



From Good To Lean: The Bottom Line Impact of Enterprise Lean Transformation

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Preface

- **Organizations adopt lean principles for efficiency gains**
 - But much of their work results in islands of success
- **Traditional lean transformation tools and methods are useful for shop floor transformation**
 - But a new set of tools and methods are needed for transformation in the enterprise context
- **Bottoms up approach to lean is commonplace (“lean”)**
 - But a top down viewpoint gives a strategic perspective on the total enterprise value stream (“Lean”)



Motivating Questions

- 1. How do we measure return on process improvement at the enterprise level?**
- 2. What is a suitable metric for quantifying the financial impact of enterprise Lean transformation?**
- 3. Where is the financial tipping point of Lean transformation?**
- 4. How do you differentiate transformation in the small (“lean”) from transformation in the large (“Lean”)?**



Approach

- **Analyzed qualitative data to assess degree of lean adoption in large organizations**
 - **Via annual reports, CEO statements, tacit knowledge**
- **Selected Return on Invested Capital as a candidate measure of the financial impact of lean**
- **Performed longitudinal analysis of 47 firms across 7 industries over the last 10 years**
 - **Ranging from \$2B to \$193B**
 - **Good to great, LAI Members, and others**
- **Interested in identifying secondary phenomena that indicate the benefits of lean**



Data Set (47 firms)

Good to Great (7) Kimberly-Clark Kroger Walgreens	Aerospace (9) Boeing Lockheed Martin Northrop Grumman	Computer/Electronics (7) IBM HP Sony
Diversified (8) GE UTC Honeywell	Recreation (2) Harley Davidson Polaris	Automotive (7) GM Daimler Chrysler Toyota
Airlines (3) American Airlines Jet Blue Southwest		

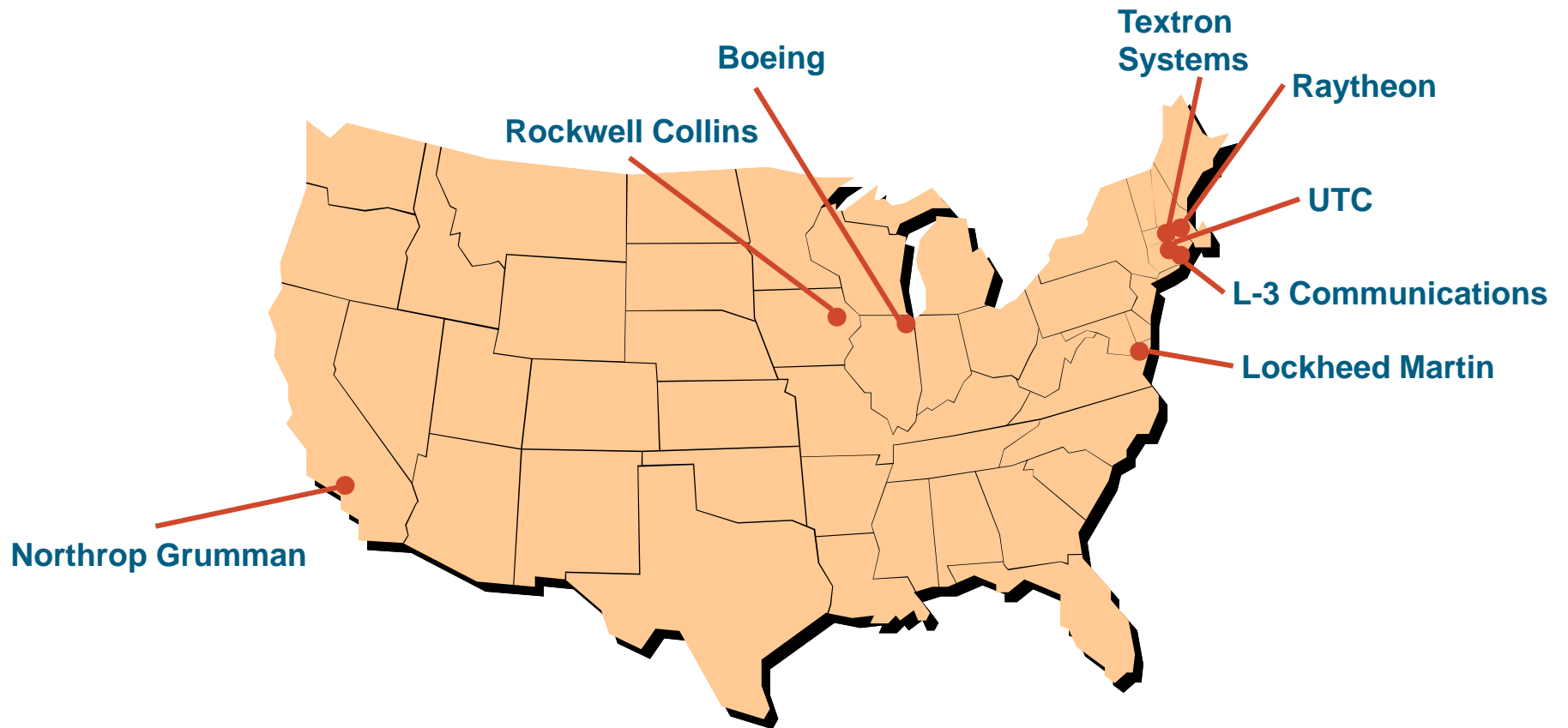
Industry categories from Value Line® (www.valueline.com)

Except for "Good to Great" category

(Collins, J., *Good to Great: Why Some Companies Make the Leap...and Others Don't*, Collins, 2001.)

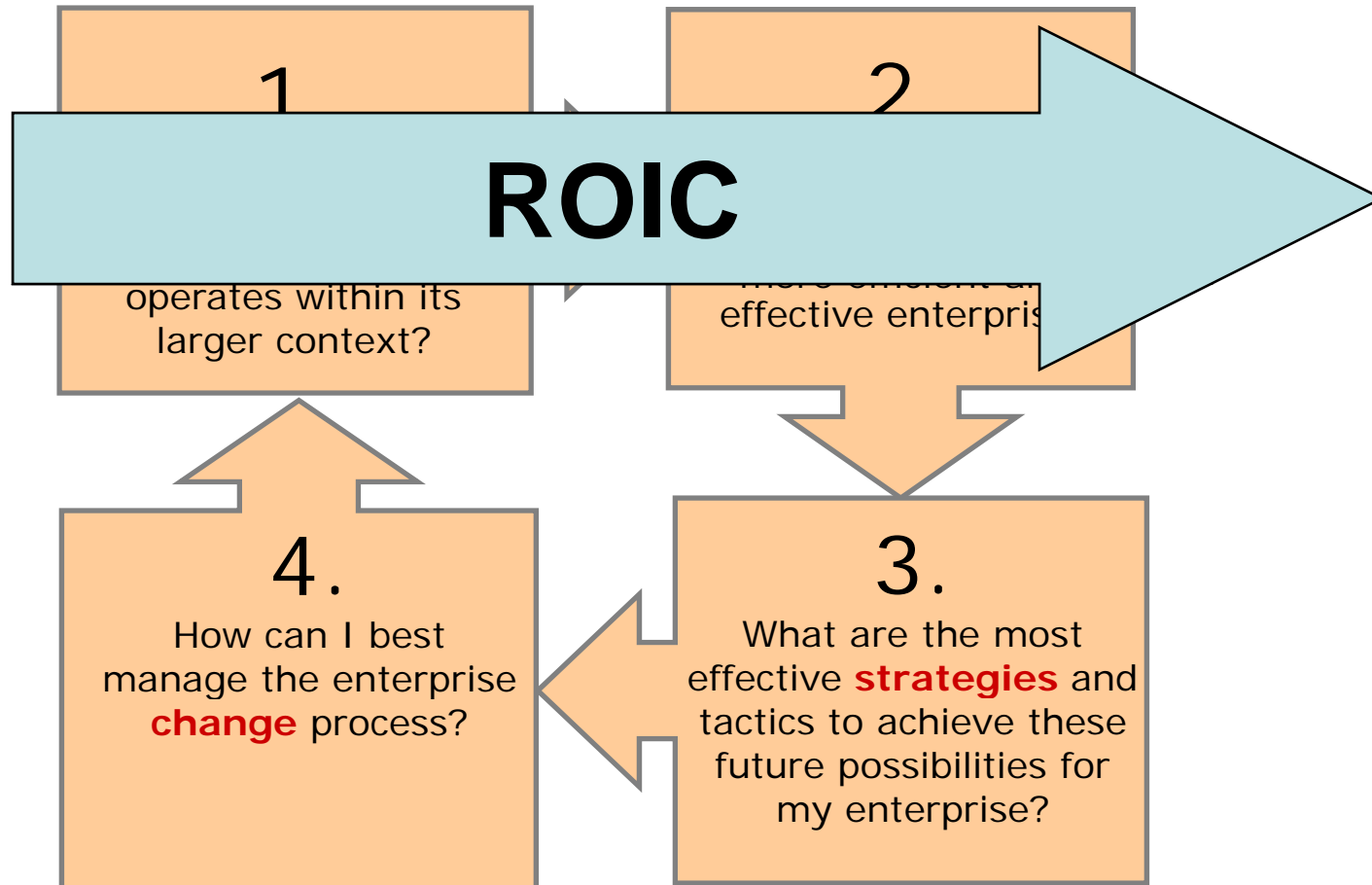


LAI Members Included in the Study (Corporate Level)



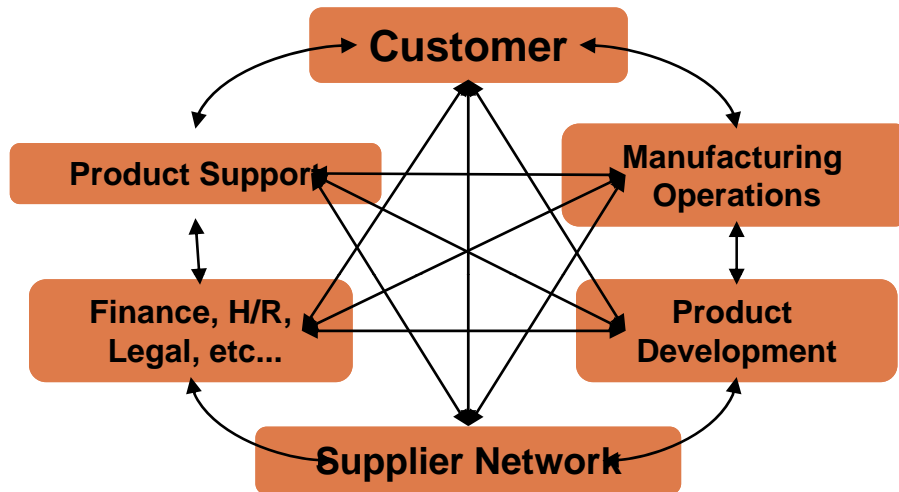
Enterprise Transformation

The Four “Grand Questions”



Enabling Lean Capabilities Enterprise Phases

Focusing on total integrated system



Characteristics:

- Multiple stakeholders collaborate across boundaries: processes vs functions vs organizations
- Superior performance requires coordination of efforts and investments
- Allocation of resources/rewards may create conflict

New Enterprise Capabilities:

- Processes/methods/tools supporting enterprise change to needed capability
- Culture of enterprise thinking not “stovepipe”
- Ability to align value stream of enterprise with strategic intent of enterprise

What we measure and analyze:

- Enterprise impact and results:

**Return on Invested
Capital (ROIC)**



The Strength of ROIC is Understanding its Three Components

ROIC = Operating Income/Invested Capital

= (Operating Income/Sales)

x (Sales/Assets)

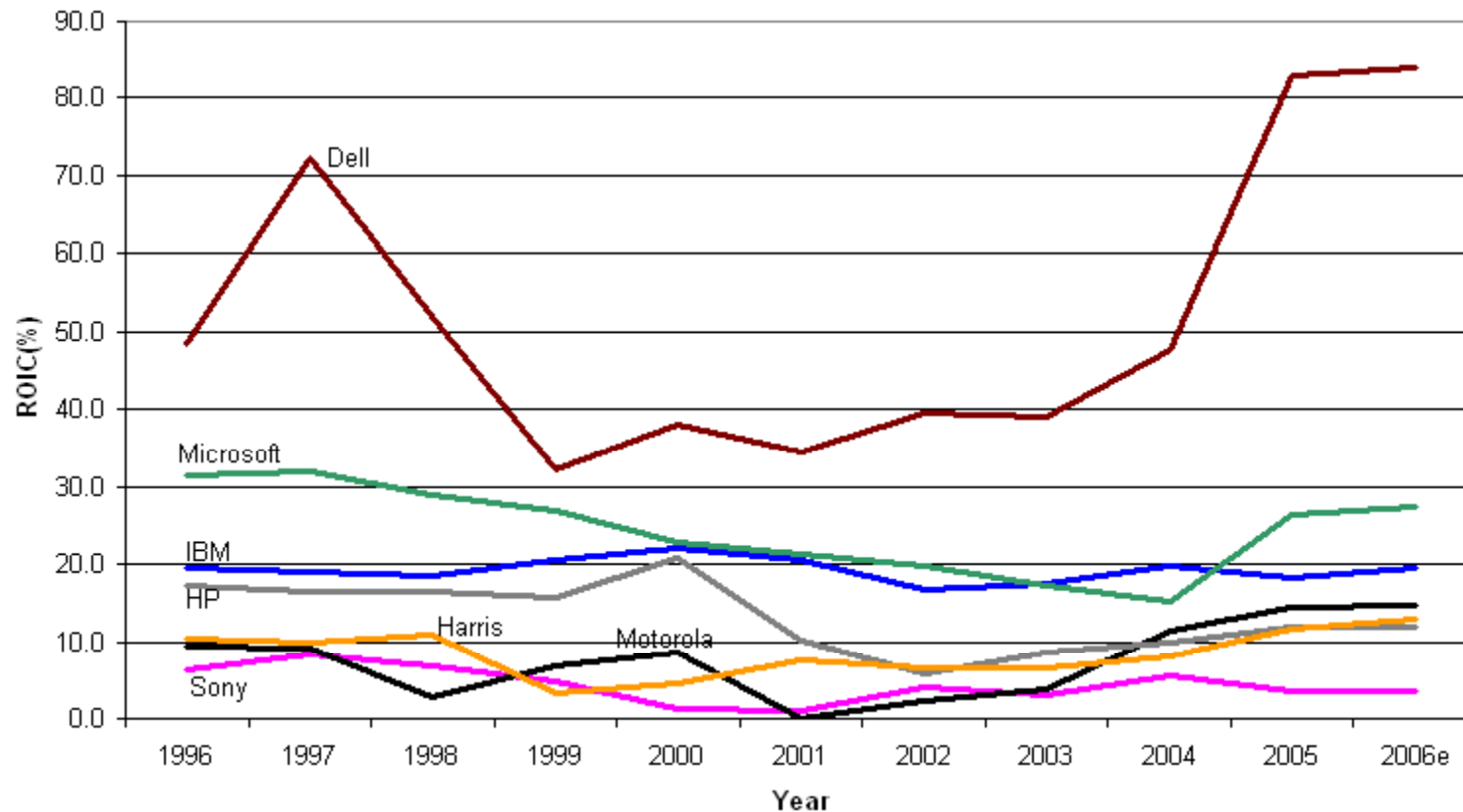
x (Assets/Invested Capital)

Thus, **ROIC** is the product of three ratios:

- **Operating Margin** → (operating income/sales)
- **Asset Turnover** → (sales/assets)
- **Financial Leverage** → (assets/invested capital)

ROIC Across the Computer/Electronics Industry (7)

ROIC for Computer/Electronics Companies (1996-2006)

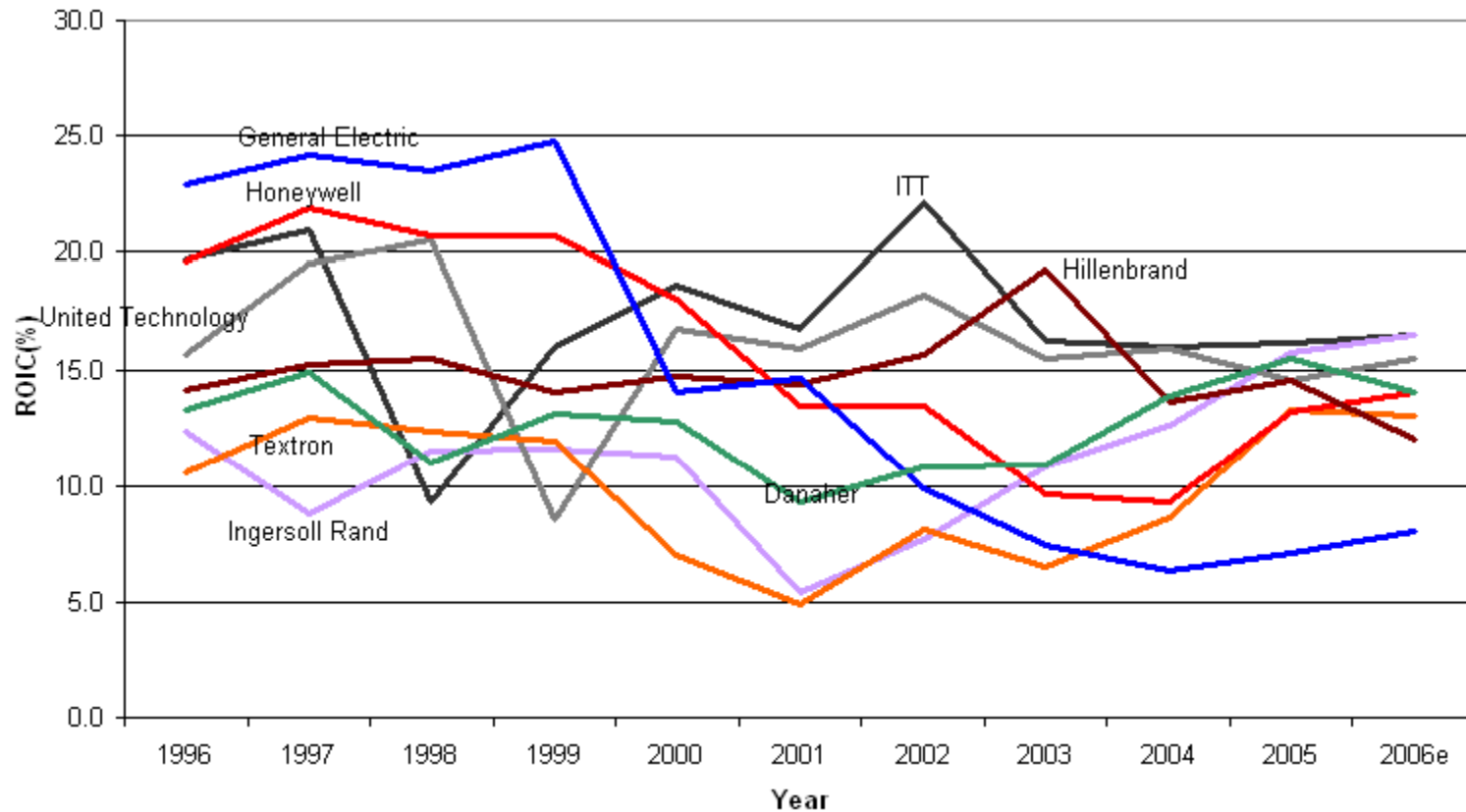


Industry	Avg. Sales (\$B)	Avg. ROIC (%)	Std Dev ROIC
Computer/Electronics	\$42.9	18.7	16.1



ROIC Across the Diversified Industry (8)

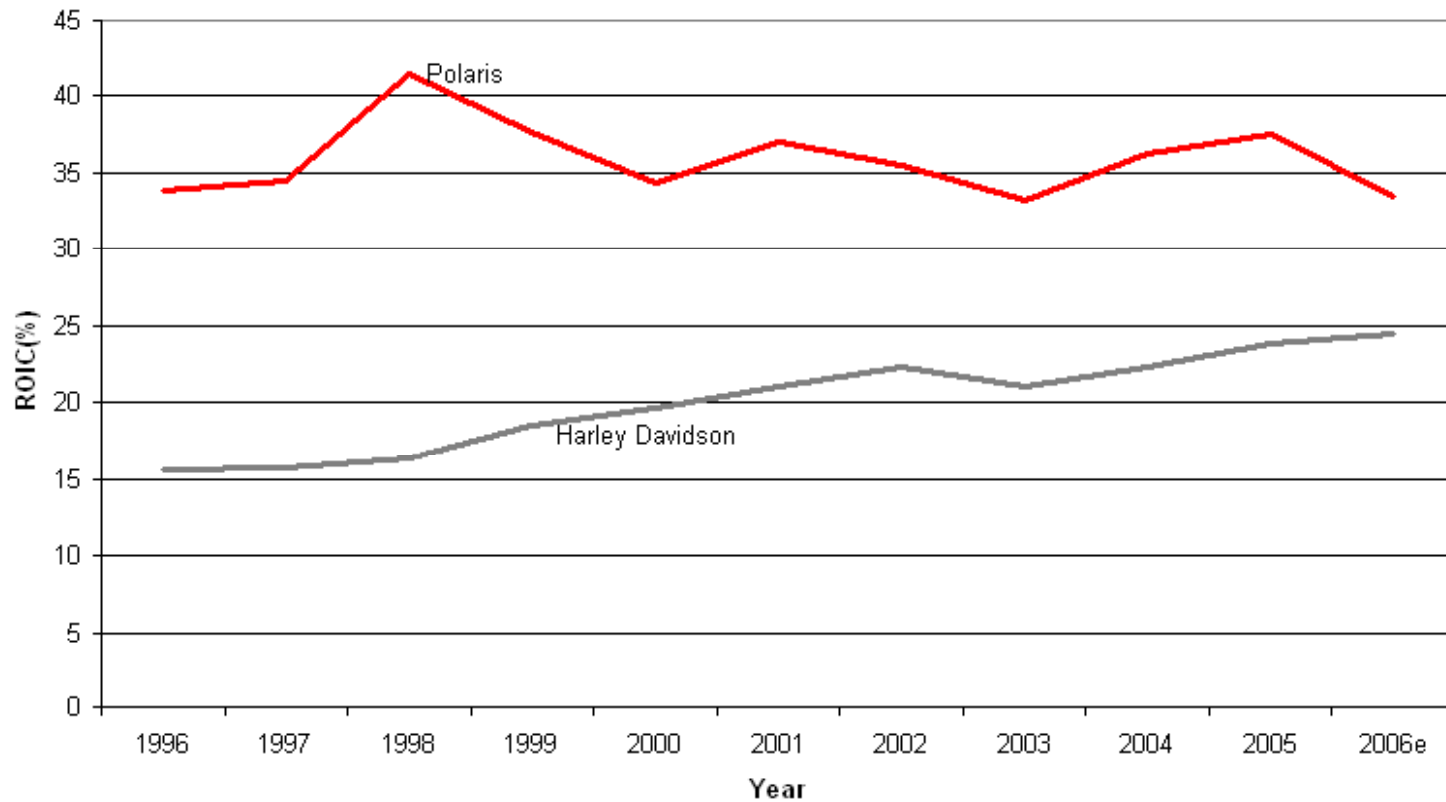
ROIC for Diversified Industry (1996-2006)



Industry	Avg. Sales (\$B)	Avg. ROIC (%)	Std Dev ROIC
Diversified	\$24.1	14	2.5

ROIC Across the Recreation Industry (2)

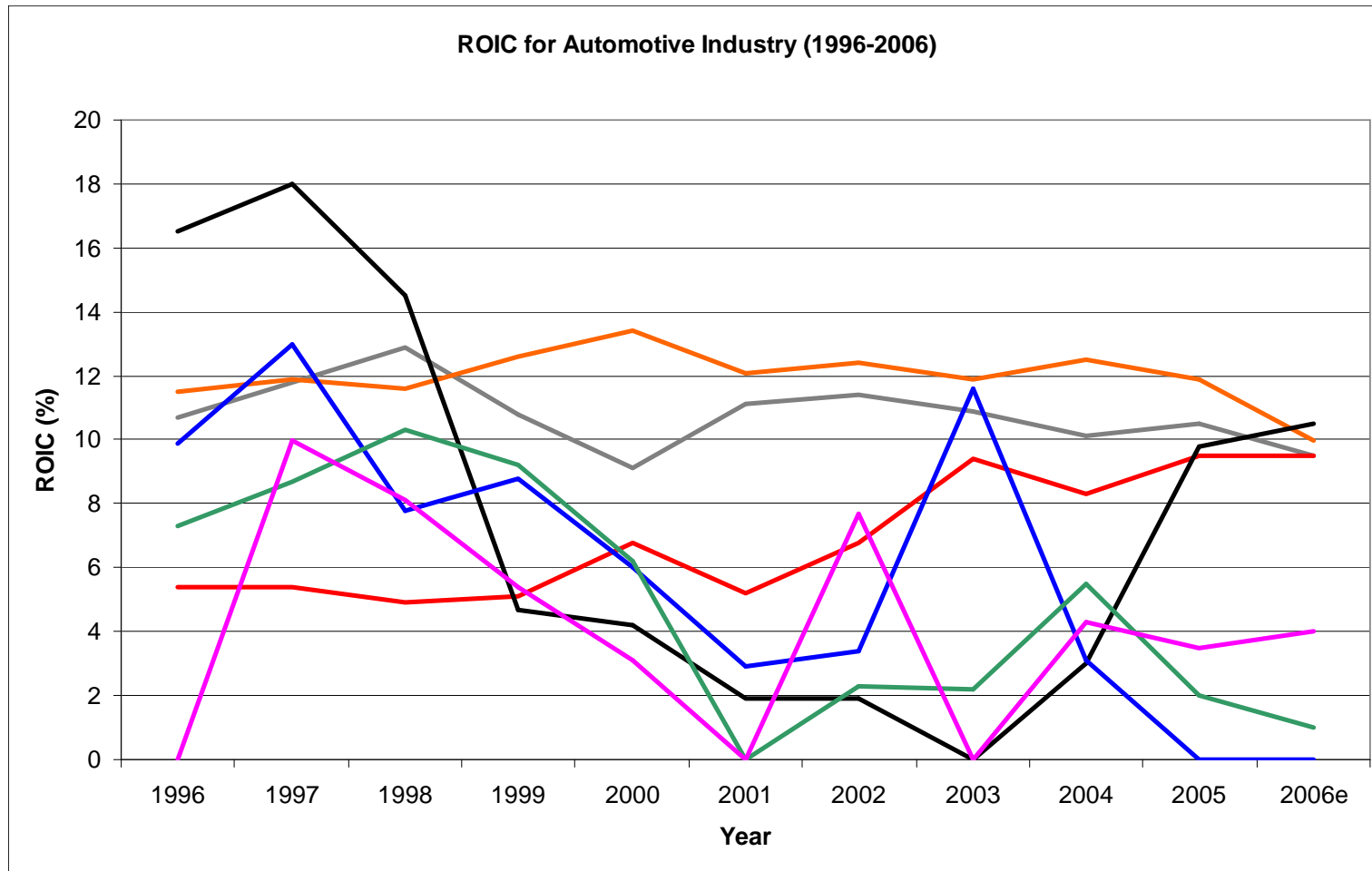
ROIC for Recreational Industry



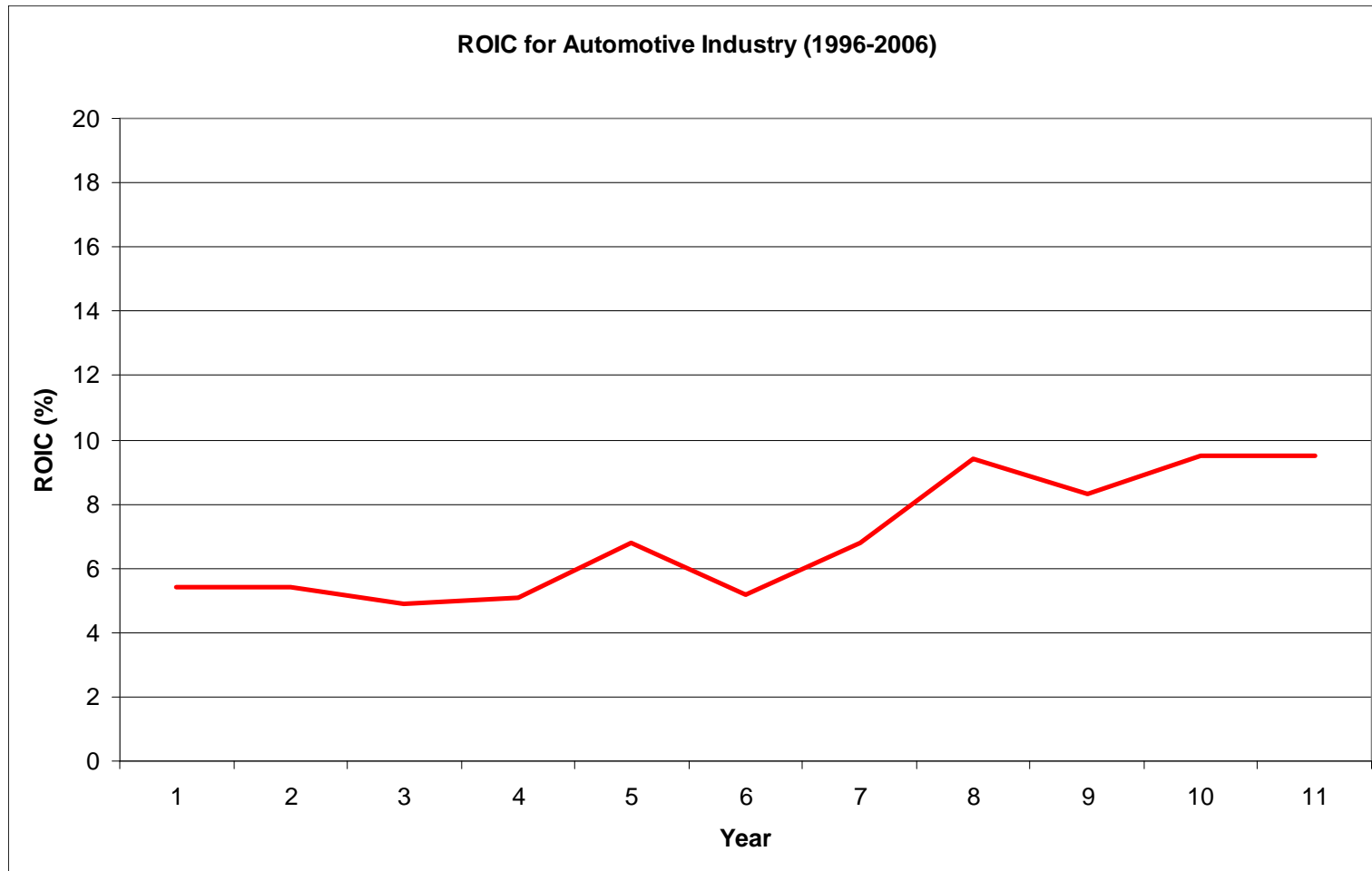
Industry	Avg. Sales (\$B)	Avg. ROIC (%)	Std Dev ROIC
Recreation	\$2.5	28	11.2



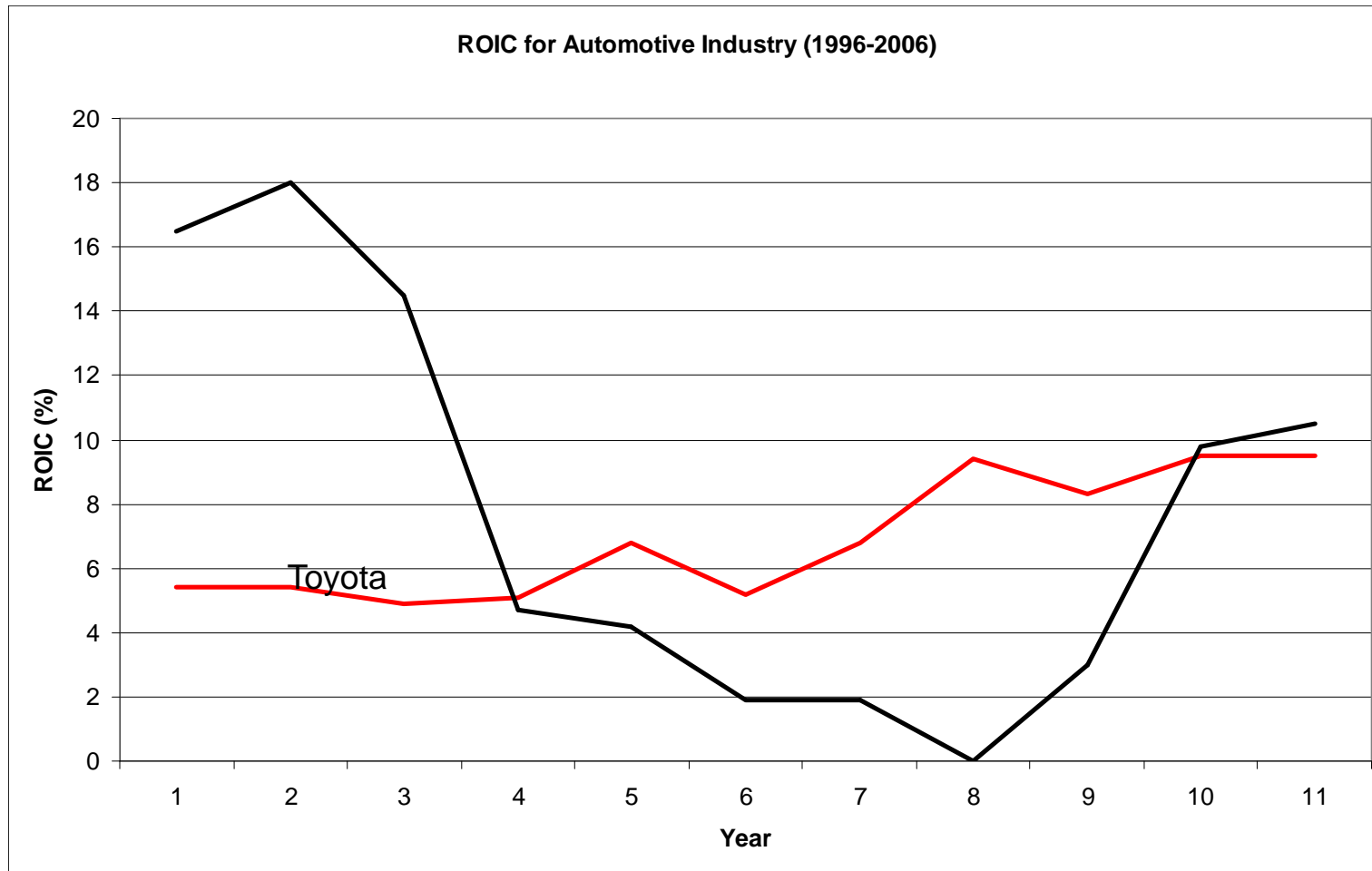
Can you guess which company in the Automotive Industry fits which line?



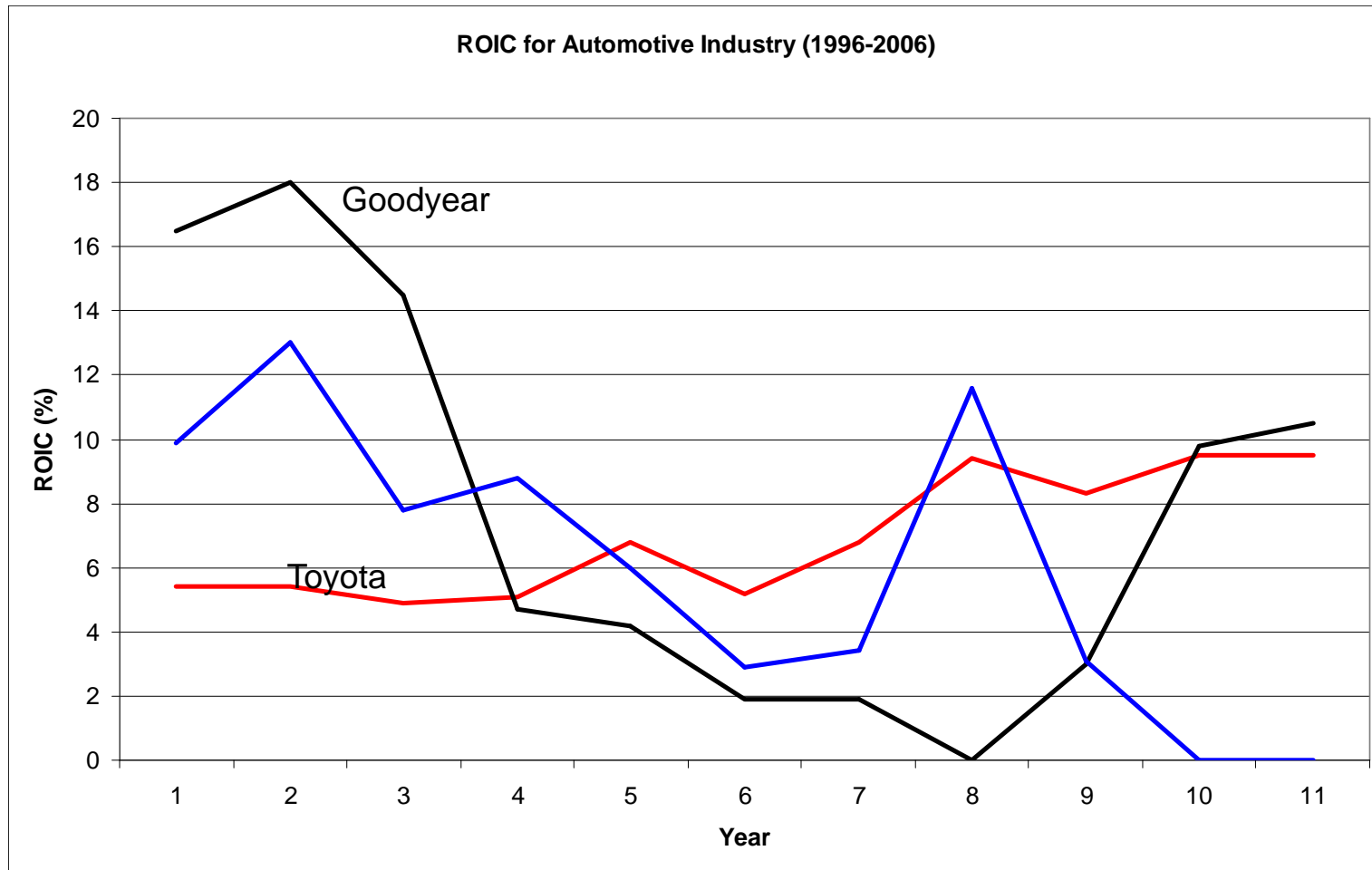
Hint: The Machine that Changed the World



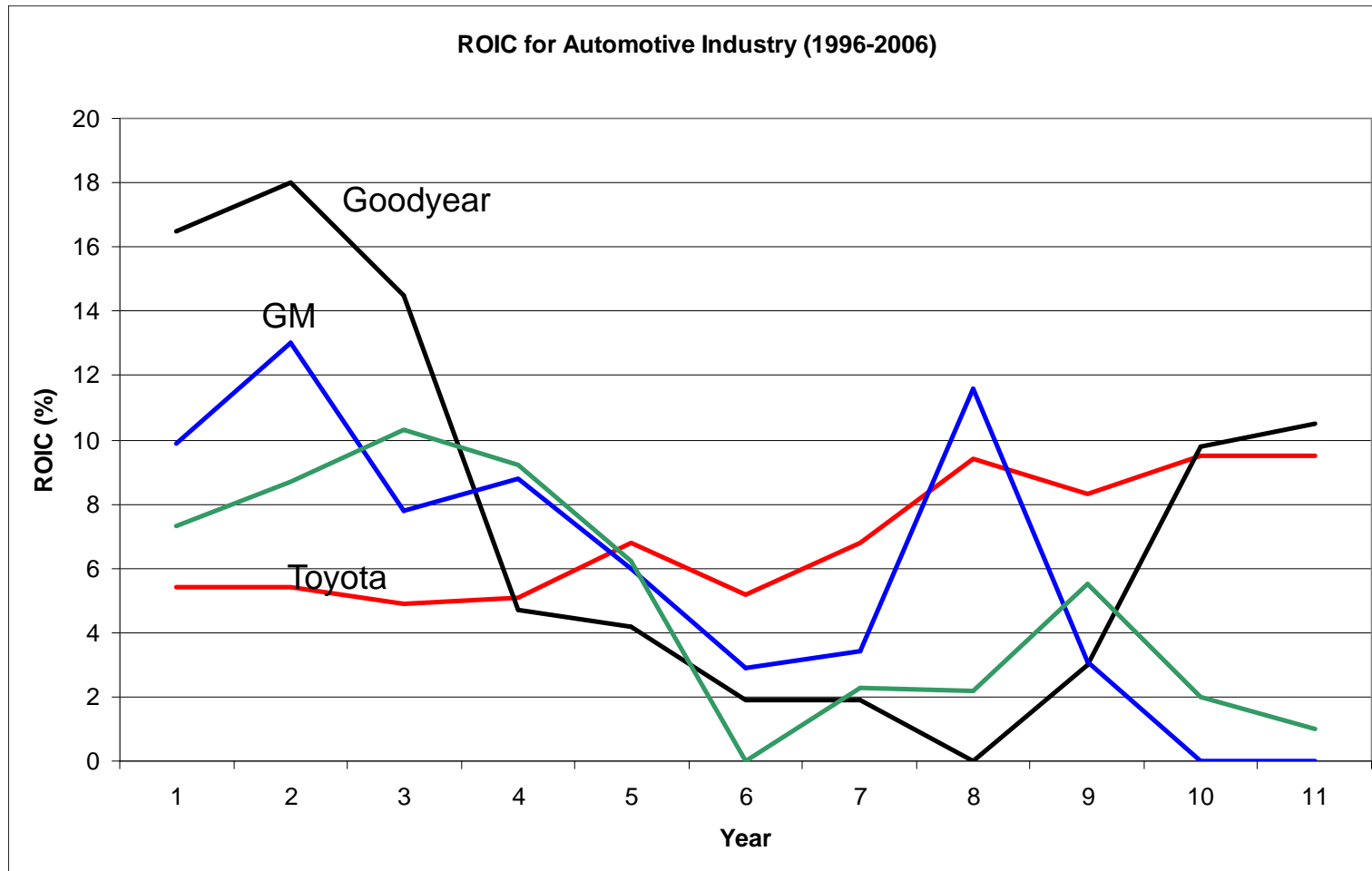
Hint: The Blimp!



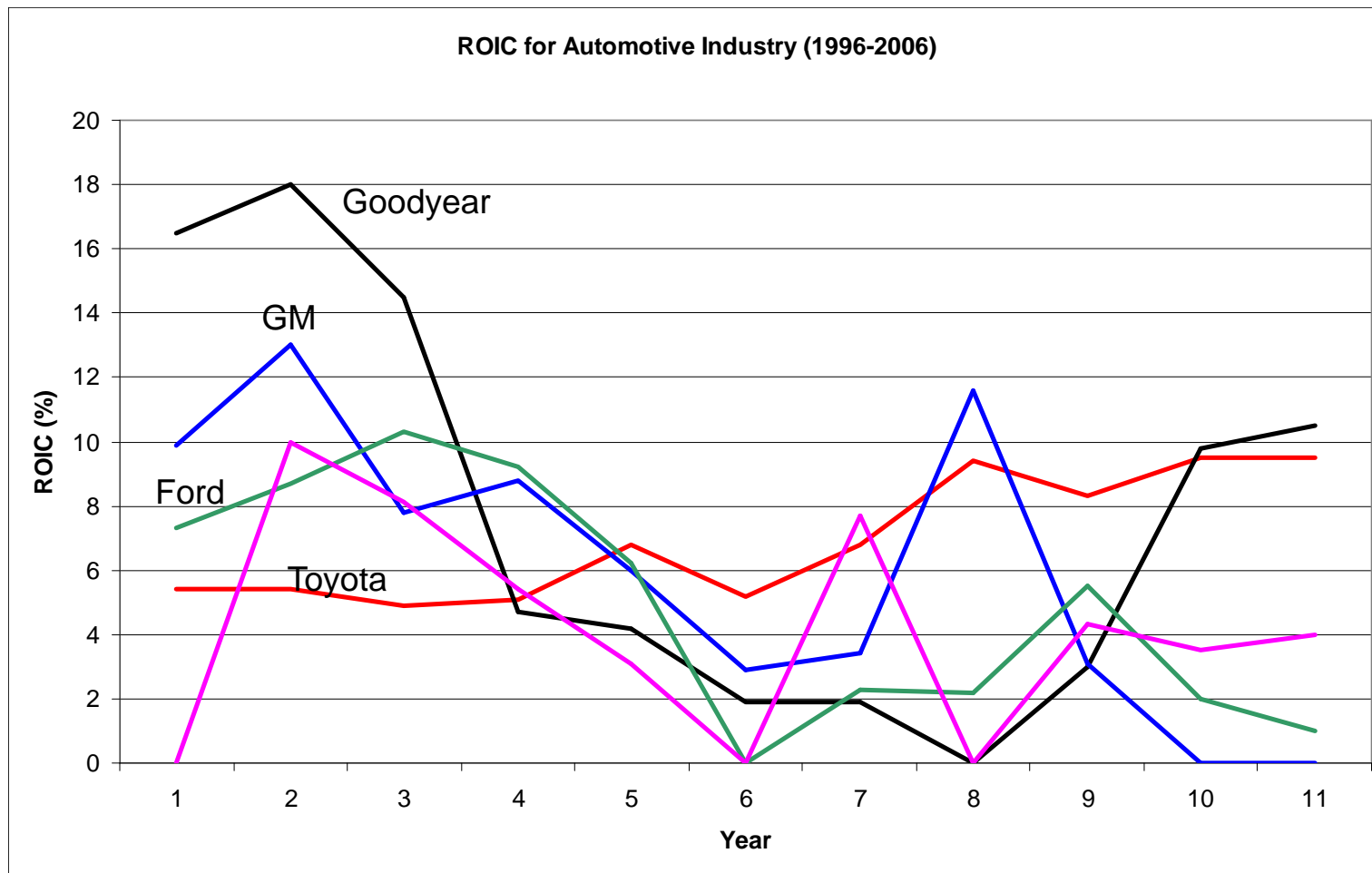
Hint: The CEO is speaking at MIT today



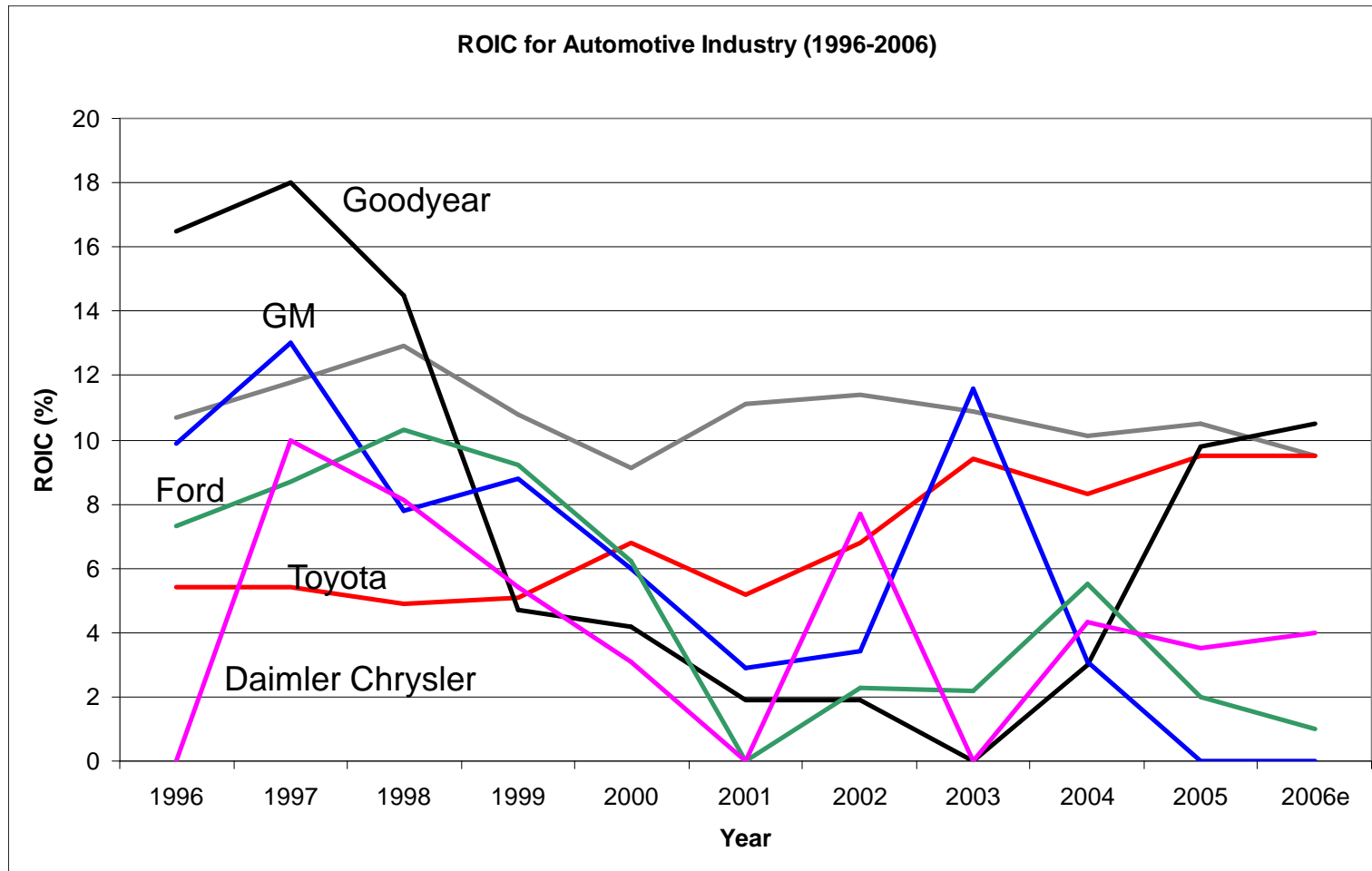
Hint: Forever new frontiers (on wheels)



Hint: Do you know Dr. Z?

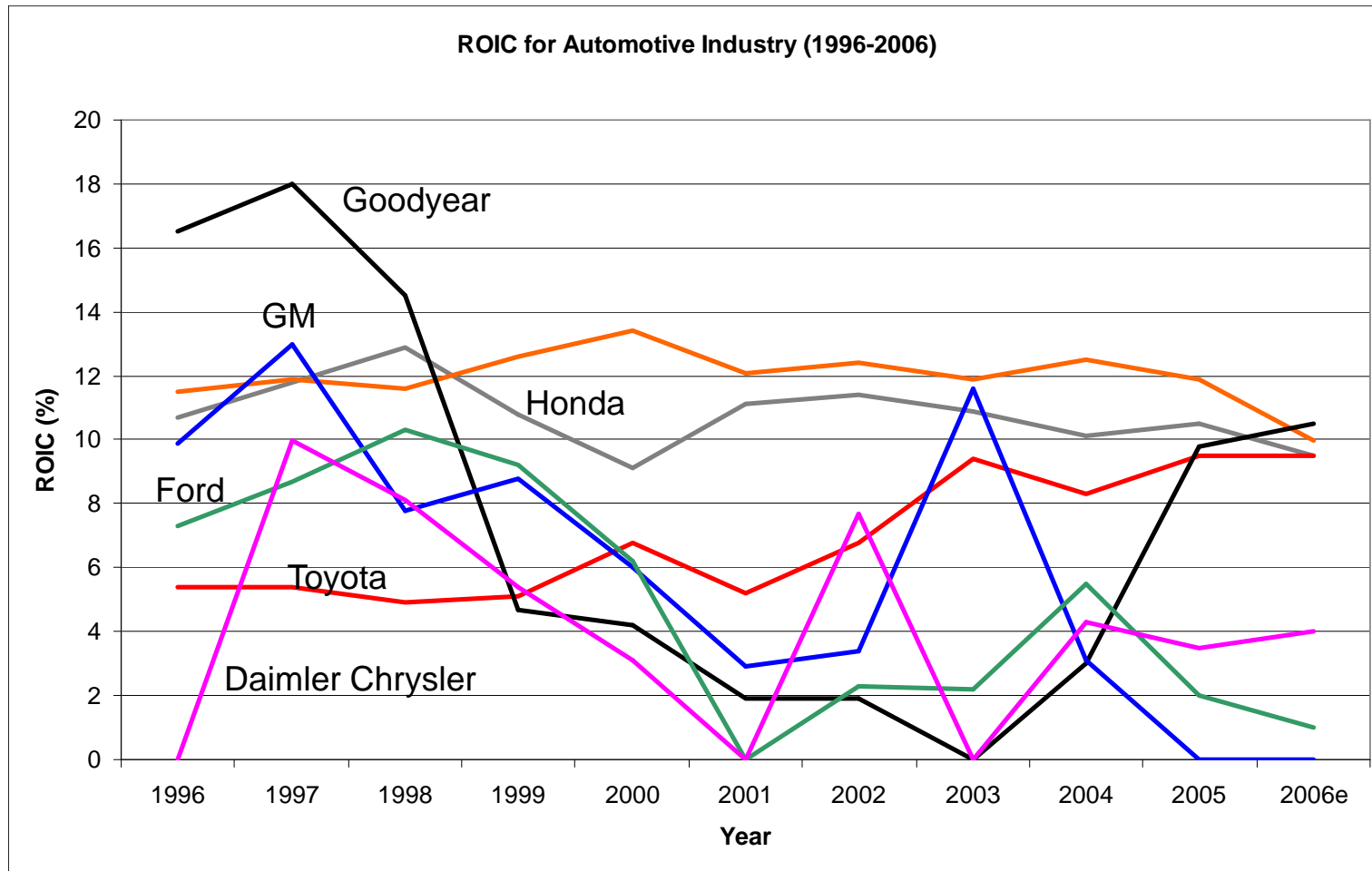


Hint: The Power of Dreams



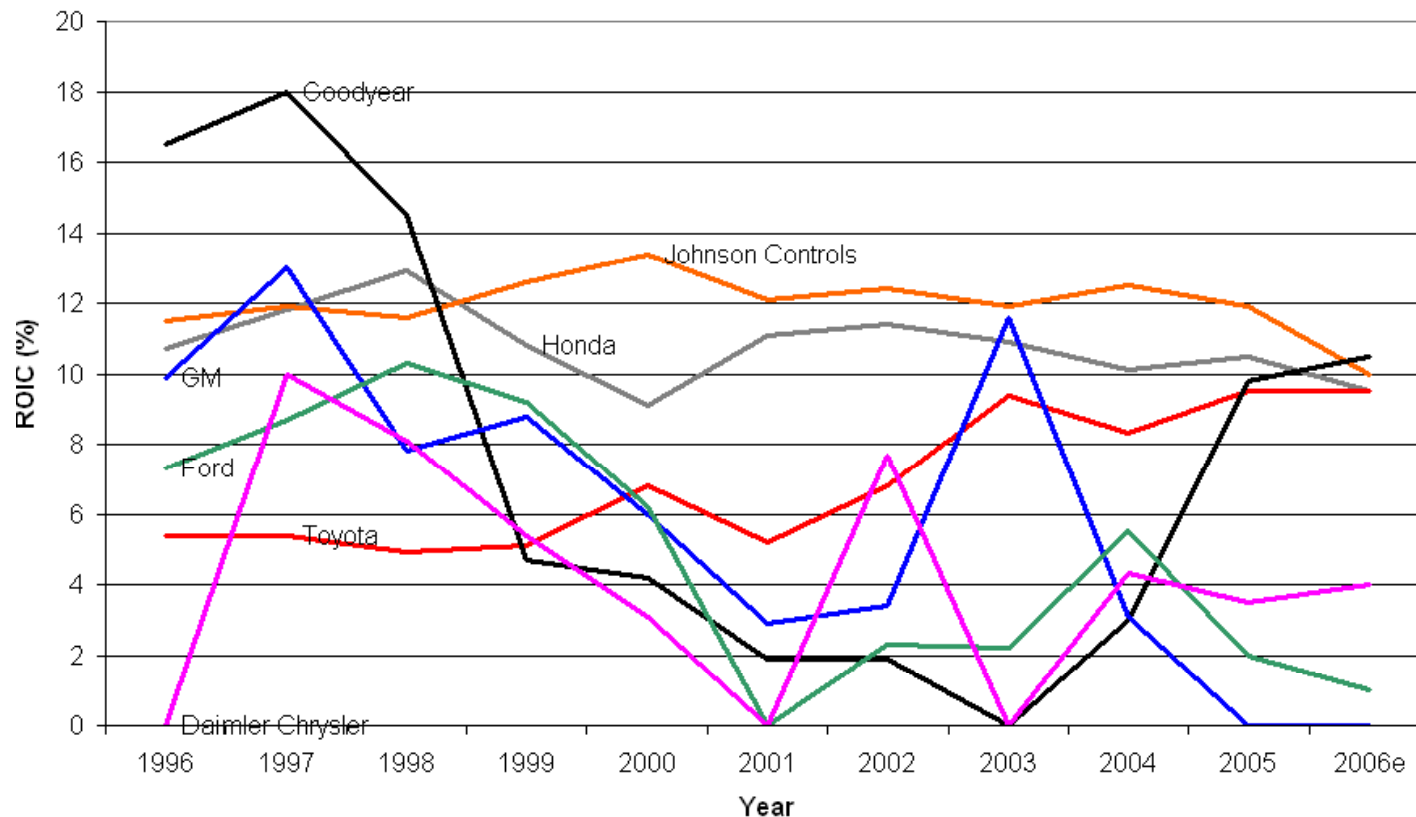


Hint: Fortune Magazine's America's Most Admired Automotive Company



ROIC Across the Automotive Industry (7)

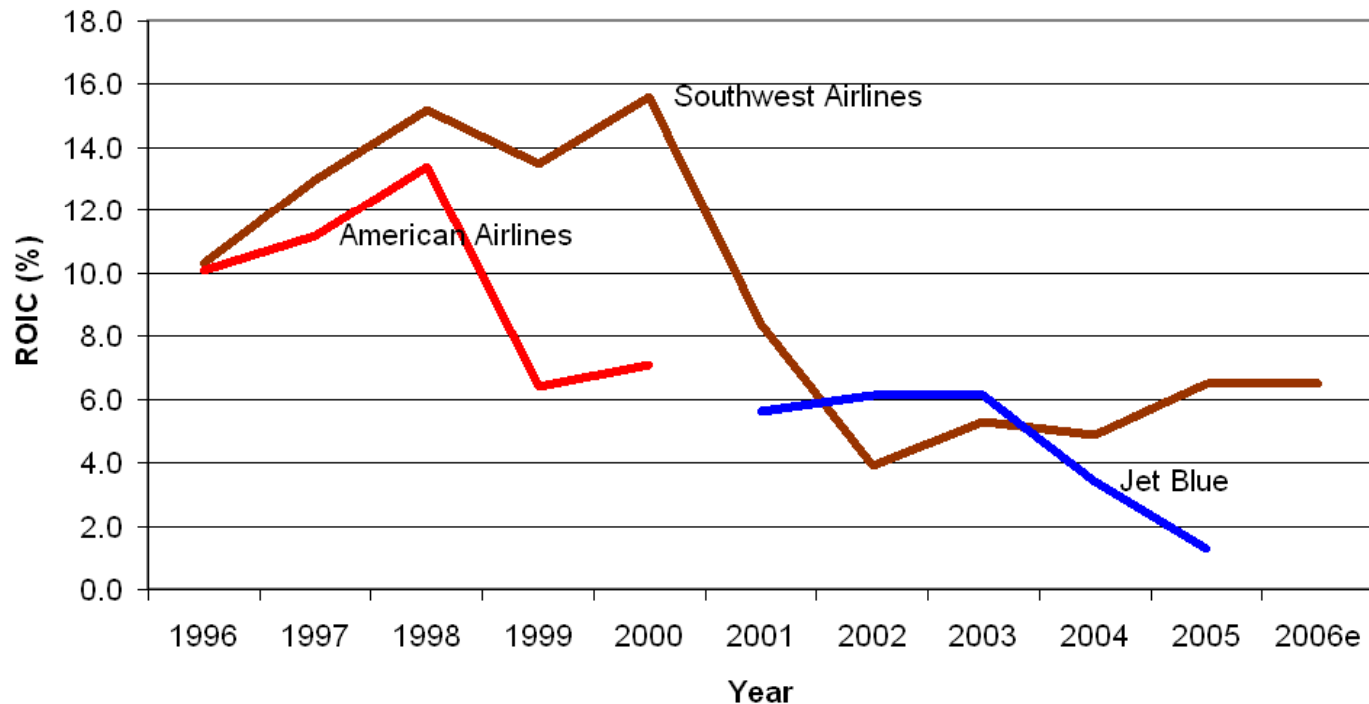
ROIC for Automotive Industry (1996-2006)



Industry	Avg. Sales (\$B)	Avg. ROIC (%)	Std Dev ROIC
Automotive	\$104.9	8.1	2.6

ROIC Across the Airline Industry (3)

ROIC for Airline Industry (1996-2006)

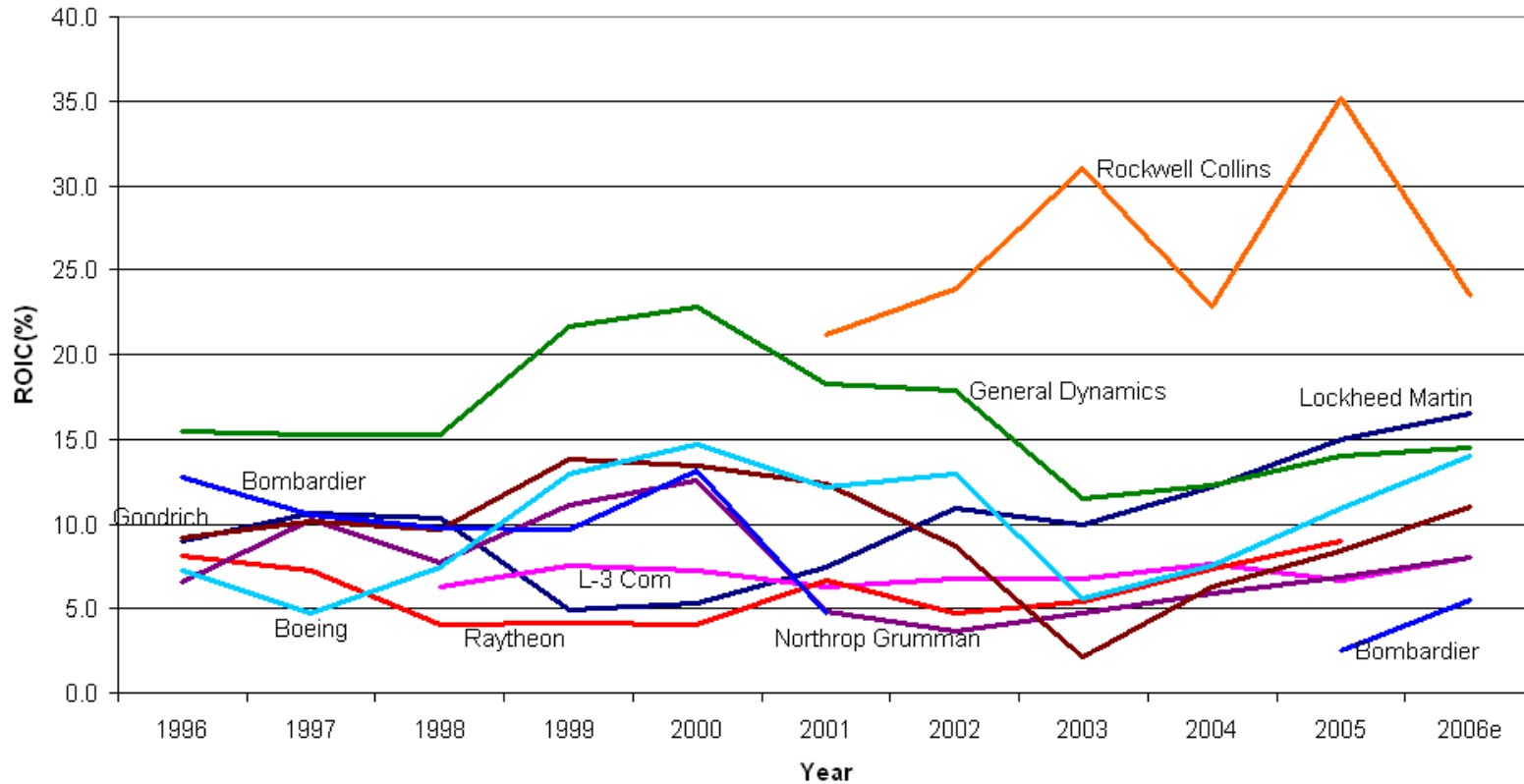


Industry	Avg. Sales (\$B)	Avg. ROIC (%)	Std Dev ROIC
Airline	\$8.5	7.8	2.9



ROIC Across the Aerospace Industry (9)

ROIC for Aerospace Industry (1996-2006)

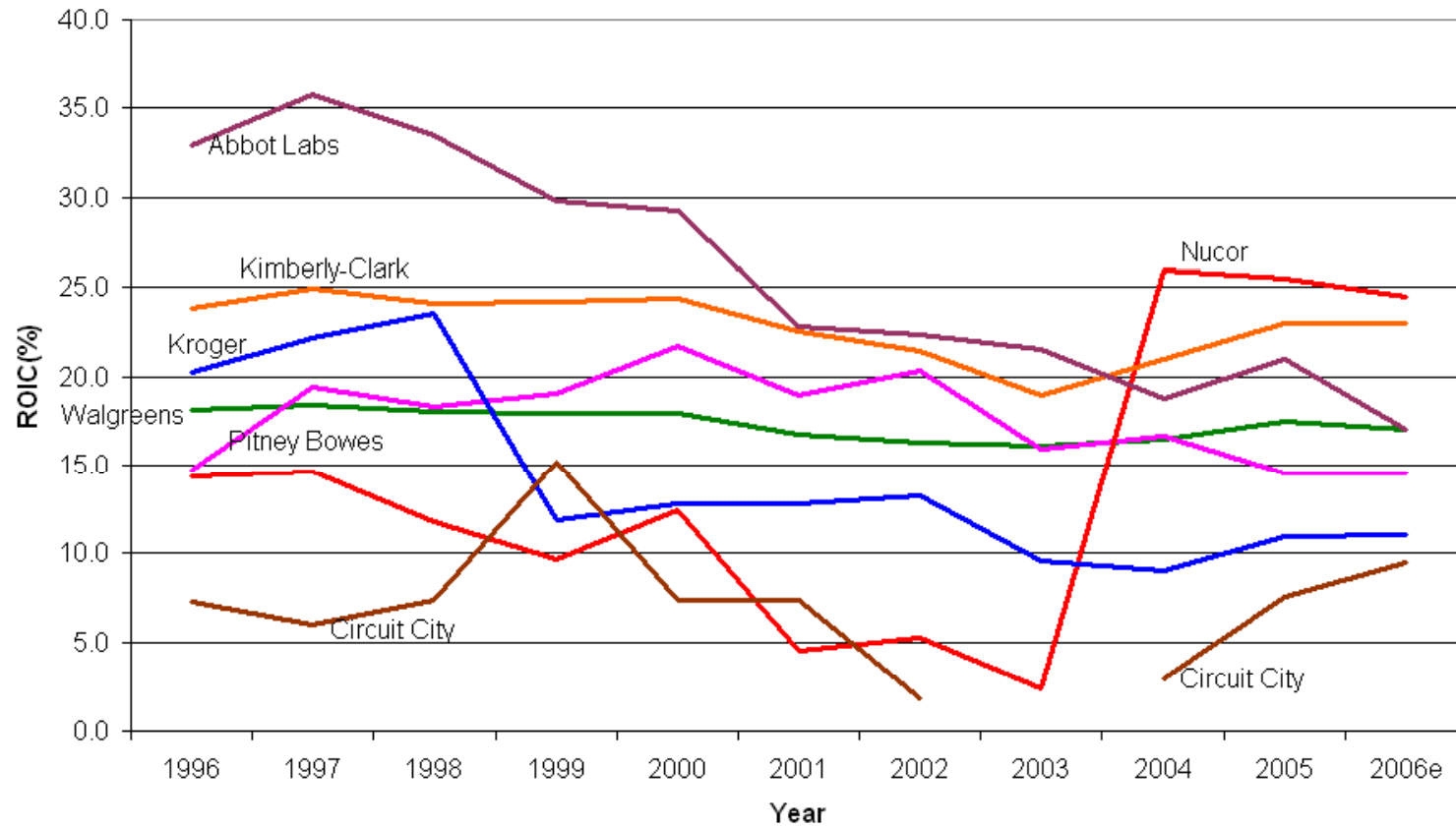


Industry	Avg. Sales (\$B)	Avg. ROIC (%)	Std Dev ROIC
Aerospace	\$17.6	11.3	6.3



ROIC for “Good to Great” Companies (7)

ROIC for Good to Great Companies (1996-2006)

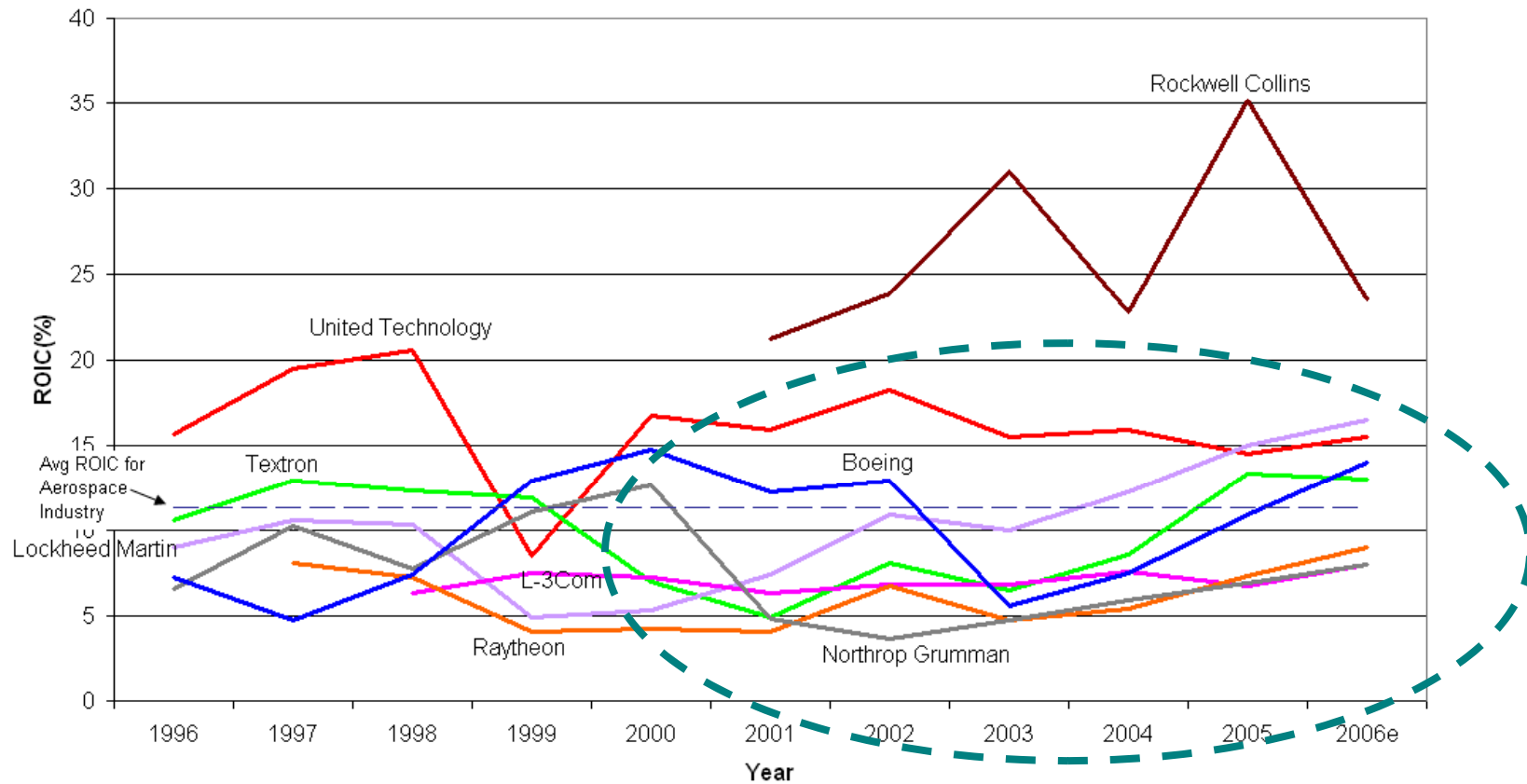


Industry	Avg. Sales (\$B)	Avg. ROIC (%)	Std Dev ROIC
Good to Great	\$17.8	16.9	6.1



ROIC of LAI Members (8)

ROIC of LAI Members



Industry	Avg. Sales (\$B)	Avg. ROIC (%)	Std Dev ROIC
LAI Members	\$20.8	11.6	6.7



Cross-industry Data Summary

Sorted by Avg. ROIC

Industry	Avg. Sales (\$B)	Avg. ROIC (%)	Std Dev ROIC
Airline	\$8.5	7.8	2.9
Automotive	\$104.9	8.1	2.6
Aerospace	\$17.6	11.3	6.3
LAI Members	\$20.8	11.6	6.7
Diversified	\$24.1	14	2.5
Good to Great	\$17.8	16.9	6.1
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Sorted by Std Dev ROIC

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Findings

Heuristic: Lean is a journey

Most organizations experienced a 3-5 year lag between the time they implemented lean and the time they say an improvement in ROIC

Heuristic: Lean efficiencies have a financial impact on the enterprise

Evidence: LAI Members have a slightly higher ROIC (0.3%) than the aerospace industry average from 1996-2006 (11.6% vs. 11.3%)



Limitations of this work

- **Limited to capital-intensive orgs**
- **ROIC is a lagging indicator**
 - Not a bullet proof metric
 - Necessary but not sufficient measure of enterprise performance
- **LAI Membership is arbitrary**



Future Work/Ideas

- **Split data set into 3 groups and compare ROIC**
 - Those we know are doing lean at the enterprise level
 - Those we're not sure about
 - Those we know are not
- **Annual analysis of ROIC average**
 - Should be more representative of market fluctuations
- **Post 9/11 analysis**
- **Incorporate data from LEV Simulations**
- **ROIC-like measure for human capital**
- **Incorporation of more qualitative data; storytelling**



Suggestions

- **Show year when LAI Members joined LAI as part of longitudinal analysis (Chilli)**
- **Should include year when orgs started Lean improvement programs such as LM21, Lean + (Tom)**
- **Consider industry maturity when comparing relative ROIC values (Tom)**
 - **See dominant design work by Utterback**
- **Compare ROIC to other metrics such as productivity and sales per employee (Kirk & Sigouris)**
- **Can't trust what companies say in annual reports (Alexis)**
- **Try to account for external factors influencing ROIC (Kirk)**
- **Include industries such as retail in the ROIC comparison (Alexis)**
- **See Dick Louis matrix from Rolls Royce (Alexis to provide ppt file)**
- **Compare to similar CMMI report (Sid to provide report)**