i,t-1} + \beta_2 DT_{i,t-1} \times Dual_{i,t-1} + \beta_3 DT_{i,t-1} \times Ten_{i,t-1} + \gamma' X_{i,t-1} + \alpha_i + \tau_t + \varepsilon_{it} \quad (1)$$

where Y is Tobin's q, return on assets, operating margin or asset turnover, α is the firm effect, and τ is the year effect, and X includes the controls and CEO duality and CEO tenure. The disclosure intensity and the tenure of the disclosure. are mean-centred, and β1 is the association at mean tenure of the firms in which there is no duality. Firm fixed effects eliminate all constant differences in the firms themselves and thus β1 is obtained only from variation in the firm's own disclosure. Errors are clustered by firm (Petersen, 2009), with a sensitivity check on the Driscoll and Kraay (1998) errors. The hypotheses and the main specification were determined prior to the estimation.

To avoid losing the cross-sectional variation from previous specifications we also present additional specifications. The first model is a pooled regression model with sector and year fixed effects, similar to Chen and Srinivasan (2024) who analyze the same sector across years. The second is a between–within (Mundlak) decomposition in which disclosure intensity is replaced by its firm mean and deviation from the mean (Bell & Jones, 2015; Mundlak, 1978):

$$Y_{it} = \theta_B \overline{DT}_i + \theta_W (DT_{i,t-1} - \overline{DT}_i) + \gamma' X_{i,t-1} + \mu_{st} + \varepsilon_{it} \quad (2)$$

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A test of whether or not the two differ is obtained when testing the difference between firm-by-year fixed effects (θB) and sector-by-year fixed effects (μ). A number of these specifications have been added but were not used in the main results and are reported as supplementary analyses.

5.Results

5.1Descriptive statistics

Descriptive statistics are presented in Table 2. The mean q of Mean Tobin is 3.015, mean return on assets 0.073 and mean operating margin 0.148. The average disclosure intensity for digital terms is 5.757/10,000 words, but it is extremely skewed. Table 3 indicates that the disclosure intensity is positively related to Tobin's q (r = .20), but not to return on assets (r = −.01) and is slightly negatively related to operating margin and asset turnover.

Table 2. Descriptive statistics, FY2015–2024

Variable	N	Mean	SD	P25	Median	P75
Tobin's q (market value)	3,444	3.015	2.269	1.501	2.244	3.606
Tobin's q (public float)	3,612	2.665	1.951	1.383	2.036	3.173
ROA	3,571	0.073	0.078	0.030	0.065	0.113
Operating margin	3,123	0.148	0.141	0.082	0.152	0.219
Asset turnover	3,591	0.809	0.618	0.422	0.625	0.983
DT disclosure intensity (per 10,000 words)	3,420	5.757	11.139	0	0	5.672
CEO duality	3,431	0.405	0.491	0	0	1
CEO tenure (years)	3,437	6.445	4.738	3	5	9
SBTi listing	3,645	0.265	0.441	0	0	1
Firm size (ln assets)	3,645	23.652	1.289	22.727	23.672	24.544
Leverage	3,641	0.639	0.219	0.496	0.634	0.758
Cash / assets	3,605	0.097	0.094	0.028	0.072	0.135
Capex / assets	3,480	0.039	0.031	0.015	0.030	0.054
R&D / sales	3,645	0.050	0.082	0	0.005	0.066
Sales growth	3,505	0.082	0.189	−0.003	0.060	0.139
ln firm age	3,643	3.964	0.843	3.434	4.025	4.673

Note. Winsorisation at 1st and 99th percentile for ratios. The value in Tobin's q is based on the market value of equity at the end of the fiscal year (price x shares outstanding).

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Table 3. Pearson correlations

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Tobin's q								
ROA	.48***							
Operating margin	.22***	.68***						
Asset turnover	.12***	.28***	−.19***					
(5) DT disclosure intensity	.20***	−.01	−.05**	−.06***				
(6) CEO duality	−.10***	−.03	.06***	−.04**	−.06***			
(7) CEO tenure	.13***	.11***	.11***	−.02	.08***	.27***		
(8) SBTi listing	.05***	.04**	.00	.01	.09***	.03*	−.03*	
(9) Firm size	−.43***	−.19***	.04**	−.19***	−.08***	.19***	−.04**	.21***

Note. Pairwise N = 2,931–3,645. *** p < .01, ** p < .05, * p < .10.

5.2Disclosure, value and operating performance within firms (H1, H2)

The within-firm estimates are presented in Table 4. There is no association between disclosure intensity and Tobin's q (b = −0.0008, p = .920; 95% CI [−0.0162, 0.0147]). The upper confidence bound rules out increases in q larger than about 5% of its mean for a one-standard-deviation increase in disclosure intensity. There is also no relationship between disclosure intensity and return on assets (p = .248), operating margin (p = .601) or asset turnover (p = .416). Hence, H1 and H2 are not allowed. The association between CEO duality and an increase in operating margin is about 14% of the mean operating margin (b = 0.021, p = .034), and the association between CEO duality and a higher ROA is significant at the 10% level (p = .055).

Table 4. Digital-transformation disclosure and firm outcomes: within-firm estimates

Variable	(1) Tobin's q	(2) ROA	(3) Operating margin	(4) Asset turnover
DT disclosure intensity (t−1)	−0.0008 (0.0079)	0.0003 (0.0002)	0.0002 (0.0004)	−0.0005 (0.0006)
CEO duality (t−1)	0.126 (0.111)	0.011* (0.006)	0.021** (0.010)	−0.004 (0.014)
CEO tenure (t−1)	0.0087 (0.0109)	0.0002 (0.0005)	−0.0008 (0.0009)	0.0017 (0.0015)
Firm size	−0.520*** (0.193)	−0.010 (0.008)	−0.017 (0.014)	−0.147*** (0.023)
Leverage	1.389** (0.708)	0.049 (0.031)	0.039 (0.040)	0.065 (0.077)
ROA (t−1)	5.505*** (1.218)			
R&D / sales	3.471 (3.343)	−0.397*** (0.146)	−0.925*** (0.285)	−0.612* (0.323)
Sales growth	−0.004 (0.202)	0.042*** (0.012)	0.080*** (0.030)	0.151*** (0.021)
Other controls	Yes	Yes	Yes	Yes

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Firm and year FE	Yes	Yes	Yes	Yes
Observations / firms	2,541 / 316	2,675 / 322	2,411 / 294	2,721 / 322
Within R^2	.054	.063	.064	.170

Note. The 2-way FE regressions are performed with lagged regressors, disclosure intensity centred, and CEO tenure centred. Standard errors clustered in parentheses. The other controls include cash, capital expenditure and ln firm age. *** p < .01, ** p < .05, * p < .10.

5.3CEO power and climate commitment as moderators (H3–H5)

The CEO power and climate commitment as moderators (H3–H5) The interaction terms are added to in table 5. The results show that neither the interaction effect with a CEO duality nor the interaction effect with a tenure of the CEO are statistically significant for any of the outcomes (all p ≥ .201), which means that H3a and H3b are not supported, nor is H4. As can be seen in column 5, the correlation between disclosure intensity and Tobin's q (b = 0.0021, p = .824) does not change when an SBTi is included and thus H5 is not supported. In the two-year-horizon models, only one of twelve terms is significant in all of which the disclosure effect is positive and not interpreted: disclosure and CEO duality in the asset turnover model at t+1 (b = 0.0026, p = .043).

Table 5. power and climate commitment of the CEO are the factors for moderation.

Variable	**(1) Tobin's q**	**(2) ROA**	**(3) Operating margin**	**(4) Asset turnover**	**(5) Tobin's q**
DT disclosure intensity (t−1)	−0.0044 (0.0087)	0.0001 (0.0003)	0.0000 (0.0004)	−0.0010 (0.0008)	−0.0020 (0.0078)
DT × CEO duality	0.0048 (0.0115)	0.0003 (0.0004)	0.0003 (0.0006)	0.0010 (0.0013)	
DT × CEO tenure	0.00182 (0.00153)	0.00004 (0.00005)	0.00006 (0.00007)	0.00015 (0.00011)	
CEO duality (t−1)	0.131 (0.112)	0.011** (0.006)	0.021** (0.010)	−0.004 (0.014)	0.156* (0.094)
CEO tenure (t−1)	0.0099 (0.0110)	0.0003 (0.0005)	−0.0007 (0.0009)	0.0019 (0.0014)	0.0063 (0.0102)
SBTi listing (t−1) DT × SBTi listing					−0.111 (0.103) 0.0021 (0.0096)
Controls, firm and year FE	Yes	Yes	Yes	Yes	Yes
Observations / firms	2,541 / 316	2,675 / 322	2,411 / 294	2,721 / 322	2,314 / 314
Within R^2	.060	.065	.065	.172	.058

Note. Two-way fixed-effects regressions using the CEOWr and disclosure intensity controls, with the standard errors clustered by firm, and disclosure intensity and CEO tenure mean-centred. *** p < .01, ** p < .05, * p < .10.

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5.4The valuation premium: between versus within firms

The supplementary specifications are reported in Table 6. When comparing disclosure intensity against Tobin's q for firms in the same sector and year (b = 0.0206, p = .015) and with q one year later (b = 0.0216, p = .023), disclosure intensity is positively related to them. The difference in disclosure intensity is approximately 0.23 or 8% of the mean of q for the difference of one standard deviation. None of the same comparison reveal an association with return on assets (p = .778), operating margin (p = .667) or asset turnover (p = .428). Panel B breaks down the association. The between-firm component is positive and significant (θB = 0.0270, p = .012), while the within-firm component is essentially zero (θW = 0.0001, p = .986) and the difference between the two is statistically significant (p = .045). The public-float version of q gives the same pattern (pooled b = 0.0171, p = .003; within-firm b = 0.0039, p = .524). The two relationships are presented in Figure 2, and the standardised estimate shown across outcomes in Figure 3.

Table 6. Digital-transformation transparency across and within companies

	(1) Tobin's q (t)	(2) Tobin's q (t+1)	(3) ROA (t)	(4) Operating margin (t)	(5) Asset turnover (t)
Panel A: pooled, sector × year FE					
DT disclosure intensity (t−1)	0.0206** (0.0085)	0.0216** (0.0095)	−0.0001 (0.0004)	−0.0003 (0.0008)	0.0016 (0.0020)
CEO duality (t−1)	0.073 (0.148)	0.058 (0.164)	0.003 (0.006)	0.003 (0.013)	0.011 (0.052)
R^2	.532	.496	.184	.107	.292
Panel B: between/within decomposition					
DT, firm mean (between)	0.0270** (0.0107)	0.0268** (0.0119)	−0.0002 (0.0005)	−0.0005 (0.0010)	0.0021 (0.0027)
DT, deviation from firm mean	0.0001 (0.0076)	0.0029 (0.0081)	0.0003	0.0003 (0.0004)	0.0001 (0.0008)
(within)			(0.0002)		
p (between = within)	.045	.110	.299	.483	.516
Observations	2,541	2,261	2,675	2,411	2,721

Note. Pooled OLS, firm-specific fixed effects, and the controls from Table 4 are reported.Standard errors are clustered within firm in parentheses. In Panel B, disclosure intensity (t−1) is substituted by the mean of the firm and the difference between disclosure intensity and the mean of the firm. *** p < .01, ** p < .05, * p < .10.

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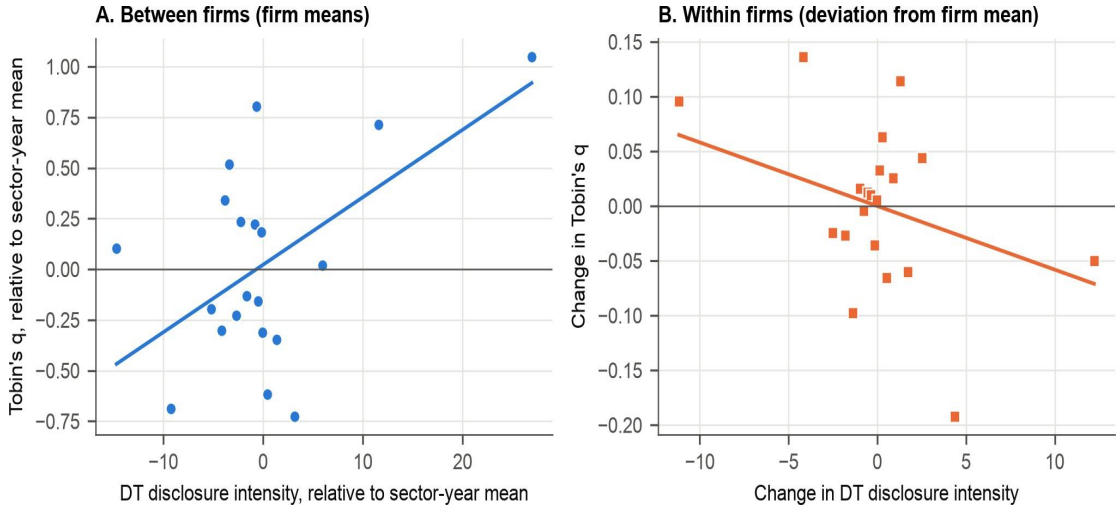


Figure 2. The intensity of disclosure of digital transformation and Tobin's q within and across firms. Panel A shows the distribution of mean values of sector-year-demeaned values in 20 equal-sized bins, and Panel B shows the distribution of deviations from the means. The least squares fits are shown as lines.

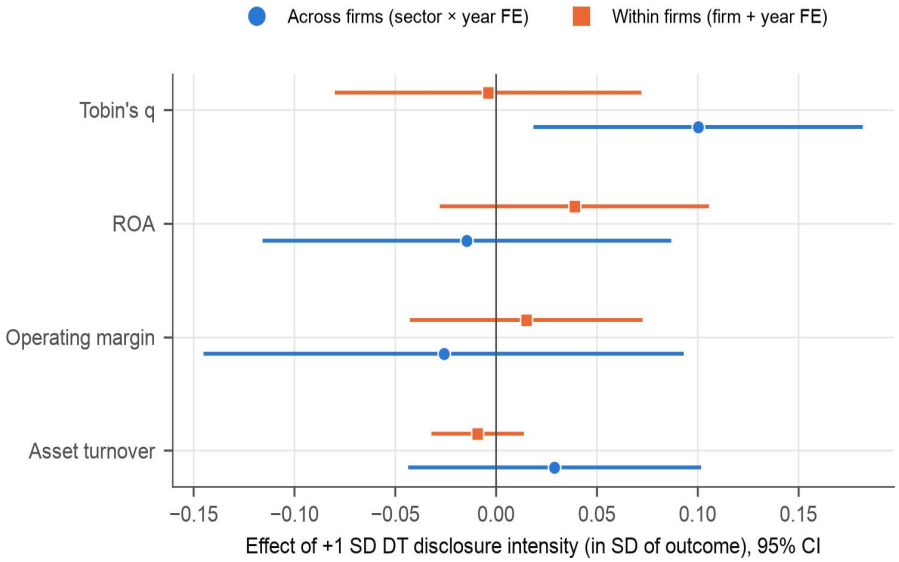


Figure 3. Standardised association of disclosure-intensity of digital transformation with each outcome: effect of a one-standard-deviation increase in disclosure intensity, in standard deviations of the outcome, with 95% confidence intervals. The pooled estimates with sector-by-year fixed effects, shown in blue, are computed in Table 6, Panel A; the within-firm estimates, shown in orange, are computed in Table 4.

5.5Frontier versus established digital language (H6)

We can see in Figure 4 that the use of frontier terms increased over the timeframe (2015 – 2024) from 0.74 terms per 10,000 words in 2015 to 3.02 terms per 10,000 words in 2024, while the use of established terms increased from 3.21 to 3.95. Both components are related to the outcomes in Table 7. Within firms, neither component is associated with Tobin's q (frontier: b = 0.0302, p = .138; established: b = −0.0153, p = .130). The two components are similarly cross-firm correlated to q, with a similar size coefficient (b = 0.0244, p = .305 for the frontier firms and b = 0.0198, p = .100 for the established firms, respectively), and the cross-firm correlations statistically are not significantly different for equality (p = .879). So the valuation premium is not localized in frontier language; hence, H6 is not supported. The results of the business do not align with the hype interpretation.Business Results do not follow the hype interpretation. For return on assets, frontier terms have a significantly positive correlation (p = .013) with established terms, which have a slightly negative correlation (p = .045); for asset turnover, a similar situation exists (p = .013). .037).

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Table 7. Frontier and established digital terms

(1) Tobin's q	(2) ROA		
Panel A: within firms (firm + year FE)		(3) Operating margin	(4) Asset turnover
Frontier terms (t−1) 0.0302 (0.0204)	0.0012* (0.0007)		
Established terms (t−1) −0.0153 (0.0101)	−0.0000 (0.0003)	0.0017 (0.0012)	0.0021 (0.0015)
p (frontier = established) .076	.129	−0.0004 (0.0004)	−0.0011 (0.0009)
Panel B: across firms (sector × year FE)		.125	.121
Frontier terms (t−1) 0.0244 (0.0238)	0.0023** (0.0011)		
Established terms (t−1) 0.0198* (0.0120)	−0.0009** (0.0004)	0.0016 (0.0018)	0.0162** (0.0073)
p (frontier = established) .879	.013	−0.0008 (0.0010)	−0.0032 (0.0030)
Panel C: between-firm components		.288	.037
Frontier terms, firm mean 0.0181 (0.0384)	0.0037* (0.0020)		
Established terms, firm mean 0.0295* (0.0165)	−0.0014** (0.0006)	0.0021 (0.0034)	0.0267** (0.0133)
Observations 2,314	2,436	−0.0011 (0.0013)	−0.0054 (0.0045)
		2,191	2,474

Note. Artificial intelligence, machine learning and big data (frontier terms); and analytics, cloud and digitisation (established terms) (10-K Item 1, terms per 10,000 words). Note: Panel A is two-way fixed effects; Panels B–C are pooled OLS with sector-by-year fixed effects. Standard errors are clustered by firm as in Table 4. *** p < .01, ** p < .05, * p < .10.

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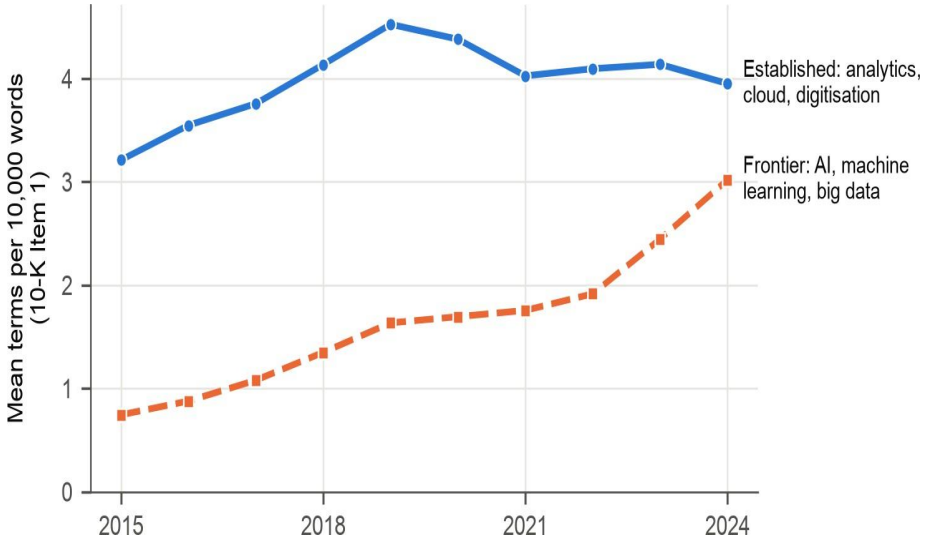


Figure 4. Frontier and established digital-technology terms in 10-K business terms for FY2015-2024 (mean terms per 10,000 words; N = 388 firms).

5.6Timing, reverse causality and robustness

There are three checks that deal with timing and direction. First, disclosure does not have a positive or negative relationship with value or operating performance 2 years later within firms (Tobin's q at t+1: b = −0.0067, p = .477). Second, neither lagged q (b = 0.052, p = .778) nor lagged return on assets (p = .645) predicts subsequent disclosure, which suggests that there is no evidence that valuation or performance influences disclosure within firms. Third, there are no meaningful differences between the association of the information-technology and communication firms with the other firms in that regard (Tobin's q: p = .885; return on assets: p = .356).

Table 8 presents robustness tests of the interaction products of q and return on assets. When using sector-by-year fixed effects, after excluding information-technology and communication firms or the pandemic years 2020–2021, as well as with the two alternative disclosure measures and with a public float based q, the disclosure coefficient remains insignificant. We treat the interaction between disclosure and tenure as a sensitivity because the cross-product remains statistically significant with Driscoll–Kraay standard error, but not in any other specification because it is based on a long time dimension that the sample of ten annual periods does not allow.

Table 8. Robustness of the within-firm interaction models

Specification	Outcome	DT	DT × duality	DT × tenure	N
Driscoll–Kraay SE	Tobin's q	−0.0044 (0.0075)	0.0048 (0.0060)	0.00182*** (0.00064)	2,541
Sector × year FE	Tobin's q	−0.0048 (0.0090)	0.0040 (0.0116)	0.00130 (0.00148)	2,541
Excl. IT and communication	Tobin's q	0.0163 (0.0233)	−0.0138 (0.0227)	0.00185 (0.00390)	1,889
Excl. FY2020–2021	Tobin's q	−0.0088 (0.0094)	0.0145 (0.0122)	0.00160 (0.00178)	2,013
DT = ln(1 + intensity)	Tobin's q	0.0436 (0.1012)	−0.0849 (0.1080)	0.01808 (0.01225)	2,541
DT = 0–3 score	Tobin's q	0.0729 (0.1077)	−0.1346 (0.1202)	0.01645 (0.01180)	2,541

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Driscoll–Kraay SE	ROA	0.0001 (0.0002)	0.0003* (0.0002)	0.00004** (0.00002)	2,675
Sector × year FE	ROA	0.0002 (0.0003)	0.0003 (0.0003)	0.00003 (0.00004)	2,675
Excl. IT and communication	ROA	0.0004 (0.0006)	−0.0002 (0.0006)	0.00006 (0.00008)	1,979
Excl. FY2020–2021	ROA	0.0001 (0.0003)	0.0004 (0.0005)	0.00002 (0.00006)	2,114
DT = ln(1 + intensity)	ROA	0.0004 (0.0026)	0.0006 (0.0032)	0.00056 (0.00037)	2,675
DT = 0–3 score	ROA	0.0010 (0.0028)	0.0017 (0.0035)	0.00029 (0.00036)	2,675
q based on public float	Tobin's q	0.0020 (0.0072)	0.0017 (0.0097)	0.00137 (0.00149)	2,643

Note. Each row restimates the value in Table 5, column 1 (Tobin's q) or column 2 (ROA) using the new value in the column. *** p < .01, ** p < .05, * p

Table 9. Summary of hypothesis tests

Hypothesis	Prediction	Result
H1	DT disclosure → firm value (+)	Not supported within firms (b = −0.0008, p = .920); positive across firms (supplementary, b = 0.0206, p = .015)
H2	DT disclosure → operating performance (+)	Not supported (ROA p = .248; operating margin p = .601; asset turnover p = .416)
H3a / H3b	DT × CEO duality (+ / −)	Not supported (all p ≥ .381 at t)
H4	DT × CEO tenure (−)	Not supported (all p ≥ .201 at t)
H5	DT × SBTi listing → firm value (+)	Not supported (b = 0.0021, p = .824)
H6	Frontier > established terms → firm value	Not supported (equality p = .879 across firms); frontier terms related to higher ROA and asset turnover across firms

Note. Decision rule: p < .05 in the firm-clustered pre-specified within-firm models. DT = digital-transformation disclosure intensity.

6.Discussion

6.1Priced but not productive

The findings come with the distinction of two questions that are commonly combined. Investors like digital firms that self-identify as such, but there is no supporting evidence in this sample that being more digital (as measured by disclosure) increases a firm's value or operating performance in the next 2 years. The valuation premium is not a result of any within-firm association, it is quite large, and it is not correlated with increased profitability or efficiency. Three interpretations Follow this pattern are the. Digital orientation can be priced as a growth option whose cash flows may still be in the future, as in the case of the delayed returns forecasted in the productivity J-curve (Brynjolfsson et al., 2021). Because digital disclosure can represent other attributes of firms with business models that rely heavily on data, like scalability or intangible assets, it could be used to proxy for those attributes in the analysis (Saunders & Brynjolfsson, 2016). But as in the days of internet names 20 years ago (Cooper et al., 2001; Hirshleifer & Teoh, 2003), investors can react to the language of the technology. Such interpretations cannot be distinguished in the design, but the difference between the between-firm and within-firm component is noteworthy and indicates that the premium is not related to disclosure per se, but rather to firm characteristics that persist.

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The results are similar to and extend the evidence of Chen and Srinivasan (2024). Their cross-sectional correlation between disclosure and value is reproduced here, but not within-firm changes in disclosure, nor is it matched in operating outcomes. Analyses that estimate the returns to digital transformation from the cross-sectional valuation of firms might consequently overestimate the returns an individual firm would gain from greater digital activity. The results also echo concerns about narrative disclosure going beyond substance that have been raised with regard to climatic disclosures (Bingler et al., 2022), and more recently, with regard to disclosure of artificial intelligence (Song et al., 2026).

6.2Technology language: hype or substance?

The breaking down of digital language nullifies worries about technology enthusiasm. If investors were buying into trendy phrases like ‘AI’ the premium in valuation should be focused around these rather than around ‘operations', and the ‘AI' should have nothing to do with the operations. This sample is not like that, however. The premium is comparable for frontier and established language, and companies employing frontier language are – if anything – more profitable and asset efficient than their sector counterparts. This trend aligns with frontier language marking in contrast to systematic AI washing that is underway at a large number of American companies, while it does not preclude overstatement by individual companies (Song et al., 2026). The results for the less profitable companies that focus on “traditional technologies” could suggest that in some industries, digitisation is a business expense, not a business asset.

6.3CEO power

Payoff of disclosure doesn't depend on the CEO's power. Duality and intensity do not appear to be related to value and operating performance, as is the case in the meta-analysis of Dalton et al. (1998) which found no strong average effect of leadership structure on operating performance. The positive relationship between duality and operating margin is in line with the unity-of-command view (Finkelstein & D'Aveni, 1994), but was not a hypothesis of this study, and is not significant for Tobin's q, therefore should be considered exploratory.

6.4Implications for theory

There are three implications for theory. First, the value-creating argument for digital capabilities is only underpinned in its cross-sectional form, that is, that firms which are consistently digital are valued more highly, but that an increase in the value of a firm's own digital orientation is not accompanied by value or operating gains within two years – consistent with the long gestation time predicted by the productivity J-curve (Brynjolfsson et al., 2021). Second, the findings of this study indicate that the financial benefit of digital transformation is not necessarily driven by CEO power, as suggested by upper echelons theory, particularly in large firms due to the lack of moderation by the CEO duality and tenure variables.Second, evidence from this study is equivocal, with the financial benefit of digital transformation not necessarily being driven by CEO power, as argued by upper echelons theory and given the lack of moderation by CEO duality and tenure variables in large firms. Third, the results indicate that the strategic change measures using narratives are more sensitive to capturing firm types than firm changes, which is important for any study that relies on text-based measures to proxy for the firm's strategic change.

6.5Implications for practice

The findings raise a warning bell for investors and analysts: Investors should not use digital stories as signs of operating better, as changes in digital language are not followed. By improving their performance. They recommend that for boards or managers, the declaration of digital transformation is not an alternative to the organizational "complements" that make technology productive (Aral & Weill, 2007; Brynjolfsson & Hitt, 2000); monitoring the progress should be done through operating metrics, not disclosure. Regulators' concern on the difference between the value of digital language and processes of operation is pertinent to scrutiny of overstated technology claims in company communication today. The implications are based upon associations in large U.S. firms, and they should be used judiciously in other settings.

7.Limitations and conclusion

Limitations. The disclosure measure is a proxy for firms' actual technology investment, but it reflects the extent to which they talk about digital technologies. There are few direct measures; only 5% of the filings in this sample capitalise software development in XBRL and those are too few to use as an alternative. Share prices are obtained from Yahoo Finance and not directly from any official data feed, but were double-checked with Tiingo for a subset of firms, and all market values checked against the market value given by the public

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float of the firm on the SEC, with the results not changing for the firms for which the two data sources agree, but around 6% of firm-years in the sample have a market value that was not validated with the market value provided by the public float. Tobin's q is based on book liabilities and no intangible assets are capitalised (Peters & Taylor, 2017). This sample is current S&P 500 members which is subject to survivorship bias. While firm-level fixed effects and lagged regressors control for stable confounders, they do not control for time-varying confounders and the between-firm premium could stem from firm characteristics that are associated with digital orientation, and not digital capability. The supplementary specifications and H6 were added after the main results and should be considered exploratory; and there are a number of tests, which increases the chances of false significant coefficients (Harvey, 2017). Future studies may include disclosure information and direct technology adoption measures (e.g., job postings, data on products), longer time periods (e.g., for longer lagged returns), and wider samples of index membership or product data.

Conclusion. Digital-transformation disclosure is correlated with the higher market valuations of large Changes in the U.S. firms' disclosure by itself is not followed by a change in the firm's value or performance, although it might be followed by a change in overall profitability or efficiency. The value premium has little to do with frontier technology buzz words and the same conclusion holds true when it comes to CEO power. Overall, the market doesn't seem to value digital orientation as a given, and the only lesson to take from digital narratives is that investors and managers should not expect to see operating improvement as a result.

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