Going Digital: Implications for Firm Value and Performance

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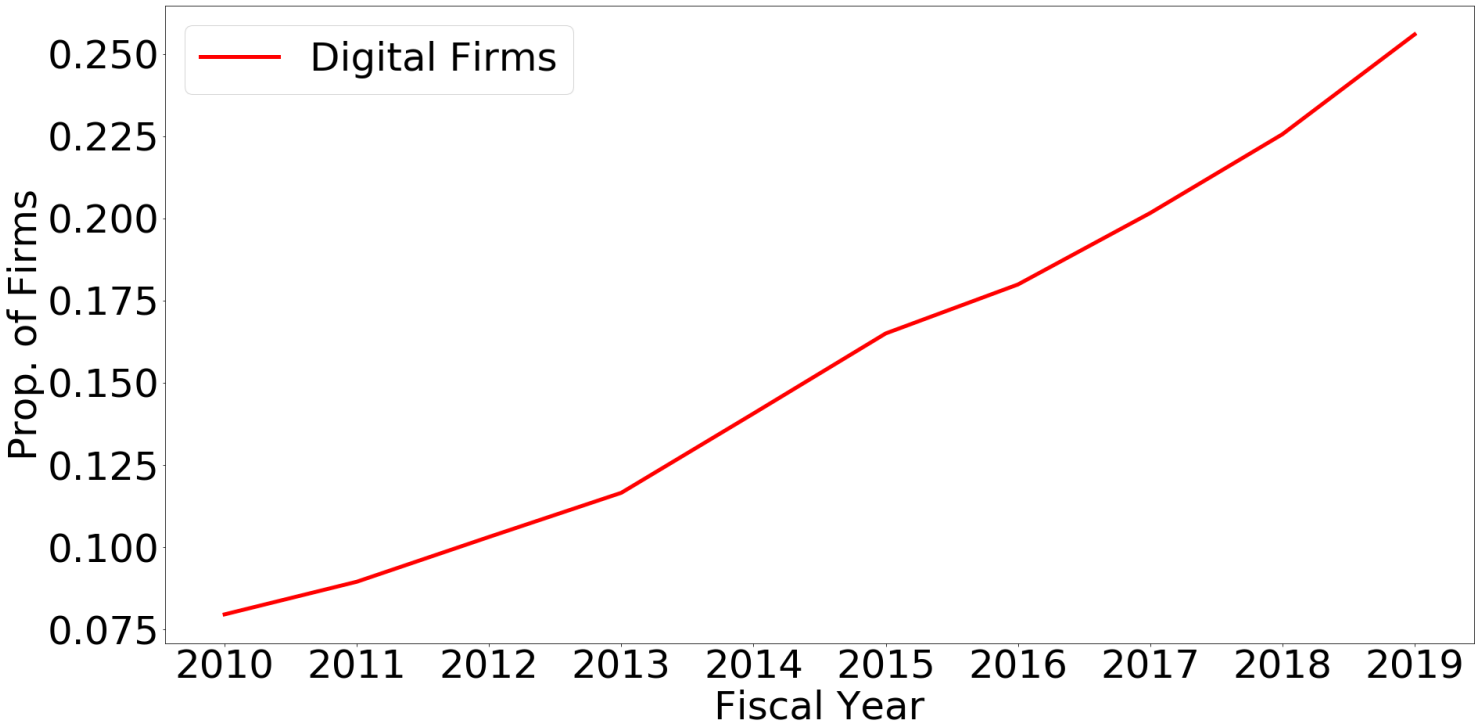
Going Digital

- Over the past few years, non-tech companies are increasingly shifting into the new economy by going digital.



Research Question

- What are the valuation consequences of digital investments?
  - Are prices reacting to these investments in a timely fashion?
- What are the accounting performance effects of digital investments?

Literature Review

- Prior work in the IT literature shows that there are several potential benefits and frictions associated with digital investments.
  - Benefits:
    - Improves productivity (Tambe 2014).
    - Enables companies to scale both vertically and horizontally (Hitt, 1999; Baker and Hubbard. 2004).
    - A GPT technology that increases value of other forms of investments (Cockburn et al, 2017).
  - Costs:
    - Costly investments with limited payoffs in the short-term (Brynjolffson and Hitt, 1996).
    - Requires complementary organizational and human capital to realize benefits (Bresnahan and Greenstein, 1996).

Research Design

- The sample of our study consists of non-tech firms and runs from 2010-2019.
  - Non-tech industries are those that are not related to computers, electronics, communications, data processing and internet services.
- We examine the valuation effects of engaging digital activities by measuring the effect of these activities on market-to-book, the earnings/sales response coefficient.
- We also examine the accounting performance effects by studying asset turnover, profit margins, sales growth and return-on-assets.

Measuring Digital

- We measure digital activities using a text-based methodology:
  - Develop a digital dictionary by collating key words in industry and practitioner writings on digital transformation.
  - Obtain text on the business activities of firms from the business description in 10-Ks.
  - Count digital related terms in the business description.
  - Compute a digital proxy by ranking yearly tercile of digital terms (coded 0 for no digital terms, and 1-3 for the tercile ranks).

Validation of Digital Measure

- We validate the measure by studying whether digital non-tech firms are more similar to tech and less similar to non-tech firms in return co-movement tests.

	Co-Movement with Tech		Co-Movement with Non-Tech	
	Levels	Past 3-Year change	Levels	Past 3-Year change
$\text{Digital}_{i,t}$	0.014^{a}	0.012^{b}	-0.043^{a}	-0.017^{b}
	(0.004)	(0.005)	(0.008)	(0.007)
Controls	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	16,961	12,735	16,961	12,735
Adj. R^2	0.2437	0.0948	0.3926	0.1640

^{a}, ^{b}, ^{c} denote significance at the 1%, 5% and 10% level.

Market-to-Book

- We find significant positive effects of digital activities on market-to-book.
- Moreover, we find that market-to-book for digital firms is increasing over time.

	Current Change	Levels	1-Year Ahead Change	2-Year Ahead Change	3-Year Ahead Change
$\text{Digital}_{i,t}$	0.104^a	0.265^a	0.108^a	0.174^a	0.215^a
	(0.027)	(0.065)	(0.030)	(0.052)	(0.068)
Controls	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Observations	20,615	20,804	17,452	14,439	11,811
Adj. R^2	0.0930	0.3722	0.0924	0.1232	0.1247

^{a}, ^{b}, ^{c} denote significance at the 1%, 5% and 10% level.

Accounting Capitalization Restrictions?

- As digital investments are likely intangible investments, part of the valuation increases in market-to-book comes from capitalization restrictions.
- We control for this effect by regressing on a market-to-book that adjusts for capitalization restrictions (McNichols et al, 2014) for a sub-sample of firms with sufficient investment histories.
- A comparison of the valuation effects of raw market-to-book and adjusted market-to-book shows that this channel explains 15% of the market-to-book premium for digital firms.

ERC/SRC

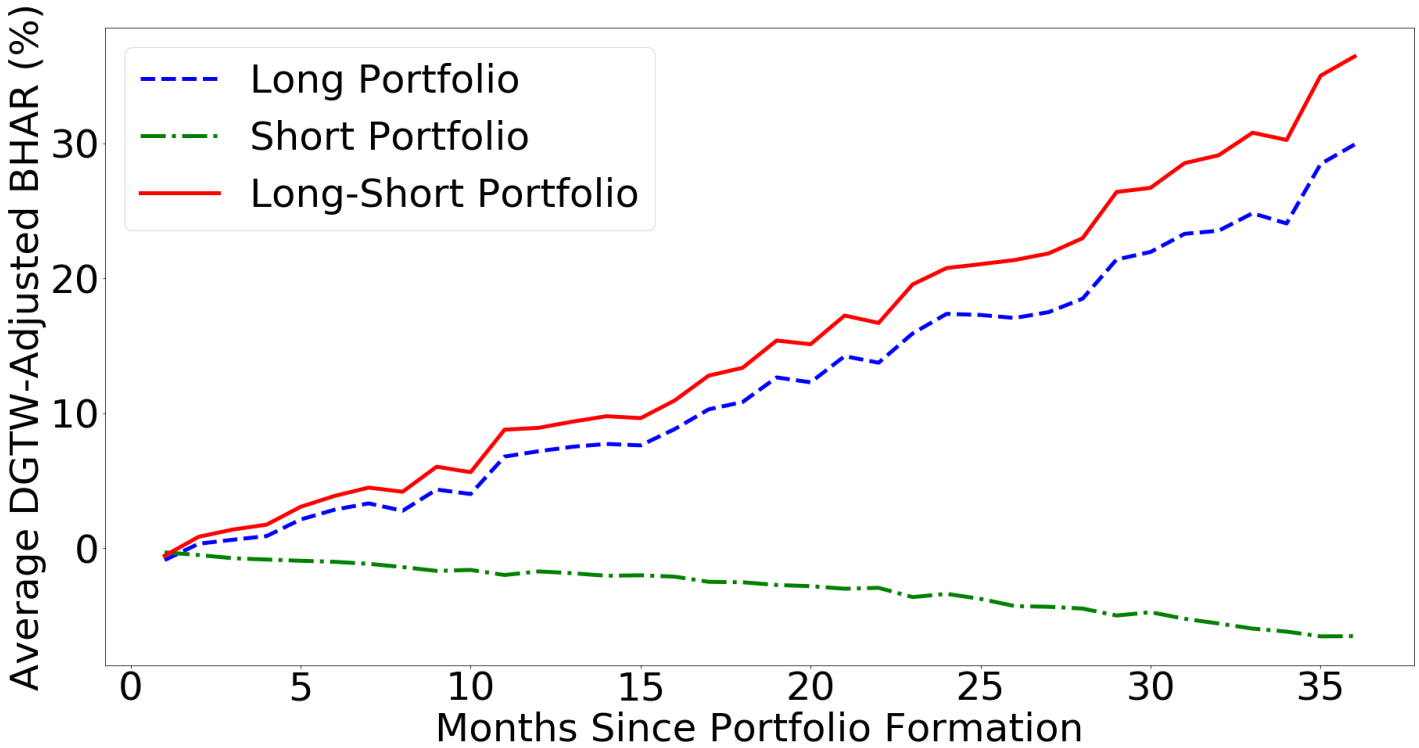
- We also find positive valuation effects on the earnings/sales response coefficients.

	ERC		SRC	
	Baseline	With Digital	Baseline	With Digital
$UE/S_{i,t}$	2.661^{a}	1.384	0.440^{a}	0.754^{c}
	(0.304)	(1.894)	(0.103)	(0.388)
$Digital_{i,t}$		0.005^{b}		0.005^{a}
		(0.002)		(0.002)
$Digital_{i,t} \times UE/S_{i,t}$		0.559^{c}		0.373^{a}
		(0.292)		(0.122)
Controls + UE/S Interaction	Yes	Yes	Yes	Yes
Time FE + UE/S Interaction	No	Yes	No	Yes
Industry FE + UE/S Interaction	No	Yes	No	Yes
Observations	11,778	11,778	11,589	11,589
Adj. R^2	0.0330	0.0527	0.0252	0.0414

^{a}, ^{b}, ^{c} denote significance at the 1%, 5% and 10% level.

Digital Portfolio Returns

- Portfolios formed on digital/non-digital firms yield significantly positive risk-adjusted returns.



Accounting Performance

- We find positive effects on asset turnover.
- But negative effects on profit margins and sales growth. Insignificant effects on ROA.

Panel A: Levels

	Asset Turnover	Profit Margins	Sales Growth	ROA
$\text{Digital}_{i,t}$	0.020^{c}	-0.010^{a}	-0.009^{a}	0.001
	(0.004)	(0.005)	(0.008)	(0.002)
Controls	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	20,804	19,660	20,804	20,804
Adj. R^2	0.6707	0.7223	0.0990	0.5680

^{a}, ^{b}, ^{c} denote significance at the 1%, 5% and 10% level.

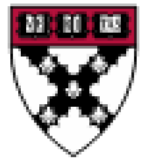
Accounting Performance (Cont.)

Panel B: 3-Year Ahead Changes				
	Asset Turnover	Profit Margins	Sales Growth	ROA
$Digital_{i,t}$	0.012^{b}	-0.005^{b}	-0.018^{c}	-0.000
	(0.004)	(0.002)	(0.010)	(0.002)
Controls	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	11,766	11,205	11,766	11,782
Adj. R^2	0.2198	0.3487	0.1694	0.2260

^{a}, ^{b}, ^{c} denote significance at the 1%, 5% and 10% level.

Implications of Results

- Digital investments are valuable investments, but the positive valuations tend to drift over time.
  - From an investors perspective — an opportunity to earn returns by investing in digital firms.
- But mixed accounting performance suggests that the benefits of digital technologies are fairly uncertain.
  - Coupled with the return predictability result, this result suggests that there is room for managers to do more in disclosing about their digital initiatives.



Thank You!