Board of Governors of the Federal Reserve System

Measuring and Evaluating the Productivity of U.S. Corporate Information Management

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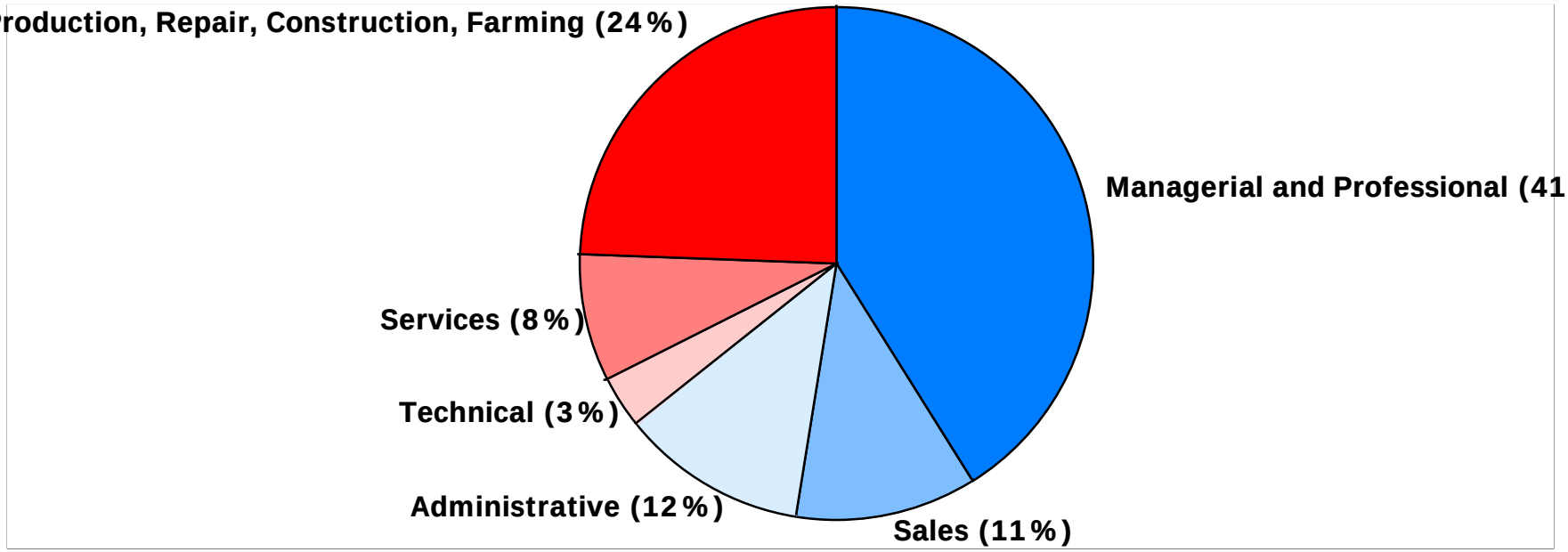
Washington, D.C., April 15, 1999

Summary

- Information workforce now determines productivity results.
- Three favorable productivity indicators were overcome by an adverse trend in information management costs.
- The effects of information technology are irrelevant and are likely to have contributed to a rise in information management costs.
- Recent favorable gains in Information Productivity can be explained entirely by lower interest costs.
- There is an enormous potential for future sustainable growth in productivity.

Importance of Information Management Occupations (Dollar-weighted)



Information Occupations Earned 64% of Salaries & Wages in 1996

Annual Salary & Wage Increases for Occupational Groups

	1991	1992	1993	1994	1995	1996	1997	Total
Information Workers	**2.95%**	**8.35%**	**4.95%**	**3.58%**	**6.17%**	**4.46%**	**3.88%**	**34.33%**
Production workers	**3.60%**	**3.10%**	**2.40%**	**2.50%**	**2.70%**	**2.90%**	**3.30%**	**20.50%**

Information Workers Gained Larger Increases than Production Workers

Information Management Occupations Grew Fastest

Civilian Occupations (1,000)	1983	1996	Growth Rate
Information Occupations	51,805	70,254	36%
All Others	49,029	56,453	15%
Total Employment	100,834	126,707	26%

Information Occupations May Earn 75% of Wages & Salaries by 2010

Corporate Information Management Costs in this Presentation

Information Management Costs =

Sales + General + Administrative + Research + Development Costs

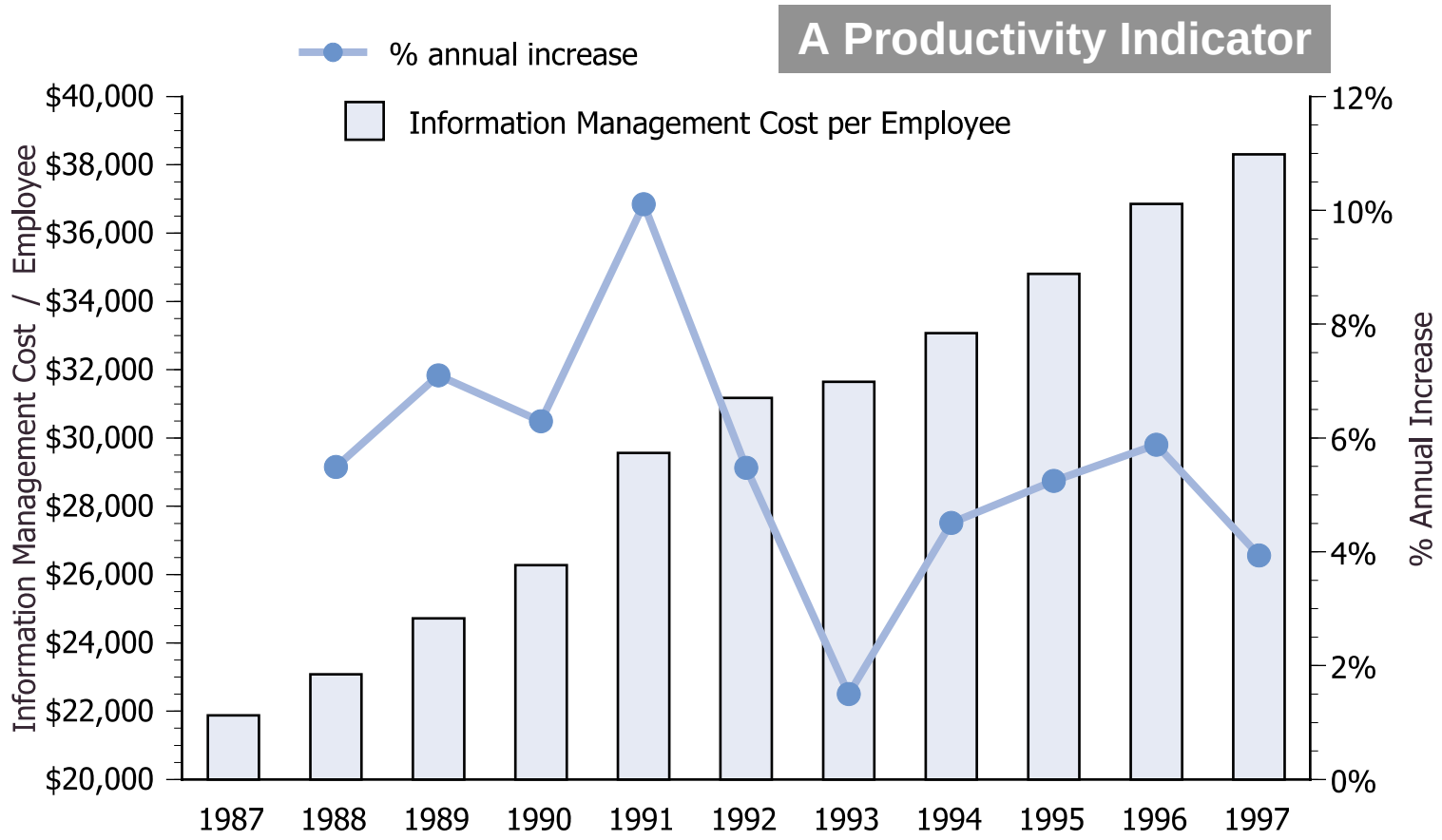
SOURCE OF CORPORATE DATA:
Primark Disclosure Database, Worldscope Global Researcher, November 1998

DATA SAMPLE:
- Includes SIC #010 through SIC #599
- Covers 1997 employment of 20.8 million in industrial corporations.
- Information productivity of 7.4 million employees in finance and services to be reported separately.

It Now Takes Less Information Management to Produce Goods

Recent Trend Favorable but Inconclusive

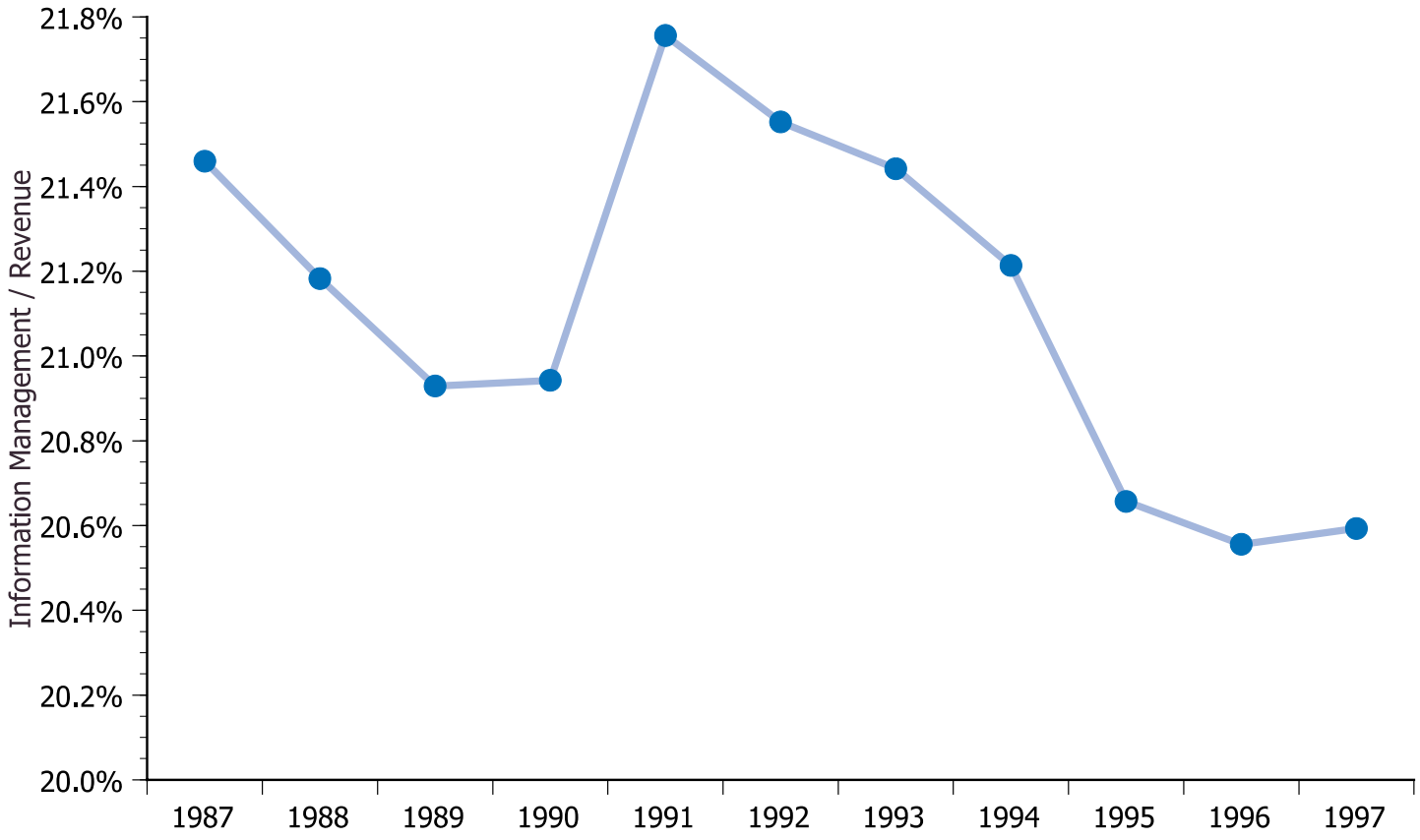
Information Management Costs Equal or Exceed Average Compensation



Information Management Costs Rise Faster than Any Other Corporate Input

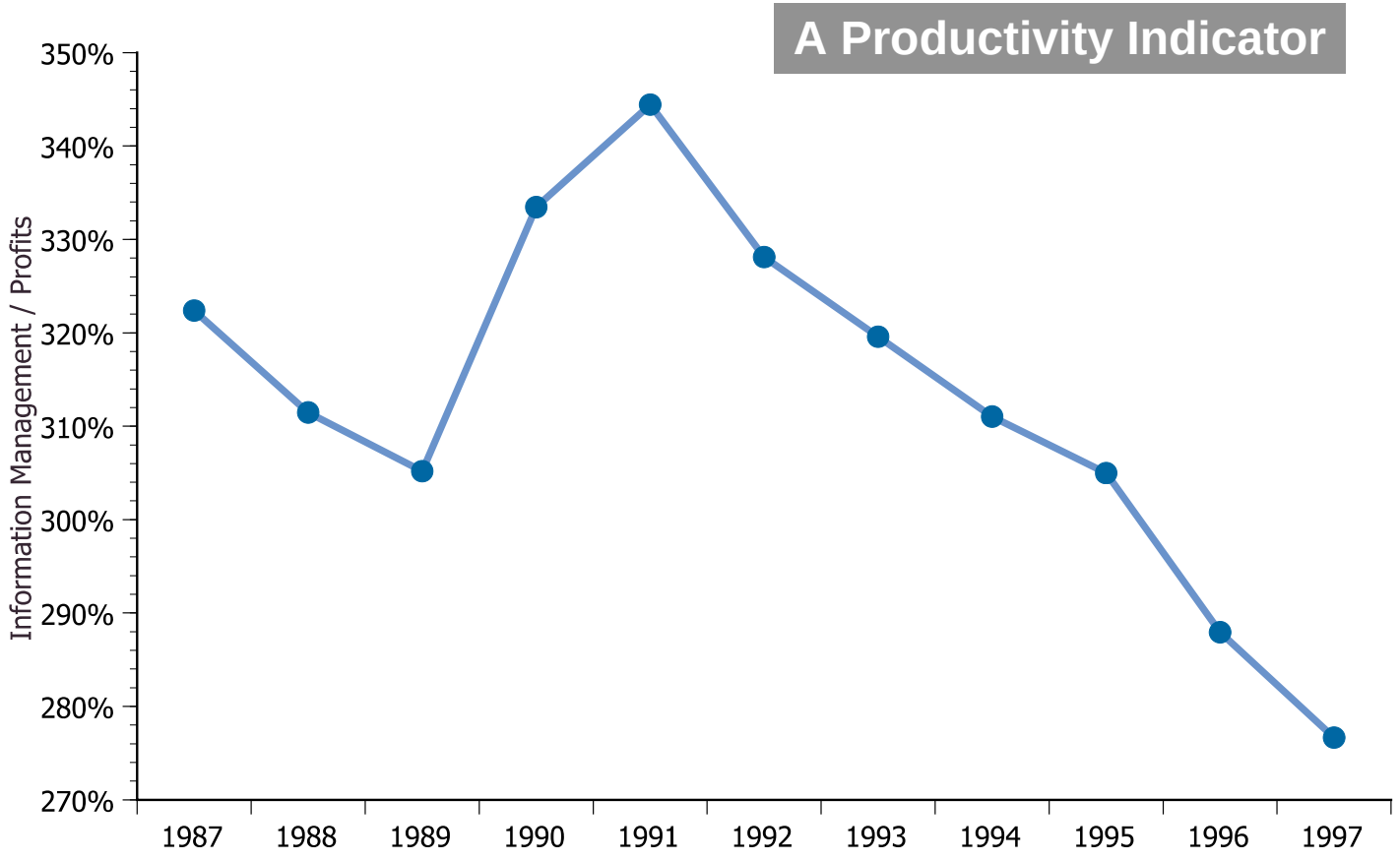
It Now Takes Less Information Management to Generate Revenue

A Productivity Indicator



Recent Trend Favorable but Inconclusive

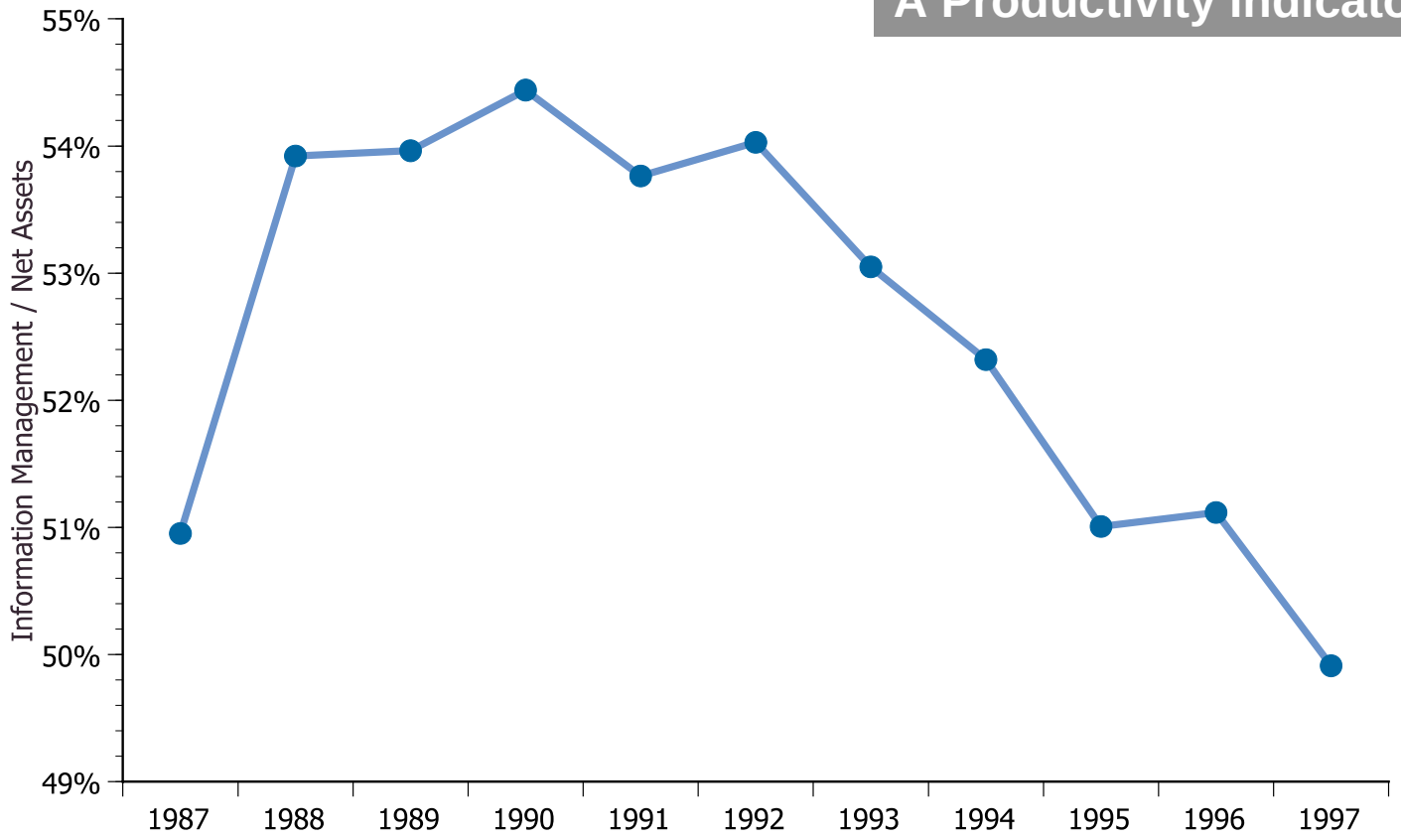
It Now Takes Less Information Management to Generate Profits



Recent Trend Favorable but Inconclusive

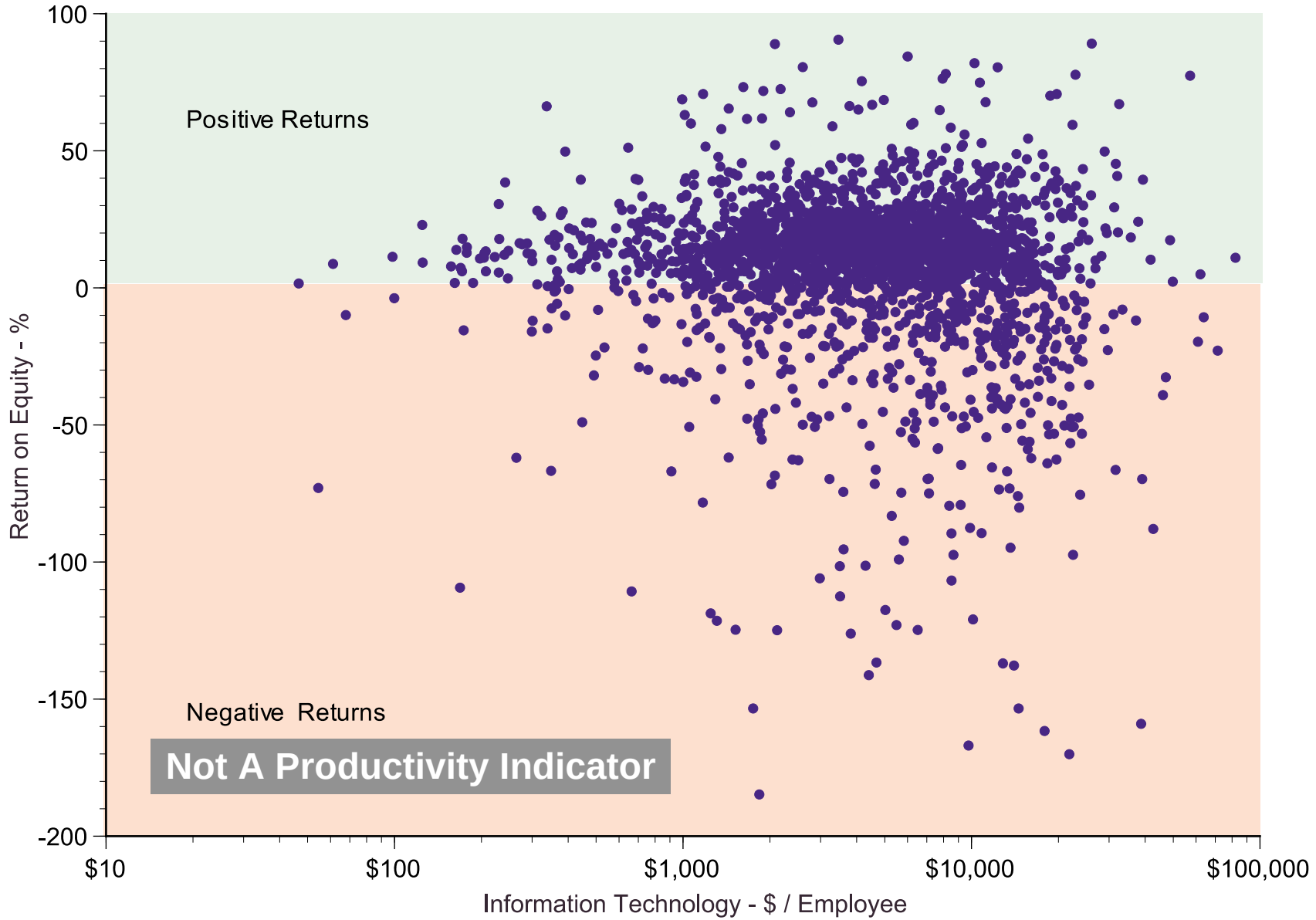
It Now Takes Less Information Management to Manage Assets

A Productivity Indicator



Recent Trend Favorable but Inconclusive

Information Technology and Profitability Continue to Be Unrelated

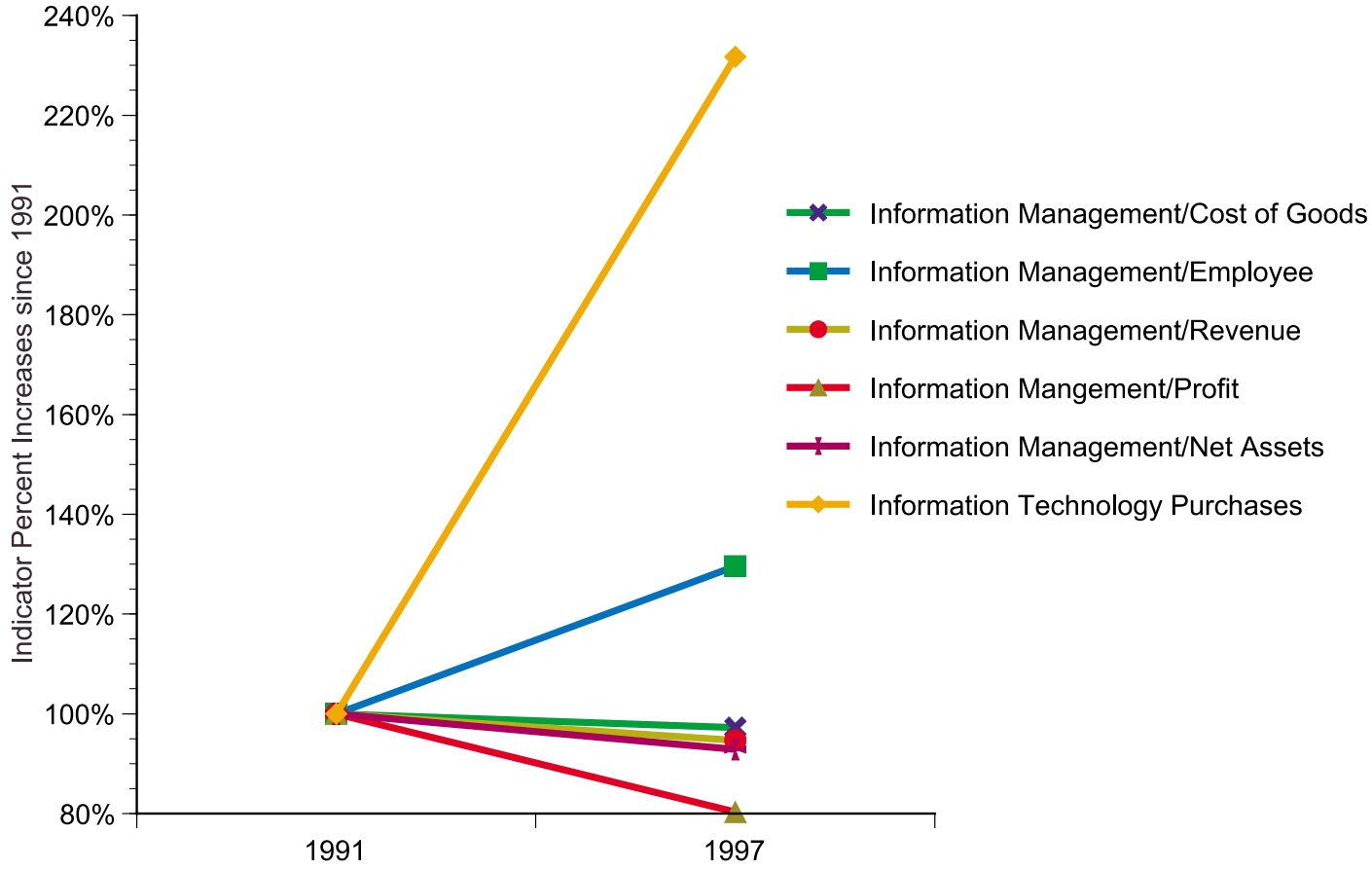


Information Management Indicators Diverge

Indicator	1991	1997	% Change
Information Management/Cost of Goods	32.1%	31.2%	-2.8%
Information Management/Employee	$29,559	$38,304	29.6%
Information Management/Revenue	21.8%	20.6%	-5.3%
Information Management/Profit	344.4%	276.7%	-19.7%
Information Management/Net Assets	53.8%	49.9%	-7.2%
Information Technology Purchases - $B	$139	$321	131.7%

Net Effect on Productivity Not Readily Apparent

Information Management Ratios Diverge



It is Not Clear if Improvements Offset Declines

Multi-Factor Productivity Indicator Needed to Assess Corporate Gains

Productivity = Output / Input

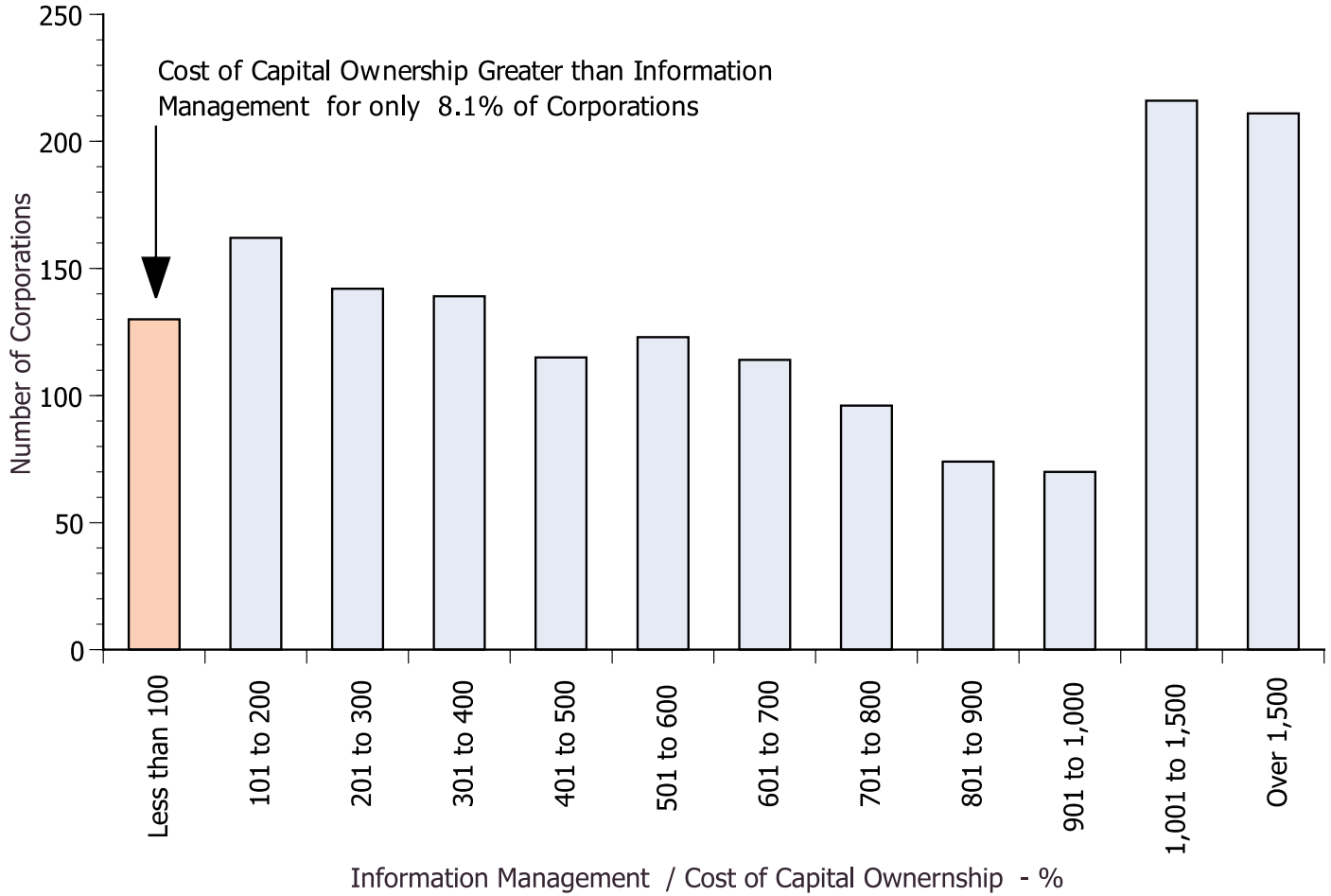
Return-on-Assets = ROA = Accounting Profits / Assets Employed

Return-on-Investment = ROI = Accounting Profits / Investment

Return-on-Equity = ROE = Accounting Profits / Shareholder Equity

Industrial Age Measures of Corporate Productivity Largely Irrelevant

Capital is Now a Commodity and Not the Decisive Input Factor



Information Management, Not Capital, Makes the Difference in Performance

Economic Value is the Output; Information Management Is the Input

Productivity = Output/Input

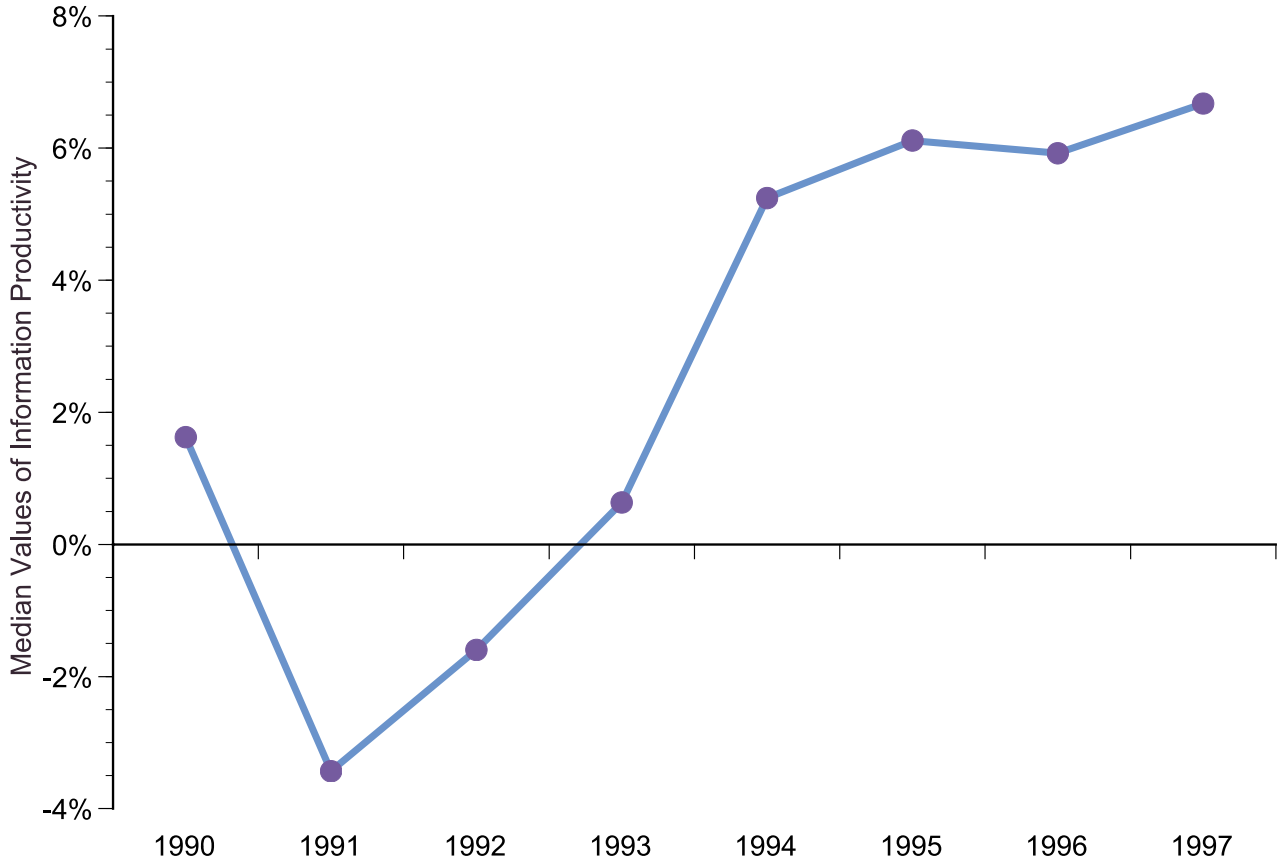
Information Productivity = EVA / (S.G.&A + R&D)

Output = Economic Value-Added = EVA

Input = Sales, General, Administrative, Research & Development = S.G.&A + R&D

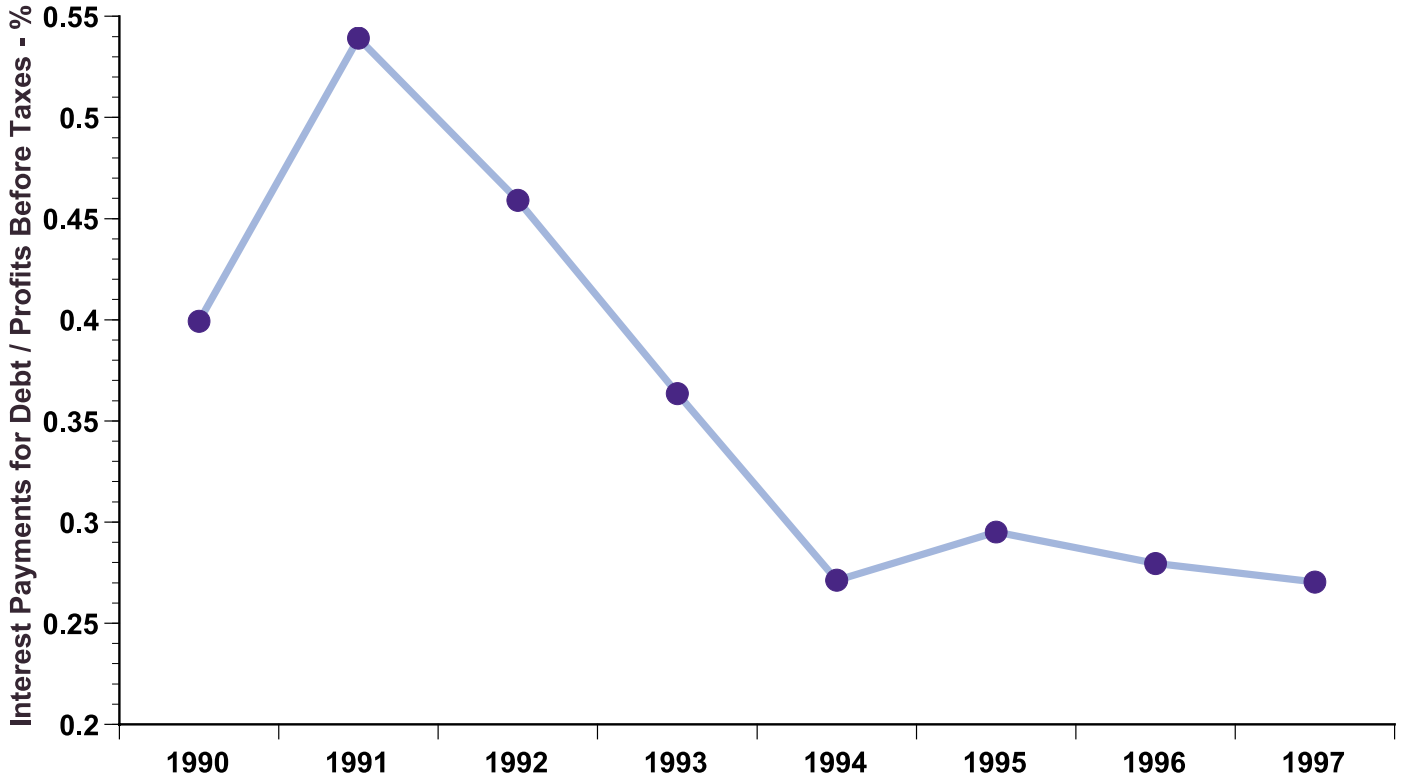
Information Management Determines the Performance in the Information Economy

Information Productivity Shows Remarkable Recent Gains



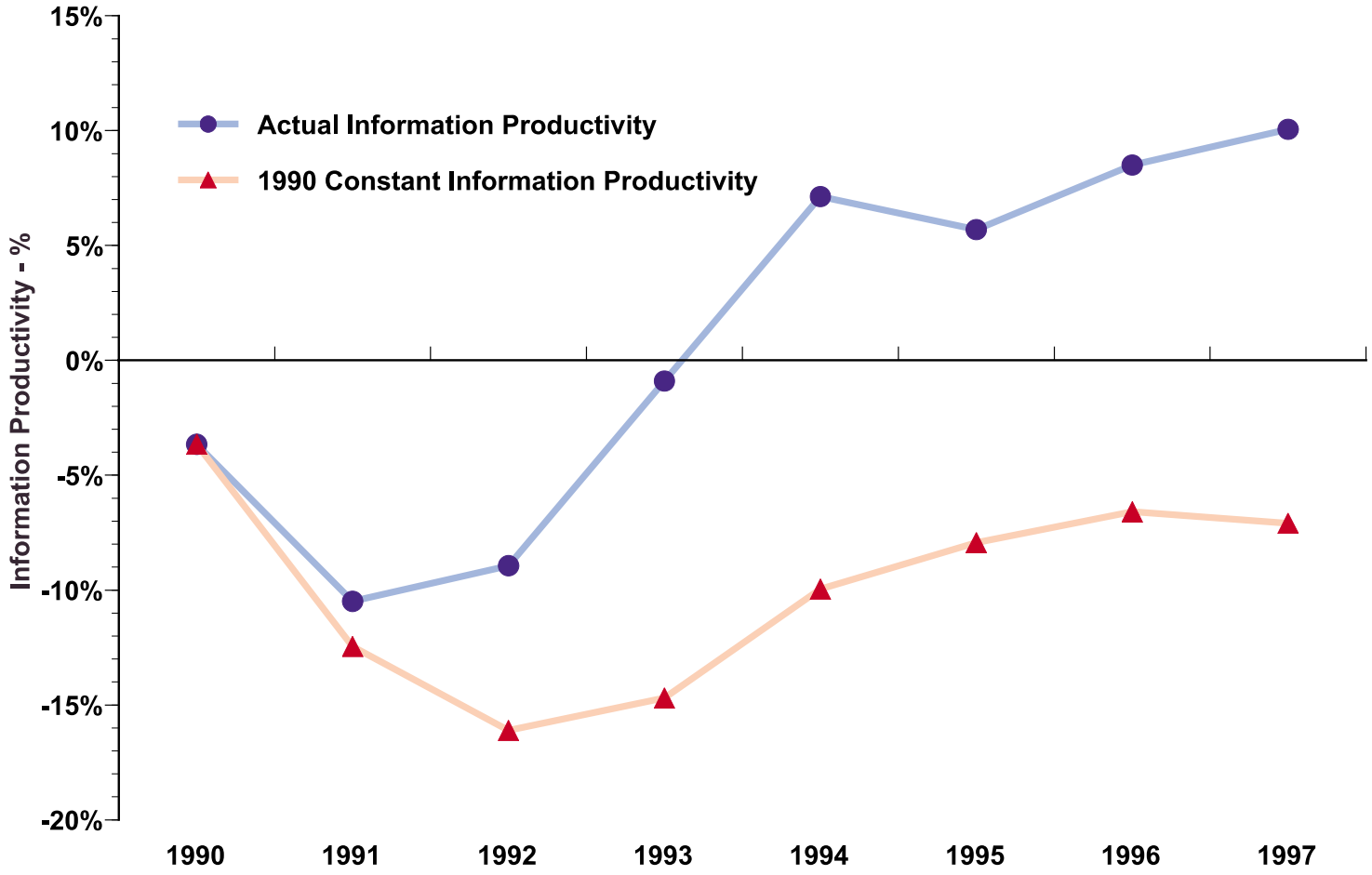
Recent Trend Encouraging but Dependent on Interest Rates and Taxes

Are Increased Profits Explained by Lower Interest Rates?



Drop in Interest Costs Coincides with Gains in Information Productivity

Information Productivity Remains Negative *(in 1990 interest rates)*



Information Technology & Improved Management Unrelated to Gains

Large Productivity Gains Feasible: 40% of Corporations Can Improve

Ranking of Firms by Information Productivity	Median Information Productivity	Information Management / Cost of Goods	Information Management / Net Assets	Information Management / Revenue
Top decile	72.9%	11.2%	13.6%	6.7%
Ninth decile	32.3%	20.6%	32.6%	13.6%
Eighth decile	20.3%	30.6%	44.6%	19.1%
Seventh decile	13.6%	28.9%	52.1%	19.4%
Sixth decile	8.5%	38.7%	66.1%	23.5%
Fifth decile	3.5%	34.5%	76.7%	23.2%
Fourth decile	-2.4%	35.1%	72.6%	23.3%
Third decile	-11.7%	34.5%	67.5%	23.0%
Second decile	-30.4%	27.5%	48.6%	20.2%
Bottom decile	-101.5%	21.3%	20.1%	13.4%

Productivity Detractors

Sustained Gains in Information Productivity Require Changes in Business

Summary

- Information workforce now determines productivity results.
- Three favorable productivity indicators were overcome by an adverse trend in information management costs.
- The effects of information technology are irrelevant and are likely to have contributed to a rise in information management costs.
- Recent favorable gains in Information Productivity can be explained entirely by lower interest costs.
- There is an enormous potential for future sustainable growth in productivity.

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