

What is the Worth of an Employee?

Prof. Paul A. Strassmann
George Mason University, April 17, 2006

Ideas Emerging at End of 20th Century

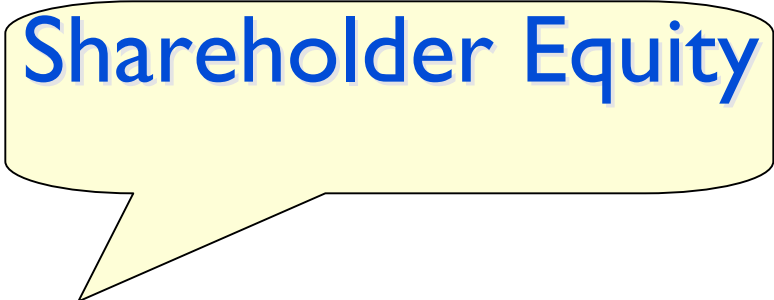
- Knowledge Capital
- Knowledge Assets
- Knowledge Management
- Intellectual Capital
- Information Assets

Payroll Expense Differs from Knowledge Assets



Accepted Metrics Measure Returns on Finance Capital

$$\text{Productivity} = \frac{\text{Output}}{\text{Input}}$$

$$\text{Return-On-Equity} = \frac{\text{Profit}}{\text{Shareholder Equity}}$$


SOURCE OF WEALTH?

Summary

- Financial statements account for only wages as an expense.
- Financial balance sheets account for only net financial assets, that is shareholder equity.
- The value of knowledge is reported only when a company or its shares are sold.

Theme of This Presentation

**Only if you Can Measure Can You
Understand How to Invest.**

Outline of this Presentation I

Part I : Market Valuation of Knowledge Assets

Part II : Value-Added of Knowledge Capital

Part III : Special Studies

Part IV : Worth of Employees

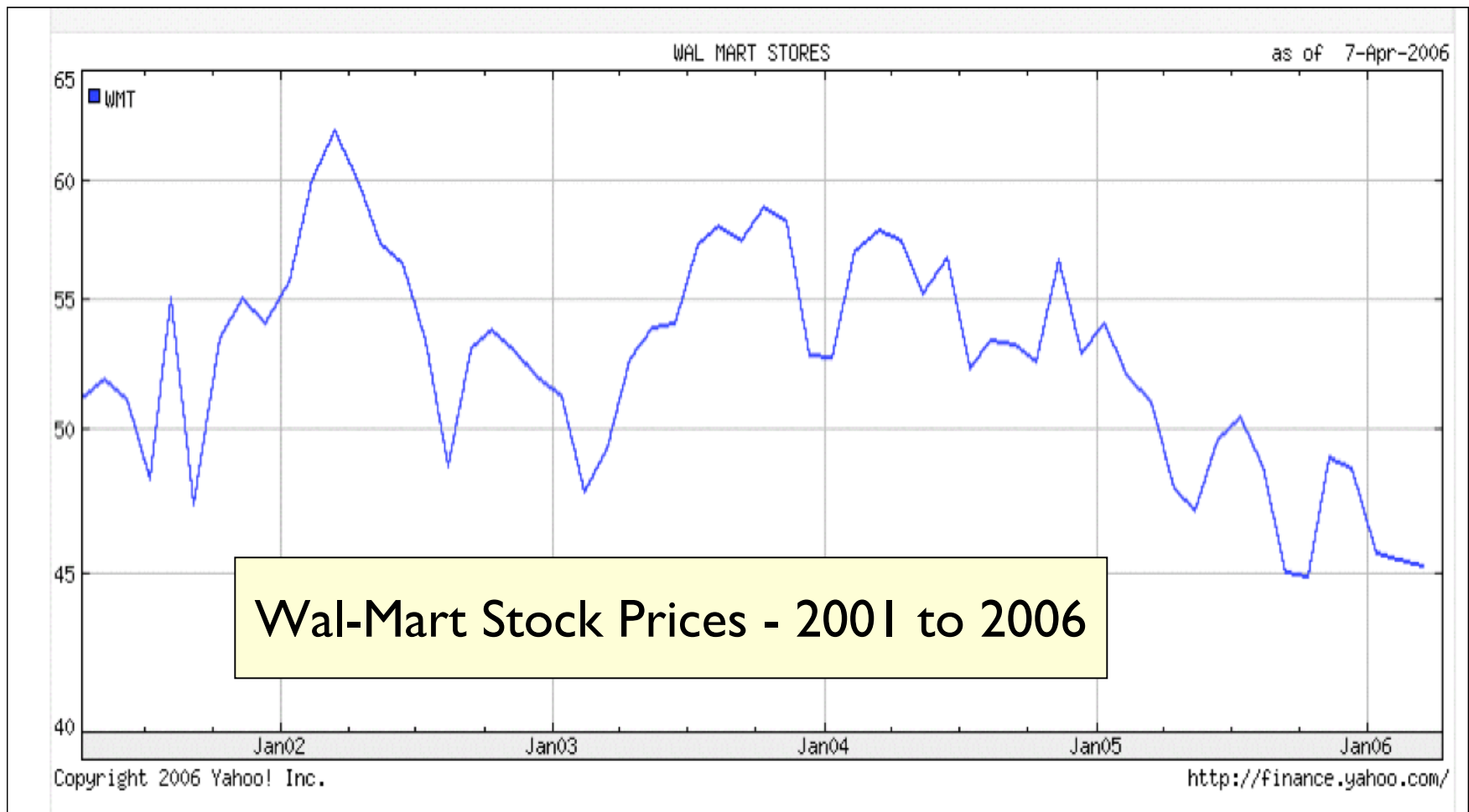
Shareholder Equity Cannot Explain the Sources of Wealth (FY2004)

Company Name	Sales - \$ Millions	Shareholder Equity - \$ Millions	Market Valuation - \$Millions	Market Valuation Multiple
EXXON MOBIL CORP	\$263,989	\$101,756	\$330,693	3.25
WAL-MART STORES	\$257,157	\$43,623	\$223,686	5.13
GENERAL MOTORS CORP	\$190,812	\$27,726	\$22,627	0.82
FORD MOTOR CO	\$171,652	\$16,045	\$25,749	1.60
GENERAL ELECTRIC CO	\$151,802	\$110,821	\$385,883	3.48

Market-Based Calculation of Knowledge Assets

Company Name	Market Valuation - \$Millions	Shareholder Equity - \$ Millions	Knowledge Assets - \$ Million	Knowledge / Equity Ratio
EXXON MOBIL CORP	\$330,693	\$101,756	\$228,937	2.25
WAL-MART STORES	\$223,686	\$43,623	\$180,063	4.13
GENERAL MOTORS CORP	\$22,627	\$27,726	\$-5,099	-0.18
FORD MOTOR CO	\$25,749	\$16,045	\$9,704	0.60
GENERAL ELECTRIC CO	\$385,883	\$110,821	\$275,062	2.48

Market-Based Pricing of Knowledge Assets is Questionable



Summary

- Market Valuation of Knowledge Assets:

Market Valuation - Shareholder Equity

- Market Valuation of Knowledge Assets reveals the inadequacies in financial reporting about the worth of a firm.
- Market Valuation of Knowledge Assets offers a quick approximation of the worth of Knowledge Capital.

Outline of this Presentation II

Part I : Market Valuation of Knowledge Assets

Part II : Value-Added of Knowledge Capital

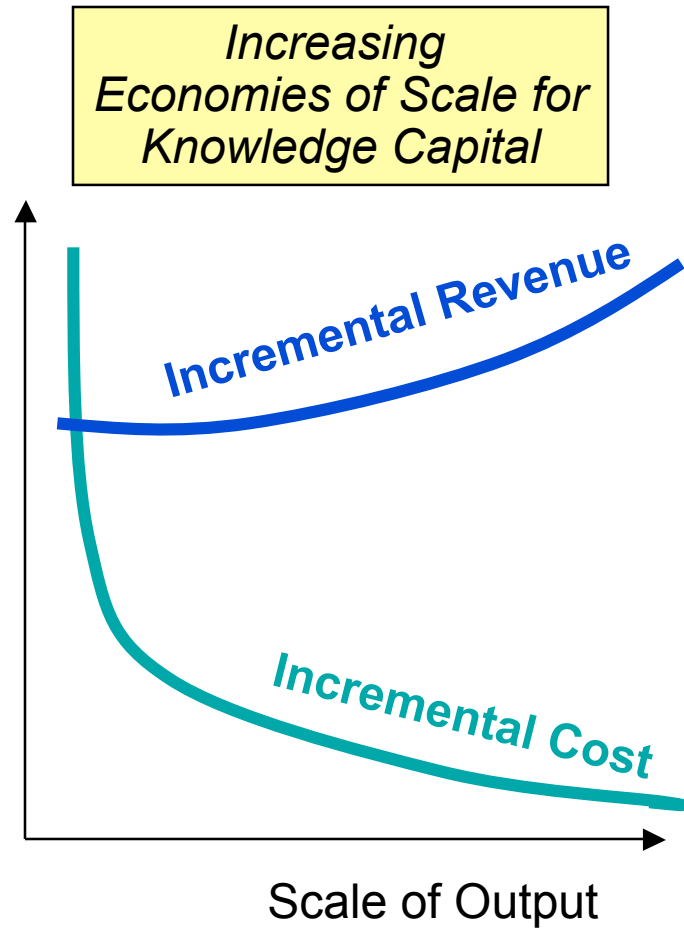
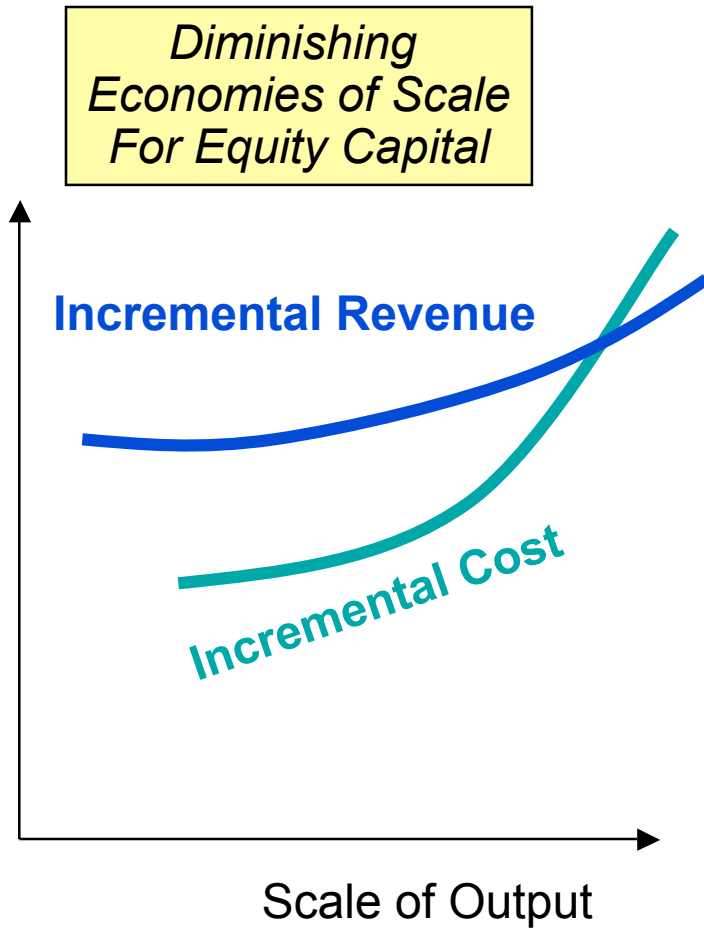
Part III : Special Studies

Part IV : Worth of Employees

Fundamental Premises of the Information Age

- Equity Capital is a commodity. Readily available at a price. It is not a source of competitive advantage.
- In a successful firm Knowledge Capital will vastly exceed Equity Capital.
- Knowledge Capital is the only source of competitive advantage.

Equity Capital vs. Knowledge Capital



Calculating the Value-Added Worth of Knowledge Capital

$$\text{Productivity} = \frac{\text{Output}}{\text{Input}}$$


$$\text{Knowledge Capital} = \frac{\text{Knowledge Value-Added}}{\text{Cost of Equity Capital}}$$

SOURCE OF WEALTH

Knowledge Capital® is a Registered Trademark of Strassmann, Inc.

What is Knowledge Value-Added?

Knowledge Value-Added = Profit - Equity Rent

Where:

Equity Rent = Cost of Equity Capital * Equity

Capital Asset Pricing Model - Cost of Equity Capital

Company Name	Cost of Equity Capital - %
EXXON MOBIL CORP	6.08
WAL-MART STORES	7.86
GENERAL MOTORS CORP	13.90
FORD MOTOR CO	15.11
GENERAL ELECTRIC CO	12.22

Knowledge Value-Added After Subtracting “Rent” for Equity

Company Name	Profit - \$ Millions	Shareholder Equity - \$ Millions	Capital Asset Pricing Model	Equity Rent - \$ Millions	Knowledge Value-Added - \$ Millions
EXXON MOBIL CORP	\$25,330	\$101,756	6.08	\$6,191	\$19,139
WAL-MART STORES	\$8,861	\$43,623	7.86	\$3,427	\$5,434
GENERAL MOTORS CORP	\$2,805	\$27,726	13.90	\$3,855	\$-1,050
FORD MOTOR CO	\$3,634	\$16,045	15.11	\$2,425	\$1,209
GENERAL ELECTRIC CO	\$16,819	\$110,821	12.22	\$13,538	\$3,281

Calculating the Intrinsic Worth of Knowledge Capital

$$\text{Productivity} = \frac{\text{Output}}{\text{Input}}$$


$$\text{Knowledge Capital} = \frac{\text{Knowledge Value-Added}}{\text{Cost of Equity Capital}}$$

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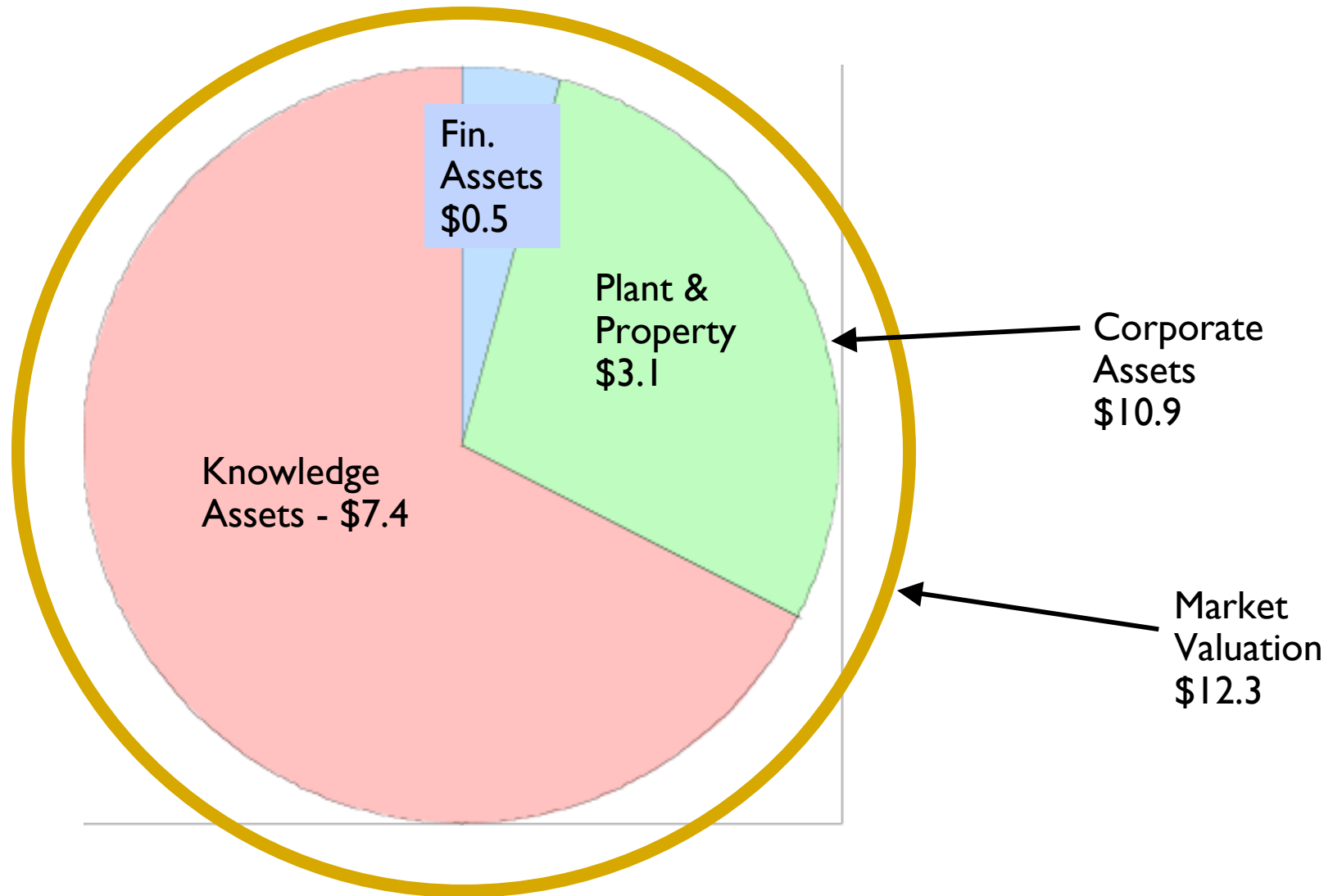
Knowledge Capital® Calculation Based on Value-Added

Company Name	Knowledge Value-Added - \$ Millions	Capital Asset Pricing Model	Knowledge Capital - \$ Millions
EXXON MOBIL CORP	\$19,139	6.08	\$314,584
WAL-MART STORES	\$5,434	7.86	\$69,157
GENERAL MOTORS CORP	\$-1,050	13.90	\$-7,550
FORD MOTOR CO	\$1,209	15.11	\$8,001
GENERAL ELECTRIC CO	\$3,281	12.22	\$26,862

Comparisons of Market-Based vs. Value-Added Knowledge Worth

Company Name	Value-Added Knowledge Capital - \$ Millions	Market-Based Knowledge Assets - \$ Million	Market Over/Under Valuation - %
EXXON MOBIL CORP	\$314,584	\$228,937	-37.4%
WAL-MART STORES	\$69,157	\$180,063	61.6%
GENERAL MOTORS CORP	\$-7,550	\$-5,099	-48.1%
FORD MOTOR CO	\$8,001	\$9,704	17.6%
GENERAL ELECTRIC CO	\$26,862	\$275,062	90.2%

Knowledge Assets in the US Economy (1998 data, \$ trillions)



SOURCE: Strassmann, Inc. database of 5,763 US firms

Summary

- Value-Added valuation of Knowledge Capital reflects a view that Equity Capital is available as a risky commodity.
- Value-Added valuation is based on the generally accepted Capital Asset Pricing Model (CAPM).
- Value-Added valuation links actual financial results to an estimate of Knowledge Capital as “surplus value.”

Outline of this Presentation III

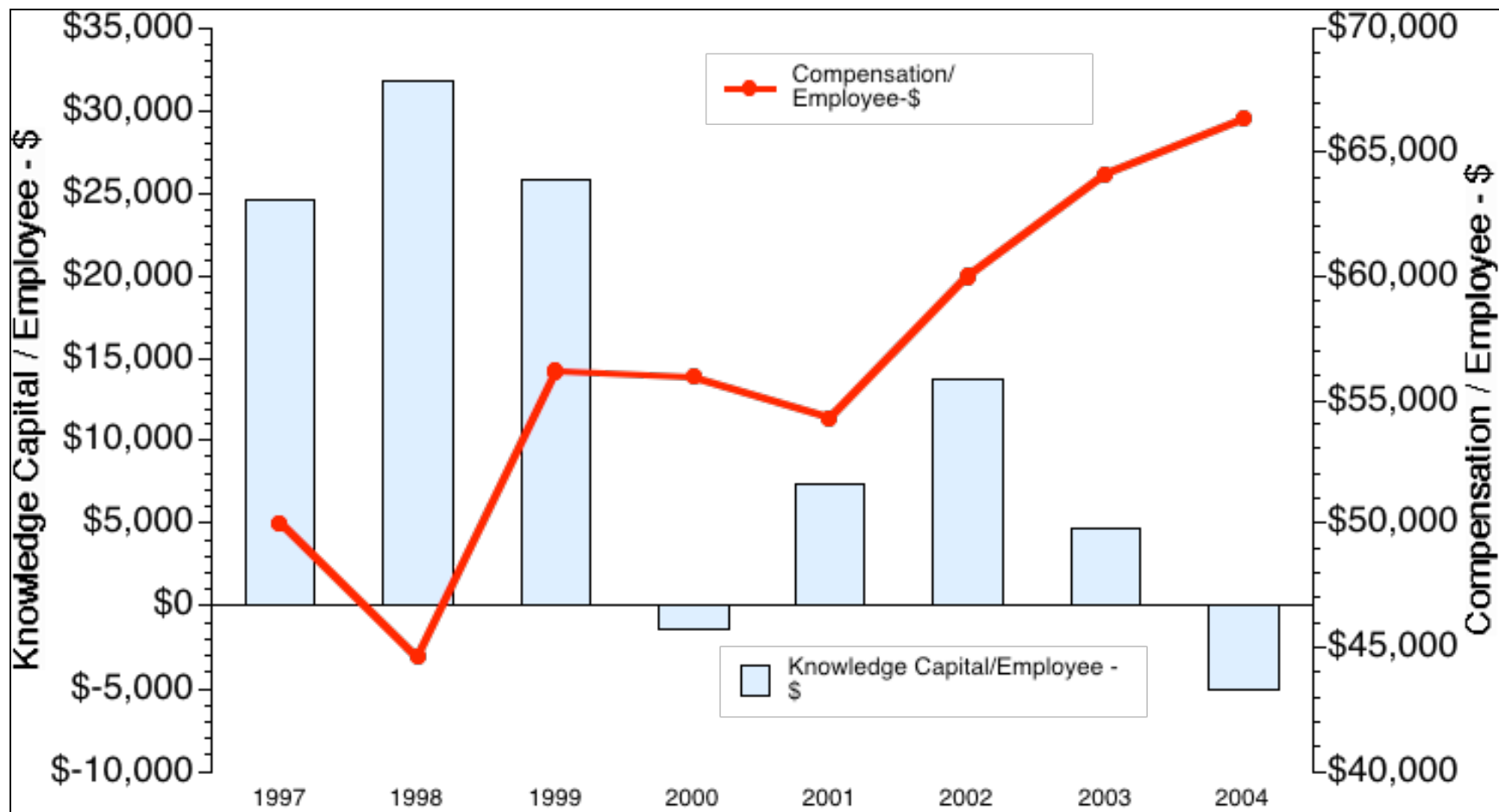
Part I : Market Valuation of Knowledge Assets

Part II : Value-Added of Knowledge Capital

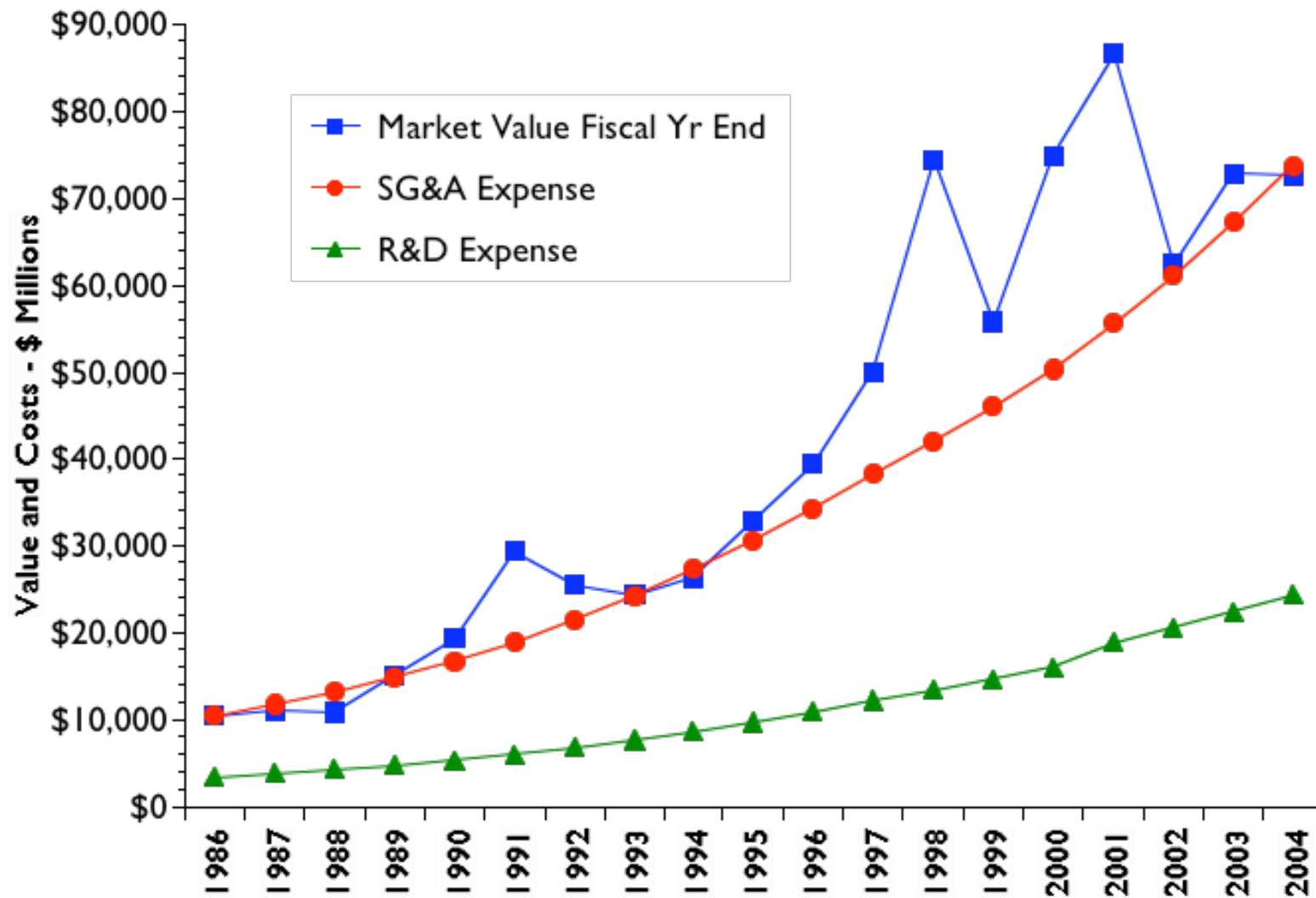
Part III : Special Studies

Part IV : Worth of Employees

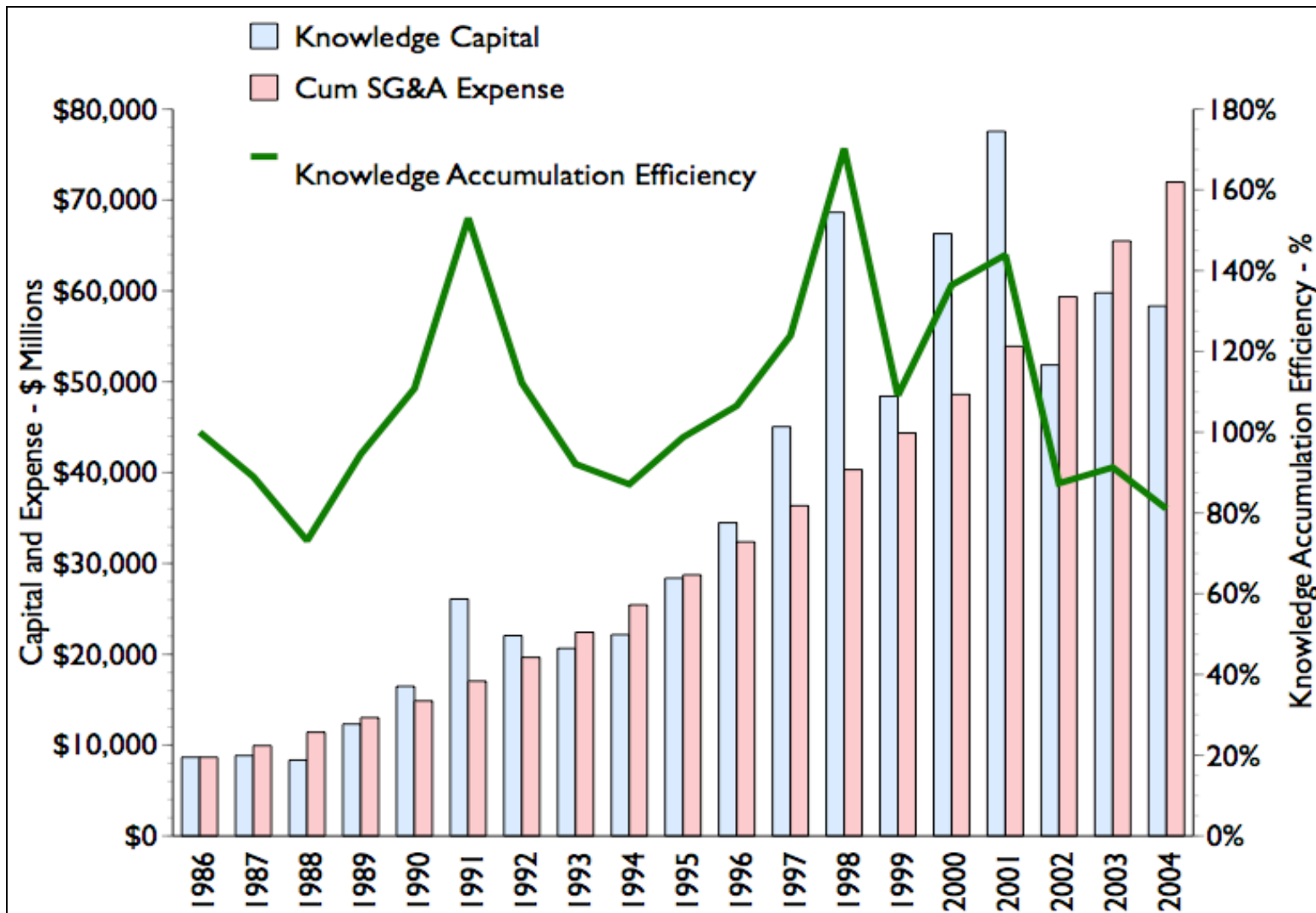
GM as a Case Study



Market Value and Cumulative SG&A - Abbott Laboratories



Knowledge Accumulation Efficiency Affects Employee Worth



Summary

- Knowledge valuations offer a wide range of analytic methods for evaluating the results delivered by information technologies.
- Knowledge asset tracking suggests that market valuations may reflect the effective investments in the management of information resources.

Outline of this Presentation IV

Part I : Market Valuation of Knowledge Assets

Part II : Value-Added of Knowledge Capital

Part III : Special Studies

Part IV : Worth of Employees

The Top 10 “Smartest” U.S. Firms, out of 5,253 (FY 2004)

Company Name	Classification	Sales - \$ Millions	Shareholder Equity - \$Millions	Knowledge Assets - \$ Millions	Employees	Knowledge Assets / Employee - \$	U.S. Rank of 5253 Firms
VENTAS INC	REAL ESTATE INVESTMENT TRUST	\$212.85	\$54.30	\$1,571.14	24	\$66,386,155	1
NATIONWIDE HEALTH PTYS INC	REAL ESTATE INVESTMENT TRUST	\$169.69	\$649.12	\$506.11	15	\$33,740,356	2
ROYAL GOLD INC	MINERAL ROYALTY TRADERS	\$16.49	\$61.69	\$367.97	13	\$28,305,154	3
GETTY REALTY CORP	REAL ESTATE INVESTMENT TRUST	\$68.59	\$228.98	\$357.75	16	\$22,359,229	4
CAPITAL AUTOMOTIVE REIT	REAL ESTATE INVESTMENT TRUST	\$171.78	\$627.94	\$555.18	28	\$19,594,565	5
CYPRESS BIOSCIENCE INC	BIOLOGICAL PDS,EX DIAGNSTICS	\$6.94	\$42.70	\$220.36	13	\$16,950,462	6
TRAVELZOO INC	CMP PROGRAMMING,DATA	\$20.51	\$15.30	\$583.31	38	\$15,216,678	7
HEALTH CARE REIT INC	REAL ESTATE INVESTMENT TRUST	\$204.88	\$1,127.40	\$482.19	34	\$14,044,427	8
MCMORAN EXPLORATION CO	CRUDE PETROLEUM & NATURAL GS	\$29.91	\$-34.88	\$273.84	21	\$13,040,175	9
DORCHESTER MINERALS	OIL ROYALTY TRADERS	\$41.58	\$147.48	\$304.46	24	\$12,685,639	10

Biggest US Firms Do not Rank in the Top 20 Smartest List

Company Name	Sales - \$ Millions	Shareholder Equity - \$Millions	Knowledge Assets - \$ Millions	Employees - 000s	Knowledge Assets / Employee - \$	Knowledge Asset /Employee Rank
EXXON MOBIL CORP	\$263,989	\$101,756	\$228,937	86	\$2,665,162	165
WAL-MART STORES	\$257,157	\$43,623	\$180,063	1,500	\$120,042	2850
GENERAL MOTORS	\$190,812	\$27,726	\$-5,099	324	\$-15,738	4506
FORD MOTOR CO	\$171,652	\$16,045	\$9,704	325	\$29,871	3850
GENERAL ELECTRIC CO	\$151,802	\$110,821	\$275,062	307	\$895,967	654
CHEVRON CORP	\$142,897	\$45,230	\$66,018	56	\$1,178,898	486
CONOCOPHILLIPS	\$118,719	\$42,723	\$17,210	36	\$480,724	1204
CITIGROUP INC	\$108,276	\$109,291	\$140,751	294	\$478,746	1206
AMERICAN INTL BUSINESS	\$97,152	\$80,607	\$90,435	92	\$982,991	598
HEWLETT-PACKARD CO	\$96,293	\$29,747	\$134,359	329	\$408,384	1414
BERKSHIRE HATHAWAY	\$79,905	\$37,564	\$25,763	151	\$170,618	2502
VERIZON	\$74,382	\$85,900	\$49,380	180	\$274,331	1902
MCKESSON CORP	\$71,283	\$37,560	\$74,610	210	\$355,288	1576
BANK OF AMERICA	\$69,506	\$5,165	\$4,081	25	\$165,906	2529
HOME DEPOT INC	\$65,447	\$99,645	\$90,156	176	\$513,002	1128
ALTRIA GROUP INC	\$64,816	\$22,407	\$71,448	299	\$238,957	2098
JPMORGAN CHASE & CO	\$63,963	\$30,714	\$94,699	156	\$607,042	964
VALERO ENERGY CORP	\$56,931	\$105,653	\$33,319	161	\$206,990	2264
KROGER CO	\$53,919	\$7,798	\$3,853	20	\$194,644	2349
	\$53,791	\$3,985	\$8,857	290	\$30,543	3839

Worth of Employees, Pharmaceutical Firms

Company Name	Employees - 000s	Knowledge Assets / Employee	Compensation / Employee
JOHNSON & JOHNSON	109.9	\$1,423,114	\$100,764
GLAXOSMITHKLINE	99.8	\$1,278,880	\$90,276
NOVARTIS	81.4	\$1,091,851	\$85,807
WYETH	51.4	\$913,903	\$63,818
ROCHE	64.7	\$881,137	\$109,684
ASTRAZENECA	64.2	\$708,440	\$82,414
NOVO-NORDISK	20.3	\$567,189	\$83,655

Assumptions About the Valuation of the Worth of Knowledge

- Employees are a risky asset.
- The annual worth of an employee asset reflects a firm's risks in obtaining capital, multiplied by the stock market's assessment of the "smartness" of a firm:

$$\text{Capital Asset Pricing Model} * \frac{\text{Market Value}}{\text{Shareholder Equity}}$$

Annual Worth of Employee Knowledge Assets

Company Name	Knowledge Assets / Employee	Capital Asset Pricing Model - %	Asset Risk Discount	Annual Worth of Employee Knowledge Assets - \$
JOHNSON & JOHNSON	\$1,423,114	4.04	0.79	\$160,302
GLAXOSMITHKLINE	\$1,278,880	4.37	0.77	\$141,344
NOVARTIS	\$1,091,851	3.08	0.83	\$130,023
WYETH	\$913,903	10.92	0.54	\$70,104
ROCHE	\$881,137	7.56	0.65	\$81,291
ASTRAZENECA	\$708,440	7.08	0.66	\$67,136
NOVO-NORDISK	\$567,189	9.16	0.59	\$47,890

Net Worth = Difference Between Knowledge and Compensation

Company Name	Annual Worth of Employee Knowledge Assets - \$	Actual Annual Employee Compensation in 2004	Average Net Worth / Employee - \$
JOHNSON & JOHNSON	\$160,302	\$100,764	\$59,538
GLAXOSMITHKLINE	\$141,344	\$90,276	\$51,068
NOVARTIS	\$130,023	\$85,807	\$44,216
WYETH	\$70,104	\$63,818	\$6,286
ROCHE	\$81,291	\$109,684	\$-28,394
ASTRAZENECA	\$67,136	\$82,414	\$-15,278
NOVO-NORDISK	\$47,890	\$83,655	\$-35,765

Summary

- Two methods for calculating the worth of knowledge assets are available.
- Knowledge assets have become the dominant corporate assets.
- Comparison of knowledge assets can be used for competitive benchmarking.
- Effective organizations accumulate knowledge assets.
- Knowledge asset accumulation, not only efficiencies in the uses of information technologies, can become a metric for evaluating CIO performance.

General Information

- Videos of all Strassmann GMU lectures now available on <http://video.google.com/videosearch?q=strassmann>
- Questions about this presentation can be addressed to pstrassm@gmu.edu
- Next lecture will be “Systems Transformation Technologies.”