

INFORMATION TECHNOLOGY CAPABILITY AND FIRM PERFORMANCE: CONTRADICTION FINDINGS AND THEIR POSSIBLE CAUSES

Ho-Chang Chae

Department of Finance, Accounting, and Information Systems, Gary E. West College of Business, West Liberty University, West Liberty, WV 26074 U.S.A. {ho-chang.chae@westliberty.edu}

Chang E. Koh and Victor R. Prybutok

Department of Information Technology and Decision Sciences, College of Business, University of North Texas, Denton, TX 76203-5017 U.S.A. {Chang.Koh@unt.edu} {prybutok@unt.edu}

Appendix A

List of IT Leaders and Control Companies

IT Leader Sample	SIC Code	Control Sample	SIC Code
Consol Energy Inc	1220	Walter Energy Inc	1220
Halliburton Co	1389	Schlumberger Ltd	1389
Standard Pacific Corp	1531	M/I Homes Inc	1531
Beazer Homes USA Inc	1531	Hovnanian Entrprs Inc -CI A	1531
Toll Brothers Inc	1531	MDC Holdings Inc	1531
D R Horton Inc	1531	Ryland Group Inc	1531
Lennar Corp	1531	KB Home	1531
Granite Construction Inc	1600	Empresas Ica Soc Ctl - ADR	1600
Fluor Corp	1600	Alstom - ADR	1600
Gold Kist Inc	2015	Sadia Sa - ADR	2015
Kraft Foods Inc	2000	ConAgra Foods Inc	2000
Smithfield Foods Inc	2011	Hormel Foods Corp	2011
Campbell Soup Co	2030	Heinz (H J) Co	2030
General Mills Inc	2040	Kellogg Co	2040
Imperial Sugar Co	2060	Wrigley (Wm) Jr Co	2060
Hershey Co	2060	Tate & Lyle Plc - ADR	2060
Molson Coors Brewing Co	2082	Comp Bebidas Americas - ADR	2082
Constellation Brands - CI A	2084	Gruma S.A.B. de C.V. - ADR B	2040
Brown-Forman - CI B	2085	Coca Cola Hellenic Btlg - ADR	2086

IT Leader Sample	SIC Code	Control Sample	SIC Code
McCormick & Company Inc	2090	PepsiAmericas Inc	2086
Unifi Inc	2200	Burlington Industries Inc	2200
Cintas Corp	2320	Polo Ralph Lauren Cp - CI A	2320
Kellwood Co	2330	Benetton Group Spa - ADR	2330
WestPoint Stevens Inc	2390	Warnaco Group Inc	2300
Universal Forest Prods Inc	2421	Potlatch Corp	2421
Clayton Homes Inc	2451	Oakwood Homes Corp	2451
Louisiana-Pacific Corp	2400	Champion Enterprises Inc	2451
Johnson Controls Inc	2531	Lear Corp	2531
Georgia-Pacific Corp	2600	Intl Paper Co	2600
Steelcase Inc	2522	Intier Automotive Inc	2531
Stora Enso Corp - ADR	2621	Upm-Kymmene Corp - ADR	2621
MeadWestvaco Corp	2631	Temple-Inland Inc	2631
Sonoco Products Co	2650	Packaging Corp Of America	2650
Sealed Air Corp	2670	Bemis Co Inc	2670
Rayonier Inc	2611	Graphic Packaging Holding Co	2631
Smurfit-Stone Container Corp	2631	Amcor Ltd - ADR	2600
Gannett Co	2711	Tribune Co	2711
Dow Jones & Co Inc	2711	Washington Post - CI B	2711
Banta Corp	2750	Cenveo Inc	2750
Bowne & Co Inc	2750	ACG Holdings Inc	2750
Donnelley (R R) & Sons Co	2750	World Color Press Inc	2750
Standard Register Co	2761	Scholastic Corp	2731
New York Times Co - CI A	2711	Wolters Kluwer NV - ADR	2732
FMC Corp	2800	Ciba Holding AG - ADR	2800
Bayer Ag - ADR	2800	BASF Se - ADR	2800
Millennium Chemicals Inc	2810	Grace (W R) & Co	2810
Air Products & Chemicals Inc	2810	BOC Group Plc - ADR	2810
PolyOne Corp	2821	Schulman (A.) Inc	2821
Eastman Chemical Co	2821	Huntsman Intl Llc	2821
Lilly (Eli) & Co	2834	Warner-Lambert Co	2834
Abbott Laboratories	2834	Astrazeneca Plc - ADR	2834
Wyeth	2834	Aventis Sa - ADR	2834
Johnson & Johnson	2834	Novartis Ag - ADR	2834
Dade Behring Holdings Inc	2835	Applied Biosystems Inc	2835
Sigma-Aldrich Corp	2836	Merck Serono Sa - ADR	2836
Avon Products	2844	Lauder (Estee) Cos Inc - CI A	2844
Colgate-Palmolive Co	2844	Alliance Boots Plc - ADR	2844
Dow Chemical	2821	Bristol-Myers Squibb Co	2834
Du Pont (E I) De Nemours	2820	Merck & Co	2834
Baxter International Inc	2836	Rhodia - ADR	2800
PPG Industries Inc	2851	Air Liquide Sa - ADR	2810
Sherwin-Williams Co	2851	Celanese Ag	2860
Engelhard Corp	2810	Arco Chemical Co	2860
Praxair Inc	2810	Syngenta Ag - ADR	2870
Dial Corporation	2840	Amersham Plc - ADR	2835
Tesoro Corp	2911	Pennzoil-Quaker State Co	2911

IT Leader Sample	SIC Code	Control Sample	SIC Code
Lubrizol Corp	2990	Suncor Energy Inc	2911
Cooper Tire & Rubber Co	3011	Hanna (M A) Co	3080
Armstrong Holdings Inc	3089	Jacuzzi Brands Inc	3080
Pactiv Corp	3089	Reebok International Ltd	3021
Goodyear Tire & Rubber Co	3011	Nike Inc - CI B	3021
Lafarge North America Inc	3270	Fletcher Building Ltd	3270
Owens Corning	3290	CEMEX S.A.B de C.V. - ADR	3241
Weirton Steel Corp	3312	Rouge Industries Inc	3312
Ispat Inland Inc	3312	Commercial Metals	3312
Allegheny Technologies Inc	3312	AK Steel Holding Corp	3312
Harsco Corp	3390	Grupo Imsa SA de CV - Ads	3312
Worthington Industries	3310	Gerdau SA - ADR	3312
APW Ltd	3460	Alliant Techsystems Inc	3480
Tower Automotive Inc	3460	Silgan Holdings Inc	3411
Snap-On Inc	3420	Crane Co	3490
Varco International Inc	3533	Grant Prideco Inc	3533
National Oilwell Varco Inc	3533	Weatherford Intl Ltd	3533
Gateway Inc	3571	Apple Inc	3571
Applied Materials Inc	3559	Dover Corp	3559
Maxtor Corp	3572	Iomega Corp	3572
Xerox Corp	3577	Canon Inc - ADR	3577
Tecumseh Products Co - CI A	3585	Lennox International Inc	3585
Flowserve Corp	3561	Pall Corp	3569
Storage Technology Cp	3572	Pentair Inc	3561
Timken Co	3562	Nacco Industries - CI A	3537
AGCO Corp	3523	Metso Corp - ADR	3530
Western Digital Corp	3572	Lexmark Intl Inc - CI A	3577
Quantum Corp	3572	York International Corp	3585
3Com Corp	3576	Baker Hughes Inc	3533
Black & Decker Corp	3540	SKF AB - ADR	3562
EMC Corp/Ma	3572	Atlas Copco AB - ADR	3560
NCR Corp	3578	CNH Global NV	3523
Illinois Tool Works	3540	Trane Inc	3585
Cisco Systems Inc	3576	Komatsu Ltd - ADR	3531
Deere & Co	3523	Sanyo Electric Co Ltd - ADR	3579
Dell Inc	3571	Caterpillar Inc	3531
American Power Conversion Cp	3620	Sgl Carbon Ag - ADR	3620
Acuity Brands Inc	3640	Thomas & Betts Corp	3640
Sanmina-Sci Corp	3672	Viasystems Inc	3672
Fairchild Semiconductor Intl	3674	Adv Semiconductor Engr - ADR	3674
Kimball International - CI B	3679	Loral Space & Communications	3663
Analog Devices	3674	Harman International Inds	3651
Conexant Systems Inc	3674	AVX Corp	3670
ADC Telecommunications Inc	3661	Jabil Circuit Inc	3672
LSI Corp	3674	Amkor Technology Inc	3674
Imation Corp	3695	Tellabs Inc	3661
SPX Corp	3612	On Semiconductor Corp	3674

IT Leader Sample	SIC Code	Control Sample	SIC Code
National Semiconductor Corp	3674	Exide Technologies	3690
Qualcomm Inc	3663	Advanced Micro Devices	3674
Harris Corp	3663	Maytag Corp	3630
Micron Technology Inc	3674	Agere Systems Inc	3674
Cooper Industries Plc	3640	Corning Inc	3679
Solectron Corp	3672	Thomson - ADR	3663
Whirlpool Corp	3630	Marconi Corp Plc - ADR	3661
Texas Instruments Inc	3674	ABB Ltd - ADR	3613
Nortel Networks Corp	3661	Nokia Corp - ADR	3663
Intel Corp	3674	Alcatel-Lucent - ADR	3661
Emerson Electric Co	3600	Electrolux Ab - ADR	3630
Paccar Inc	3711	Navistar International Corp	3711
Daimler Ag	3711	Toyota Motor Corp - ADR	3711
General Motors Corp	3711	Ford Motor Co	3711
American Axle & Mfg Holdings	3714	Autoliv Inc	3714
Eaton Corp	3714	Tomkins Plc - ADR	3714
Textron Inc	3721	BAE Systems Plc - ADR	3721
GenCorp Inc	3760	Metaldyne Corp	3714
Harley-Davidson Inc	3751	Embraer-Empresa Bras - ADR	3721
Fleetwood Enterprises Inc	3716	Mcdermott Intl Inc	3730
ArvinMeritor Inc	3714	Goodrich Corp	3728
Federal-Mogul Corp	3714	Scania Aktiebolag - ADR	3711
Honeywell International Inc	3728	Visteon Corp	3714
Lockheed Martin Corp	3760	United Technologies Corp	3720
Northrop Grumman Corp	3812	Thales - ADR	3812
Eastman Kodak Co	3861	Fujifilm Holdings Corp - ADR	3861
AMETEK Inc	3823	Centerpulse Ltd - ADR	3842
Burlington Northern Santa Fe	4011	Canadian Pacific Railway Ltd	4011
Landstar System Inc	4213	Arkansas Best Corp	4213
Iron Mountain Inc	4220	Covenant Transportation Grp	4213
Royal Caribbean Cruises Ltd	4400	Carnival Corp/Plc (Gbr) - ADR	4400
Alaska Airlines Inc	4512	China Southn Airs Ltd - ADR	4512
Continental Airs Inc - CI B	4512	Northwest Airlines Corp	4512
Delta Air Lines Inc	4512	Japan Airlines Corp - ADR	4512
American Airlines Inc	4512	British Airways Plc - ADR	4512
Con-Way Inc	4210	YRC Worldwide Inc	4213
Hub Group Inc - CI A	4731	Expeditors Intl Wash Inc	4731
Gatx Corp	4700	Pacer International Inc	4731
Global Crossing Ltd	4813	Compania Telecom Chile - Ads	4813
Alltel Corp	4812	Telefonica Moviles SA - ADR	4812
MCI Inc	4813	Bce Inc	4813
Sprint Corp-Consolidated	4813	Telefonica SA - ADR	4813
Bellsouth Corp	4813	Telecom Italia Spa - Old	4813
AT&T Inc	4813	France Telecom - ADR	4813
Verizon Communications Inc	4813	Deutsche Telekom AG - ADR	4813
Cox Communications Inc	4841	British Sky Brdcstg Gp - ADR	4841
Cablevision Sys Corp - CI A	4841	Charter Communications Inc	4841

IT Leader Sample	SIC Code	Control Sample	SIC Code
Great Plains Energy Inc	4911	Southwestern Public Svc Co	4911
Pinnacle West Capital Corp	4911	Connecticut Light & Power Co	4911
Ameren Corp	4911	British Energy Plc - ADR	4911
Progress Energy Inc	4911	Alabama Power Co	4911
PacifiCorp	4911	FirstEnergy Corp	4911
Exelon Corp	4911	Intl Power Plc - ADR	4911
Mirant Corp	4911	Cinergy Corp	4911
Florida Power & Light Co	4911	Scottish Power Plc - ADR	4911
Tennessee Valley Authority	4911	Hydro Quebec	4911
Entergy Corp	4911	Southern California Edison	4911
Edison International	4911	American Electric Power Co	4911
Southern Co	4911	Endesa SA - ADR	4911
Peoples Energy Corp	4924	National Fuel Gas Co	4924
Alliant Energy Corp	4931	Northern Indiana Pub Serv Co	4931
Xcel Energy Inc	4931	Avista Corp	4931
CMS Energy Corp	4931	Public Service Elec & Gas Co	4931
Duke Energy Corp	4931	PG&E Corp	4931
EQT Corp	4923	Hawaiian Electric Inds	4911
Waste Management Inc	4953	Consolidated Edison Inc	4931
Anixter Intl Inc	5063	Wesco Intl Inc	5063
Watsco Inc	5070	Emco Ltd	5070
Handleman Co	5099	Amer Bldrs & Cntrctr Supply	5030
Airgas Inc	5084	Metals USA Inc	5051
United Stationers Inc	5045	Danka Business Sys Plc - ADR	5040
Owens & Minor Inc	5047	Ryerson Inc	5051
Graybar Electric Co Inc	5063	Merisel Inc	5045
Grainger (W W) Inc	5000	IKON Office Solutions	5040
Arrow Electronics Inc	5065	Wolseley Plc - ADR	5070
Ashland Inc	5160	AmerisourceBergen Corp	5122
Cardinal Health Inc	5122	Sysco Corp	5140
Belk Inc	5311	Neiman-Marcus Group Inc	5311
Saks Inc	5311	Kohl's Corp	5311
Sears Roebuck & Co	5311	Penney (J C) Co	5311
Big Lots Inc	5331	Dollar General Corp	5331
Smart & Final Inc	5411	Marsh Supermarkets - CI B	5411
Supervalu Inc	5411	Delhaize Group Sa - ADR	5411
Albertson's Inc	5411	Safeway Inc	5411
Kroger Co	5411	Koninklijke Ahold Nv - ADR	5411
Spartan Stores Inc	5411	Penn Traffic Co	5411
Pathmark Stores Inc	5411	Pao De Acucar Brasil - Gdr	5411
CSK Auto Corp	5531	TBC Corp	5531
Advance Auto Parts Inc	5531	Pep Boys-Manny Moe & Jack	5531
Mens Wearhouse Inc	5600	J Crew Group Inc	5600
Burlington Coat Factory Wrhs	5651	Ross Stores Inc	5651
Footstar Inc	5661	Retail Ventures Inc	5661
Pier 1 Imports Inc/De	5700	Linens N Things Inc	5700
Best Buy Co Inc	5731	Circuit City Stores Inc	5731

IT Leader Sample	SIC Code	Control Sample	SIC Code
Cracker Barrel Old Ctry Stor	5812	Starbucks Corp	5812
CVS Caremark Corp	5912	Walgreen Co	5912
Tiffany & Co	5944	Zale Corp	5944
Lands End Inc	5961	Amazon.Com Inc	5961
Petsmart Inc	5990	Symbion Health Ltd - ADR	5912
CDW Corp	5961	Borders Group Inc	5940
Office Depot Inc	5940	Toys R Us Inc	5945
Zions Bancorporation	6020	BBVA Banco Frances Sa - ADR	6020
Synovus Financial Corp	6020	M & T Bank Corp	6020
Northern Trust Corp	6020	AmSouth Bancorporation	6020
Regions Financial Corp	6020	UnionBanCal Corp	6020
Fifth Third Bancorp	6020	SouthTrust Corp	6020
Providian Financial Corp	6020	Espirito Santo Financial-ADR	6020
BB&T Corp	6020	Comerica Inc	6020
State Street Corp	6020	U S Bancorp	6020
Mellon Financial Corp	6020	MBNA Corp	6020
National City Corp	6020	SunTrust Banks Inc	6020
Keycorp	6020	Westpac Banking Corp - ADR	6020
PNC Financial Svcs Group Inc	6020	Australia & Nw Zlnd Bk - ADR	6020
Wells Fargo & Co	6020	FleetBoston Financial Corp	6020
Wachovia Corp	6020	Banco Bilbao Vizcaya - ADR	6020
Bank One Corp	6020	Barclays Plc/England - ADR	6020
JPMorgan Chase & Co	6020	Bank Of America Corp	6020
Capital One Financial Corp	6141	Toyota Motor Credit Corp	6141
Countrywide Financial Corp	6162	American Express Credit Corp	6153
SLM Corp	6111	ORIX Corp - ADR	6172
Cit Group Inc	6172	Household Finance Corp	6141
Fannie Mae	6111	General Electric Cap Corp	6159
Goldman Sachs Group Inc	6211	Lehman Brothers Holdings Inc	6211
Morgan Stanley	6211	Merrill Lynch & Co Inc	6211
UBS AG	6282	Credit Suisse Group - ADR	6211
Mony Group Inc	6311	ING Life Ins & Annuity Co	6311
Torchmark Corp	6311	American National Insurance	6311
Nationwide Finl Svcs - Cl A	6311	Jefferson-Pilot Corp	6311
Northwestern Mutual Life Ins	6311	Sun Life Financial Inc	6311
Prudential Financial Inc	6311	MetLife Inc	6311
American International Group	6311	ING Groep NV - ADR	6311
PacifiCare Health Systems	6324	WellPoint Inc	6324
Cigna Corp	6324	UnitedHealth Group Inc	6324
Aetna Inc	6324	Gainsco Inc	6331
Ohio Casualty Corp	6331	Berkley (W R) Corp	6331
Transatlantic Holdings Inc	6331	Unitrin Inc	6331
Cincinnati Financial Corp	6331	Old Republic Intl Corp	6331
American Family Ins Group	6331	Fairfax Financial Holdings	6331
Progressive Corp-Ohio	6331	Safeco Corp	6331
Hartford Financial Services	6331	CAN Financial Corp	6331
Allstate Corp	6331	Royal & Sun Alliance Insrnc	6331

IT Leader Sample	SIC Code	Control Sample	SIC Code
Markel Corp	6351	PMI Group Inc	6351
LandAmerica Financial Gp	6361	Fidelity National Finl Inc	6361
Equity Office Properties Tr	6798	Simon Property Group Inc	6798
Marriott Intl Inc	7011	Intercontinental Hotels - ADR	7011
Block H & R Inc	7200	Service Corp International	7200
Equifax Inc	7320	Dun & Bradstreet Corp	7320
CDI Corp	7363	Mps Group Inc	7363
Volt Info Sciences Inc	7363	Robert Half Intl Inc	7363
EarthLink Inc	7370	Sra International Inc	7370
American Management Systems	7370	GTECH Holdings Corp	7370
Silicon Graphics Inc	7370	IAC/Interactive Corp	7370
Intuit Inc	7372	Autodesk Inc	7372
Cadence Design Systems Inc	7372	Sybase Inc	7372
Electronic Arts Inc	7372	Intergraph Corp	7372
PeopleSoft Inc	7372	Adobe Systems Inc	7372
BMC Software Inc	7372	SunGard Data Systems Inc	7372
Perot Systems Corp	7373	CGI Group Inc - CI A	7373
Affiliated Computer Services	7374	DST Systems Inc	7374
Hewitt Associates Inc	7374	Fiserv Inc	7374
Unisys Corp	7373	Computer Sciences Corp	7370
Oracle Corp	7372	Manpower Inc/Wi	7363
Kelly Services Inc - CI A	7363	Interpublic Group Of Cos	7311
Administaff Inc	7363	Intl Lease Finance Corp	7359
Sabre Holdings Corp - CI A	7373	United Rentals Inc	7350
Spherion Corp	7363	Brinks Co	7381
Reynolds & Reynolds - CI A	7373	Konami Corp - ADR	7372
ABM Industries Inc	7340	Convergys Corp	7389
Ryder System Inc	7510	Avis Budget Group Inc	7510
MGM Mirage	7990	Trump Entertainment Resorts	7990
Harrahs Entertainment Inc	7990	Caesars Entertainment Inc	7990
Sun Healthcare Group Inc	8051	Mariner Health Care Inc	8051
Kindred Healthcare Inc	8051	Beverly Enterprises Inc	8051
Community Health Systems Inc	8062	Health Management Assoc	8062
Universal Health Svcs - CI B	8062	Triad Hospitals Inc	8062
Laboratory Cp Of Amer Hldgs	8071	Manor Care Inc	8051
Quest Diagnostics Inc	8071	Coventry Health Care Inc	8011
Advocat Inc	8051	AmeriPath Inc	8071
BearingPoint Inc	8742	Washington Group Intl Inc	8711
Tyco International Ltd	9997	Berkshire Hathaway	9997

Appendix B

Matched Sample Comparison of Firms at the Four Digit SIC Classification Level

Appendix B1. Results of Hypotheses Tests																	
Measurement	Category	2001				2002				2003				2004			
		Mean	Median	Z Value	P Value	Mean	Median	Z Value	P Value	Mean	Median	Z Value	P Value	Mean	Median	Z Value	P Value
ROA	IT Leaders	0.014	0.023	2.119	0.017	0.015	0.025	2.208	0.014	0.088	0.024	-0.092	0.537	0.039	0.037	1.332	0.091
	Control	0.003	0.015			0.008	0.016			0.028	0.027			0.035	0.032		
ROS	IT Leaders	0.026	0.033	1.416	0.078	0.026	0.039	3.183	0.001	0.096	0.048	0.344	0.365	0.066	0.062	0.707	0.240
	Control	-0.001	0.036			-0.016	0.031			0.053	0.057			0.054	0.067		
OI/A	IT Leaders	0.062	0.060	1.525	0.064	0.060	0.060	0.193	0.424	0.065	0.060	-0.892	0.814	0.080	0.068	-0.134	0.553
	Control	0.054	0.059			0.061	0.062			0.068	0.062			0.077	0.069		
OI/S	IT Leaders	0.101	0.078	0.977	0.164	0.108	0.083	0.180	0.429	0.119	0.093	-1.269	0.898	0.142	0.113	-0.181	0.572
	Control	0.092	0.081			0.109	0.088			0.123	0.101			0.114	0.115		
OI/E	IT Leaders	47.209	22.920	0.208	0.418	45.668	19.494	-0.857	0.804	56.049	26.474	-2.149	0.984	69.423	42.116	-1.565	0.941
	Control	43.195	17.861			57.495	22.892			69.734	31.083			79.590	37.655		
COG/S	IT Leaders	0.661	0.709	-2.027	0.021	0.653	0.710	-1.433	0.076	0.646	0.715	-0.411	0.340	0.626	0.687	-1.081	0.140
	Control	0.683	0.707			0.667	0.710			0.653	0.702			0.668	0.698		
SGA/S	IT Leaders	0.248	0.239	1.364	0.914	0.250	0.249	1.769	0.962	0.241	0.239	0.700	0.758	0.240	0.245	0.586	0.721
	Control	0.235	0.208			0.235	0.204			0.232	0.216			0.230	0.213		
OPEXP/S	IT Leaders	0.836	0.863	-0.514	0.304	0.831	0.864	0.496	0.690	0.823	0.859	1.597	0.945	0.804	0.838	0.930	0.824
	Control	0.835	0.865			0.822	0.857			0.812	0.854			0.824	0.834		

This table is comparable to Table 5, which reports the same data analysis using a single-firm control benchmark.

Appendix B2. Results of Test of Performance Sustainability													
Measurement	Category	2005				2006				2007			
		Mean	Median	Z Value	P Value	Mean	Median	Z Value	P Value	Mean	Median	Z Value	P Value
ROA	IT Leaders	0.040	0.034	0.389	0.349	0.042	0.036	-0.171	0.568	0.029	0.033	-0.743	0.771
	Control	0.037	0.029			0.044	0.035			0.037	0.036		
ROS	IT Leaders	0.066	0.062	-0.127	0.551	0.078	0.072	-0.352	0.638	0.061	0.067	-0.545	0.707
	Control	0.020	0.063			0.033	0.071			-0.055	0.070		
OI/A	IT Leaders	0.080	0.068	-0.273	0.608	0.081	0.064	-0.684	0.753	0.076	0.065	0.074	0.471
	Control	0.079	0.066			0.080	0.065			0.072	0.065		
OI/S	IT Leaders	0.140	0.115	-0.376	0.647	0.141	0.121	-1.148	0.874	0.126	0.112	-0.408	0.658
	Control	0.119	0.118			0.130	0.119			-0.042	0.113		
OI/E	IT Leaders	70.094	46.139	-1.878	0.970	83.210	49.592	-1.878	0.970	73.270	56.074	-0.771	0.780
	Control	80.183	39.062			98.986	46.879			48.155	40.820		
COG/S	IT Leaders	0.632	0.687	-1.035	0.150	0.635	0.709	-0.741	0.229	0.651	0.701	-0.888	0.187
	Control	0.665	0.701			0.660	0.696			0.830	0.712		
SGA/S	IT Leaders	0.240	0.241	1.387	0.917	0.242	0.237	1.565	0.941	0.235	0.225	1.614	0.947
	Control	0.222	0.202			0.222	0.193			0.211	0.175		
OPEXP/S	IT Leaders	0.809	0.834	0.980	0.837	0.813	0.829	1.681	0.954	0.825	0.845	0.504	0.693
	Control	0.822	0.844			0.816	0.831			0.982	0.834		

This table is comparable to Table 6, which reports the same data analysis using a single-firm control benchmark.

Appendix B3. Regression Analysis					
2002					
	Model	N	R-Square Change	2001 Financial Performance	Dummy
ROA	1	356	0.305	0.604***	
	2		0.000	0.604***	-0.048
ROS	1	356	0.091	0.359***	
	2		0.005	0.353***	-0.029
OI/A	1	356	0.708	0.784***	
	2		0.004	0.786***	0.005
OI/S	1	356	0.746	0.862***	
	2		0.001	0.863***	0.007
OI/E	1	322	0.734	0.871***	
	2		0.004	0.873***	11.438**
COG/S	1	356	0.933	0.998***	
	2		0.000	0.999***	-0.006
SGA/S	1	222	0.945	0.967***	
	2		0.000	0.966***	-0.003
OPEXP/S	1	356	0.845	0.950***	
	2		0.000	0.950***	-0.005
2003					
	Model	N	R-Square Change	2002 Financial Performance	Dummy
ROA	1	348	0.001	-0.192	
	2		0.003	-0.208	-6.237
ROS	1	348	0.012	0.240**	
	2		0.001	0.232**	-0.032
OI/A	1	348	0.768	0.785***	
	2		0.000	0.784***	0.003
OI/S	1	348	0.802	0.945***	
	2		0.000	0.944***	0.004
OI/E	1	324	0.884	1.027***	
	2		0.000	1.027***	1.268
COG/S	1	348	0.867	0.986***	
	2		0.000	0.986***	-0.005
SGA/S	1	216	0.955	0.933***	
	2		0.000	0.933***	-0.002
OPEXP/S	1	348	0.846	0.996***	
	2		0.000	0.996***	-0.001

Appendix B3. Regression Analysis (Continued)					
2004					
	Model	N	R-Square Change	2003 Financial Performance	Dummy
ROA	1	328	0.026	-0.015***	
	2		0.001	-0.015***	-0.431
ROS	1	330	0.004	-0.023	
	2		0.002	-0.023	-0.013
OI/A	1	328	0.550	0.709***	
	2		0.001	0.710***	-0.004
OI/S	1	328	0.420	1.399***	
	2		0.003	1.401***	-0.033
OI/E	1	304	0.891	0.965***	
	2		0.000	0.965***	-1.051
COG/S	1	328	0.569	1.165***	
	2		0.002	1.164***	0.031
SGA/S	1	214	0.967	0.960***	
	2		0.000	0.960***	0.002
OPEXP/S	1	328	0.461	1.399***	
	2		0.003	1.403***	0.032
2005					
	Model	N	R-Square Change	2004 Financial Performance	Dummy
ROA	1	306	0.443	0.668***	
	2		0.000	0.667***	-0.090
ROS	1	306	0.824	2.413***	
	2		0.000	2.411***	-0.014
OI/A	1	306	0.805	1.026***	
	2		0.000	1.026***	0.000
OI/S	1	306	0.957	0.721***	
	2		0.000	0.722***	0.002
OI/E	1	298	0.709	0.813***	
	2		0.000	0.813***	0.171
COG/S	1	306	0.953	0.785***	
	2		0.001	0.785***	-0.006
SGA/S	1	200	0.934	0.924***	
	2		0.000	0.923***	-0.002
OPEXP/S	1	306	0.958	0.731***	
	2		0.000	0.732***	-0.005

Appendix B3. Regression Analysis (Continued)					
2006					
	Model	N	R-Square Change	2005 Financial Performance	Dummy
ROA	1	288	0.516	0.752 ^{***}	
	2		0.000	0.752 ^{***}	0.305
ROS	1	288	0.971	0.895 ^{***}	
	2		0.000	0.895 ^{***}	-0.003
OI/A	1	288	0.732	0.857 ^{***}	
	2		0.000	0.857 ^{***}	0.002
OI/S	1	288	0.937	0.772 ^{***}	
	2		0.001	0.773 ^{***}	0.007
OI/E	1	286	0.627	1.218 ^{***}	
	2		0.000	1.217 ^{***}	5.635
COG/S	1	288	0.957	0.836 ^{***}	
	2		0.001	0.836 ^{***}	-0.005
SGA/S	1	186	0.975	1.022 ^{***}	
	2		0.000	1.022 ^{***}	0.001
OPEXP/S	1	288	0.940	0.790 ^{***}	
	2		0.000	0.790 ^{***}	-0.008
2007					
	Model	N	R-Square Change	2006 Financial Performance	Dummy
ROA	1	270	0.165	0.621 ^{***}	
	2		0.001	0.620 ^{***}	0.568
ROS	1	270	0.022	-1.839 ^{**}	
	2		0.003	-1.824 ^{**}	-0.111
OI/A	1	270	0.507	0.854 ^{***}	
	2		0.001	0.854 ^{***}	-0.005
OI/S	1	270	0.016	-1.585 ^{**}	
	2		0.001	-1.567 ^{**}	-0.159
OI/E	1	268	0.025	-0.255 ^{**}	
	2		0.002	-0.252 ^{**}	-21.685
COG/S	1	270	0.007	0.601	
	2		0.004	0.595	0.176
SGA/S	1	174	0.921	0.926 ^{***}	
	2		0.001	0.924 ^{***}	-0.006
OPEXP/S	1	270	0.005	-0.808	
	2		0.003	-0.777	0.148

***1% level; **5% level; *10% level

Model 1: Performance measure for year t = f(Performance measure for year t-1)

Model 2: Performance measure for year t = f(Performance measure for year t-1, dummy: 1 = IT leaders, 0 = control firms)

ROA: return on assets; ROS: return on sales; OI/A: operating income to assets; OI/S: operating income to sales; OI/E: operating income to employees; OPEXP/S: operating expense to sales; COG/S: cost of goods sold to sales; SGA/S: selling and general administration expense to sales

This table is comparable to Table 7, which reports the same data analysis using a single-firm control benchmark.

Appendix C

Summary of Medians from 1991 to 2007

		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
ROA	IT Leader	0.038	0.036	0.035	0.048	0.045	0.044	0.042	0.038	0.040	0.031	0.023	0.027	0.028	0.040	0.041	0.046	0.046
	Control	0.015	0.008	0.018	0.028	0.041	0.042	0.036	0.033	0.031	0.033	0.020	0.025	0.024	0.036	0.041	0.044	0.041
ROS	IT Leader	0.054	0.035	0.048	0.060	0.057	0.059	0.053	0.054	0.058	0.051	0.031	0.035	0.045	0.052	0.060	0.062	0.057
	Control	0.022	0.016	0.024	0.034	0.053	0.057	0.051	0.048	0.052	0.048	0.033	0.036	0.042	0.053	0.065	0.062	0.064
OI/A	IT Leader	0.148	0.150	0.148	0.147	0.098	0.095	0.091	0.090	0.086	0.078	0.062	0.066	0.067	0.075	0.079	0.078	0.079
	Control	0.107	0.099	0.149	0.115	0.090	0.089	0.082	0.073	0.067	0.073	0.060	0.067	0.068	0.071	0.074	0.076	0.074
OI/S	IT Leader	0.153	0.142	0.160	0.170	0.116	0.111	0.109	0.110	0.117	0.115	0.074	0.081	0.083	0.097	0.109	0.099	0.103
	Control	0.110	0.107	0.109	0.130	0.105	0.104	0.103	0.091	0.096	0.092	0.077	0.088	0.091	0.100	0.110	0.109	0.102
OI/E	IT Leader	27.170	31.790	35.050	43.140	22.606	23.039	21.711	22.751	25.077	26.979	17.750	19.074	21.068	28.300	30.370	33.980	36.080
	Control	19.830	19.820	21.980	28.430	23.902	26.729	24.368	22.160	22.985	22.872	16.940	19.848	20.593	26.808	29.564	30.834	33.092
COG/S	IT Leader	0.670	0.670	0.630	0.660	0.679	0.683	0.697	0.695	0.700	0.710	0.696	0.690	0.694	0.694	0.688	0.694	0.684
	Control	0.720	0.720	0.720	0.710	0.684	0.695	0.696	0.696	0.694	0.703	0.709	0.707	0.708	0.708	0.701	0.706	0.707
SGA/S	IT Leader	0.220	0.230	0.230	0.220	0.193	0.196	0.197	0.204	0.204	0.191	0.204	0.213	0.214	0.200	0.201	0.197	0.192
	Control	0.210	0.210	0.190	0.210	0.190	0.187	0.190	0.194	0.202	0.203	0.200	0.206	0.204	0.190	0.184	0.174	0.183
OPEXP/S	IT Leader	0.850	0.860	0.840	0.840	0.857	0.858	0.858	0.857	0.857	0.857	0.878	0.875	0.872	0.861	0.857	0.858	0.854
	Control	0.890	0.897	0.897	0.887	0.858	0.857	0.860	0.861	0.855	0.853	0.869	0.867	0.865	0.860	0.854	0.854	0.857

ROA: return on assets; ROS: return on sales; OI/A: operating income to assets; OI/S: operating income to sales; OI/E: operating income to employees; OPEXP/S: operating expense to sales; COG/S: cost of goods sold to sales; SGA/S: selling and general administration expense to sales

Method

In the process of drawing the charts in Figures 2 to 9, we obtained medians for the companies from 1991 to 1994 from Bharadwaj (2000). For data from 2001 to 2007, we used our own results shown in Table 5 and 6. An important issue was how to collect the medians from 1995 to 2000.¹ One option was to chart each performance measure excluding those years, but we decided to calculate the medians of each performance variable for the IT leader group and the control group from 1995 to 2000 because such information is essential to truly understand how being an IT leader changes over time. Therefore, we repeated the same research method described earlier.

This time, the only difference was to use the IT leaders from 1995 to 1998 and to identify corresponding control companies. Like previous tests, the firms with superior IT capability are those listed in IW 500 from 1995 to 1998, and the IT leader sample was selected from the firms listed in IW 500 for at least two of the four years. This produced a list of 522 firms. Consistent with other studies, the matching control companies were matched for size and industry. Only 270 IT leaders out of the 522 qualified firms have compatible control companies with similar industry and firm size. Once we identified IT leaders and control firms, it is relatively straightforward to calculate the medians of performance measures from 1995 to 1998. The last issue was to acquire data from 1999 to 2000, and we decided to use the same IT leaders and control group from 1995 to 1998 to get the medians from 1999 and 2000 because, as we posited in Hypotheses 3, 4, 7, and 8, IT capability should be sustainable over time.² Finally, it is worth noting that while this whole process was exploratory, it was worthy of conducting to better understand the underlying trends of how the value of being an IT leader changes.

¹We didn't use data from Santhanam and Hartono (2003) because the medians in their study included all of the firms in the industry, rather than limiting to matching control companies with similar size.

²In addition to collecting means and medians, we also conducted pair-wise Wilcoxon signed-rank test using the IT leaders and controls from 1995 to 2000 shown in Appendix D.

Appendix D

Results of Wilcoxon Signed-Rank Test of IT Leader Groups and Control Groups from 1995 to 2000

Measurement	Category	1995				1996				1997			
		Mean	Median	Z Value	P Value	Mean	Median	Z Value	P Value	Mean	Median	Z Value	P Value
ROA	IT Leader	4.972	4.527	1.975	0.024**	4.802	4.371	1.554	0.060*	3.866	4.212	1.195	0.116
	Control	4.095	4.127			4.491	4.162			4.036	3.626		
ROS	IT Leader	0.061	0.057	1.221	0.111	0.067	0.059	1.735	0.041**	0.058	0.053	1.811	0.035**
	Control	0.052	0.053			0.059	0.057			0.054	0.051		
OI/A	IT Leader	0.102	0.098	2.058	0.020**	0.098	0.095	2.034	0.021**	0.096	0.091	2.138	0.016**
	Control	0.093	0.090			0.090	0.089			0.088	0.082		
OI/S	IT Leader	0.135	0.116	0.800	0.212	0.132	0.111	1.443	0.075*	0.128	0.109	1.066	0.143
	Control	0.131	0.105			0.128	0.104			0.125	0.103		
OI/E	IT Leader	33.780	22.606	-2.065	0.981	34.800	23.039	-1.790	0.963	35.120	21.711	-1.391	0.918
	Control	75.938	23.902			52.903	26.729			50.686	24.368		
COG/S	IT Leader	0.654	0.679	-0.568	0.285	0.656	0.683	-0.690	0.245	0.664	0.697	-0.151	0.440
	Control	0.663	0.679			0.668	0.695			0.666	0.696		
SGA/S	IT Leader	0.206	0.193	-0.269	0.394	0.206	0.196	0.401	0.656	0.204	0.197	0.062	0.525
	Control	0.206	0.190			0.204	0.187			0.208	0.190		
OPEXP/S	IT Leader	0.837	0.857	-0.821	0.206	0.837	0.858	-1.326	0.092*	0.840	0.858	-1.064	0.144
	Control	0.846	0.858			0.846	0.857			0.846	0.860		

***1% level; **5% level; *10% level

ROA: return on assets; ROS: return on sales; OI/A: operating income to assets; OI/S: operating income to sales; OI/E: operating income to employees; OPEXP/S: operating expense to sales; COG/S: cost of goods sold to sales; SGA/S: selling and general administration expense to sales

Measurement	Category	1998				1999				2000			
		Mean	Median	Z Value	P Value	Mean	Median	Z Value	P Value	Mean	Median	Z Value	P Value
ROA	IT Leaders	3.847	3.79	1.734	0.041**	5.046	3.962	1.645	0.000***	4.610	3.142	1.969	0.025**
	Control	3.026	3.254			3.243	3.092			2.956	3.261		
ROS	IT Leaders	0.054	0.054	1.347	0.089*	0.070	0.058	1.681	0.045**	0.061	0.051	0.692	0.245
	Control	0.051	0.048			0.055	0.052			0.058	0.048		
OI/A	IT Leaders	0.095	0.090	2.936	0.003***	0.099	0.086	3.702	0.000***	0.096	0.078	3.594	0.000***
	Control	0.080	0.073			0.074	0.067			0.069	0.073		
OI/S	IT Leaders	0.127	0.110	2.048	0.020**	0.132	0.117	2.522	0.006***	0.126	0.115	2.547	0.005***
	Control	0.116	0.091			0.118	0.096			0.105	0.092		
OI/E	IT Leaders	34.866	22.751	0.074	0.941	39.384	25.077	1.276	0.101	40.869	26.979	1.348	0.178
	Control	51.841	22.160			40.501	22.985			38.022	22.872		
COG/S	IT Leaders	0.658	0.695	-0.498	0.309	0.655	0.700	-0.293	0.385	0.669	0.710	-0.115	0.454
	Control	0.666	0.696			0.661	0.694			0.671	0.703		
SGA/S	IT Leaders	0.206	0.204	-0.922	0.178	0.212	0.204	-1.018	0.154	0.206	0.191	-1.528	0.063
	Control	0.217	0.194			0.224	0.202			0.225	0.203		
OPEXP/S	IT Leaders	0.842	0.857	-0.859	0.195	0.837	0.857	-1.200	0.115	0.841	0.857	-0.773	0.220
	Control	0.850	0.861			0.847	0.855			0.852	0.853		

***1% level; **5% level; *10% level

ROA: return on assets; ROS: return on sales; OI/A: operating income to assets; OI/S: operating income to sales; OI/E: operating income to employees; OPEXP/S: operating expense to sales; COG/S: cost of goods sold to sales; SGA/S: selling and general administration expense to sales

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