

HOW A FIRM'S COMPETITIVE ENVIRONMENT AND DIGITAL STRATEGIC POSTURE INFLUENCE DIGITAL BUSINESS STRATEGY

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Appendix

Table A1. Firm Performance Model Showing the Effect of Current Year IT Investments on Tobin's q (Dependent Variable Is Tobin's q). Random Effects Panel Regression.

	(1) Tobin's q
IT_STRATPOSTURE (Industry Norm Minus Firm's IT investments)	-0.710 (1.517)
IT (current year)	3.653*** (1.182)
IT × INDTURB	-76.62*** (17.91)
IT × HHI	-16.12 (16.43)
IT × INDGROWTH	82.85** (36.89)
IT × COMPUNC	-14.77 (24.44)
Industry Turbulence (INDTURB)	-0.456 (0.950)
Herfindahl-Hirschman Index (HHI)	-0.754 (1.013)
Industry Growth (INDGROWTH)	6.640*** (2.227)
Competitive Uncertainty (COMPUNC)	0.913 (0.613)
Lag Investment (IT)	-1.249 (1.709)
Related Diversification	-2,901** (1,167)
Firm size: Log(Employees)	-0.0970 (0.0613)
ADV	-0.00294 (0.0378)
RD	-0.0404** (0.0204)
Tobin's q Industry Avg.	0.565*** (0.217)
Observations	1,018
Number of Firms	335
Hausman test comparison with Fixed Effects	8.93 (p = 0.78)
R ²	0.22
Wald χ^2	196.3***

Robust standard errors in parentheses; ***p < 0.01; **p < 0.05; *p < 0.10

The estimated model includes an intercept, physical capital intensity, market share, an indicator variable for regulated industry, and indicator variables for year and industry. Variables in interaction terms are mean centered. We rescaled several variables to produce meaningful coefficient decimal places: Competitive uncertainty ($\times 100$), industry growth ($\times 10$), free cash flow ($\times 10,000$), related diversification ($\times 10,000$). The Hausman test statistic suggests no significant difference from fixed-effects panel estimates.

Table A2. Effect of Outsourcing Strategic Posture on IT Investments (Dependent Variable Is IT Investments). OLS Regression Estimates.

	(1) IT Investments
OS_STRATPOSTURE	0.000573* (0.000313)
OS_STRATPOSTURE × INDTURB	-0.00145 (0.00206)
OS_STRATPOSTURE × HHI	-0.00100 (0.00128)
OS_STRATPOSTURE × INDGROWTH	-0.00182 (0.00341)
OS_STRATPOSTURE × COMPUNC	0.000786 (0.00316)
Industry Turbulence (INDTURB)	0.0218 (0.0308)
Herfindahl-Hirschman Index (HHI)	0.0120 (0.0169)
Industry Growth (INDGROWTH)	0.0144 (0.0471)
Competitive Uncertainty (COMPUNC)	0.0124 (0.0360)
Lag Investment (Outsourcing)	0.000590* (0.000335)
Related Diversification	-40.39** (18.71)
Firm size: Log(Employees)	0.00281*** (0.000900)
Market share	-0.0578*** (0.0209)
Observations	519
R ²	0.219
F stat	6.657***

Robust standard errors in parentheses. ***p < 0.01; **p < 0.05; *p < 0.10

The estimated model includes an intercept, free cash flow, and indicator variables for year and industry. Variables in interaction terms are mean centered. We rescaled several variables to produce meaningful coefficient decimal places: Competitive uncertainty (× 100), industry growth (× 10), free cash flow (× 10,000), related diversification (× 10,000).

Table A3. Seemingly Unrelated Regression (SUR) Estimates

Positive coefficient on IT_STRATPOSTURE or OS_STRATPOSTURE suggests convergence in IT investment or outsourcing, respectively; negative coefficient suggests divergence; positive interaction effects suggest stronger convergence due to environmental factors; and negative interactions suggest stronger divergence due to environmental factors.

	(1) IT Investment	(2) Outsourcing Pct. of IT
IT_STRATPOSTURE × INDTURB (H1 -)	-6.156*** (1.078)	
IT_STRATPOSTURE × HHI (H2 +)	-0.102 (0.701)	
IT_STRATPOSTURE × INDGROWTH (H3 +)	5.908*** (1.520)	
IT_STRATPOSTURE × COMPUNC	-2.485*** (0.707)	
OS_STRATPOSTURE × INDTURB (H1 -)		1.769 (1.313)
OS_STRATPOSTURE × HHi (H2 +)		0.673* (0.461)
OS_STRATPOSTURE × INDGROWTH (H3 +)		4.540*** (1.579)
OS_STRATPOSTURE × COMPUNC		1.233 (1.234)
Industry Turbulence (INDTUR)	0.0524* (0.0290)	20.77 (17.40)
Herfindahl-Hirshman Index (HHI)	-0.00292 (0.0179)	-24.85** (10.86)
Industry Growth (INDGROWTH)	-0.0174 (0.0390)	-38.69* (23.37)
Competitive Uncertainty (COMPUNC)	0.0115 (0.0285)	-8.715 (16.83)
Lag Investment (IT)	0.943*** (0.0596)	
Firm Size: Log(Employees)	0.00120 (0.000728)	0.0716 (0.433)
Related Diversification	0.668 (19.46)	21,839* (11,828)
Free Cash Flow	-0.00375 (0.00493)	3.758 (2.998)
Market Share	-0.0276 (0.0187)	12.13 (11.14)
IT_STRATPOSTURE (IT Strategic Posture)	0.0744 (0.0521)	
OS_STRATPOSTURE (Outsourcing Strategic Posture)		-0.0715 (0.0570)
Lag Investment (Outsourcing)		0.661*** (0.0632)
Observations	406	406
R ²	0.729	0.609
F stat	42.10***	24.51***

Standard errors in parentheses. ***p < 0.01; **p < 0.05; *p < 0.10; #p < 0.10 (one-tail)

The estimated models include an intercept and indicator variables for year and industry. Variables in interaction terms are mean centered. We rescaled several variables to produce meaningful coefficient decimal places: Competitive uncertainty (× 100), industry growth (× 10), free cash flow (× 10,000), related diversification (× 10,000).

Table A4. Robustness Checks (Including Controls for Diversification and Number of Industry Segments) Fixed-Effects Panel Regressions. Dependent Variable Is IT Investment.

	(1)	(2)	(3)	(4)	(5)
β_1 : IT_STRATPOSTURE \times INDTURB (H1 -)	-5.944*** (0.619)	-7.399*** (0.598)	-7.274*** (0.599)	-5.306*** (0.603)	-7.994*** (0.609)
β_2 : IT_STRATPOSTURE \times HHI (H2 +)	1.137* (0.642)	-0.104 (0.586)	-0.633 (0.631)	0.435 (0.624)	-0.392 (0.585)
β_3 : IT_STRATPOSTURE \times INDGROWTH (H3 +)	4.809*** (1.195)	3.018*** (1.139)	2.616** (1.151)	4.569*** (1.206)	3.029*** (1.129)
IT_STRATPOSTURE \times COMPUNC	-4.344*** (0.818)	-2.177*** (0.781)	-2.508*** (0.793)	-5.608*** (0.758)	-2.110*** (0.770)
IT_STRATPOSTURE	0.0352 (0.0530)	-0.000771 (0.0479)	0.0320 (0.0500)	0.111** (0.0498)	0.0158 (0.0471)
NUM_SEGMENTS				0.000500 (0.00137)	0.000468 (0.00127)
IT_STRATPOSTURE \times NUM_SEGMENTS					-0.128*** (0.0114)
TOTALDIVERSE		0.00861 (0.00532)	0.00863 (0.00530)		
IT_STRATPOSTURE \times TOTALDIVERSE		-0.400*** (0.0381)	-0.459*** (0.0462)		
RELDIVERSE	-0.000799 (0.00636)	-0.00847 (0.00711)	-0.00968 (0.00712)	-0.00341 (0.00666)	-0.00202 (0.00619)
IT_STRATPOSTURE \times RELDIVERSE	-0.272*** (0.0693)		0.177** (0.0794)		
INDTURB	0.0476* (0.0261)	0.0359 (0.0247)	0.0341 (0.0247)	0.0486* (0.0265)	0.0360 (0.0246)
HHI	0.202*** (0.0686)	0.173*** (0.0657)	0.164** (0.0657)	0.197*** (0.0695)	0.152** (0.0648)
INDGROWTH	0.0812** (0.0409)	0.0702* (0.0388)	0.0691* (0.0387)	0.0795* (0.0415)	0.0667* (0.0386)
COMPUNC (competitive uncertainty)	-0.00738 (0.0240)	-0.00975 (0.0227)	-0.00782 (0.0227)	-0.00200 (0.0242)	-0.00800 (0.0225)
1 yr Lag IT Investment	0.462*** (0.0657)	0.353*** (0.0603)	0.390*** (0.0624)	0.568*** (0.0606)	0.425*** (0.0577)
Firm size: Log(Employees)	0.000692 (0.00286)	-0.00131 (0.00272)	-0.00136 (0.00271)	0.00118 (0.00289)	-0.00138 (0.00269)
Free Cash Flow	-0.00358 (0.00524)	-0.00463 (0.00497)	-0.00469 (0.00496)	-0.00311 (0.00530)	-0.00502 (0.00493)
Market share	-0.0958 (0.0599)	-0.0725 (0.0572)	-0.0663 (0.0572)	-0.0948 (0.0606)	-0.0634 (0.0564)
Observations	1,225	1,225	1,225	1,225	1,225
E ²	0.530	0.580	0.583	0.521	0.587
Number of firms	400	400	400	400	400
F stat	47.90***	55.65***	53.50***	46.23***	57.13***

Standard errors in parentheses. ***p < 0.01; **p < 0.05; *p < 0.10

The estimated models include an intercept, and indicator variables for year and industry. Variables in interaction terms are mean centered. We rescaled several variables to produce meaningful coefficient decimal places: Competitive uncertainty (\times 100), industry growth (\times 10), free cash flow (\times 10,000), related diversification (\times 10,000).

Table A5. Robustness Checks (Controlling for Current Year and Prior Year Performance) Fixed-Effects Panel Regressions. Dependent Variable | IT investment.

	(1)	(2)	(3)	(4)
Tobin's Q (current year)		0.00101 (0.000745)		0.00101 (0.000753)
Tobin's Q (prior year)			1.42e-05 (0.000145)	-6.29e-06 (0.000149)
β_1 : IT_STRATPOSTURE × INDTURB (H1 -)	-5.291*** (0.601)	-5.327*** (0.637)	-5.336*** (0.638)	-5.328*** (0.639)
β_2 : IT_STRATPOSTURE × HHI (H2 +)	0.443 (0.623)	0.489 (0.670)	0.486 (0.670)	0.501 (0.674)
β_3 : IT_STRATPOSTURE × INDGROWTH (H3 +)	4.546*** (1.203)	4.397*** (1.278)	4.415*** (1.280)	4.401*** (1.282)
IT_STRATPOSTURE × COMPUNC	-5.618*** (0.757)	-5.824*** (0.813)	-5.803*** (0.814)	-5.831*** (0.817)
IT_STRATPOSTURE	0.111** (0.0498)	0.109** (0.0530)	0.110** (0.0531)	0.110** (0.0533)
INDTURB	0.0478* (0.0263)	0.0636** (0.0311)	0.0640** (0.0311)	0.0636** (0.0313)
HHI	0.195*** (0.0692)	0.207*** (0.0774)	0.211*** (0.0774)	0.209*** (0.0780)
INDGROWTH	0.0812** (0.0413)	0.0825* (0.0467)	0.0878* (0.0467)	0.0823* (0.0469)
COMPUNC	-0.00242 (0.0242)	-0.00299 (0.0287)	-0.000133 (0.0289)	-0.00250 (0.0292)
1 yr Lag IT Investment	0.567*** (0.0605)	0.552*** (0.0648)	0.552*** (0.0650)	0.552*** (0.0651)
Firm size: Log(Employees)	0.00121 (0.00288)	0.000366 (0.00323)	2.85e-05 (0.00322)	0.000365 (0.00324)
RELDIVERSE	-27.39 (64.00)	-27.73 (71.52)	-26.16 (72.59)	-26.71 (72.87)
Free Cash Flow	-0.00324 (0.00529)	-0.00335 (0.00586)	-0.00367 (0.00791)	-0.00299 (0.00813)
Market share	-0.0935 (0.0604)	-0.0948 (0.0652)	-0.0928 (0.0650)	-0.0957 (0.0656)
Observations	1,225	1,071	1,066	1,062
R ²	0.521	0.526	0.525	0.526
Number of firms	400	348	344	343
F stat	48.84***	41.04***	40.84***	38.72***

Standard errors in parentheses. ***p < 0.01, **p < 0.05, *p < 0.10

The estimated models include an intercept, and indicator variables for year and industry. Variables in interaction terms are mean centered. We rescaled several variables to produce meaningful coefficient decimal places: Competitive uncertainty (× 100), industry growth (× 10), free cash flow (× 10,000), related diversification (× 10,000).

Table A6. Using Rolling Averages of Strategic Posture Fixed-Effects Panel Regressions. Dependent Variable Is IT Investment.

	(1) Base Model Same as Column 2 of Table 3	(2) Using Two-Year Rolling Average for IT Strategic Posture
β_1 : IT_STRATPOSTURE \times INDTURB (H1 -)	-5.291*** (0.601)	
β_2 : IT_STRATPOSTURE \times HHI (H2 +)	0.443 (0.623)	
β_3 : IT_STRATPOSTURE \times INDGROWTH (H3 +)	4.546*** (1.203)	
IT_STRATPOSTURE \times COMPUNC	-5.618*** (0.757)	
IT_STRATPOSTURE	0.111** (0.0498)	
INDTURB	0.0478* (0.0263)	0.00915 (0.0275)
HHI	0.195*** (0.0692)	0.114* (0.0674)
INDGROWTH	0.0812** (0.0413)	0.0202 (0.0411)
COMPUNC	-0.00242 (0.0242)	0.0237 (0.0240)
IT	0.567*** (0.0605)	0.572*** (0.0546)
Firm size: Log(Employees)	0.00121 (0.00288)	0.00397 (0.00306)
RELDIVERSE	-27.39 (64.00)	-7.816 (67.70)
Free Cash Flow	-0.00324 (0.00529)	-0.00446 (0.00815)
Market share	-0.0935 (0.0604)	-0.0599 (0.0637)
SP 2 yr rolling \times INDTURB		-5.979*** (1.801)
SP 2 yr rolling \times HHI		-0.592 (0.785)
SP 2 yr rolling \times INDGROWTH		13.42*** (1.969)
SP 2 yr rolling \times COMPUNC		-2.634** (1.295)
SP 2 yr rolling = Avg(IT_STRATPOSTURE (t - 1), IT_STRATPOSTURE)		-0.302*** (0.0792)
Observations	1,225	731
R ²	0.521	0.628
Number of firms	400	273
F stat	48.84***	43.83***

Standard errors in parentheses. ***p < 0.01, **p < 0.05, *p < 0.10

The estimated models include an intercept, and indicator variables for year and industry. Variables in interaction terms are mean centered. We rescaled several variables to produce meaningful coefficient decimal places: Competitive uncertainty (\times 100), industry growth (\times 10), free cash flow (\times 10,000), related diversification (\times 10,000).