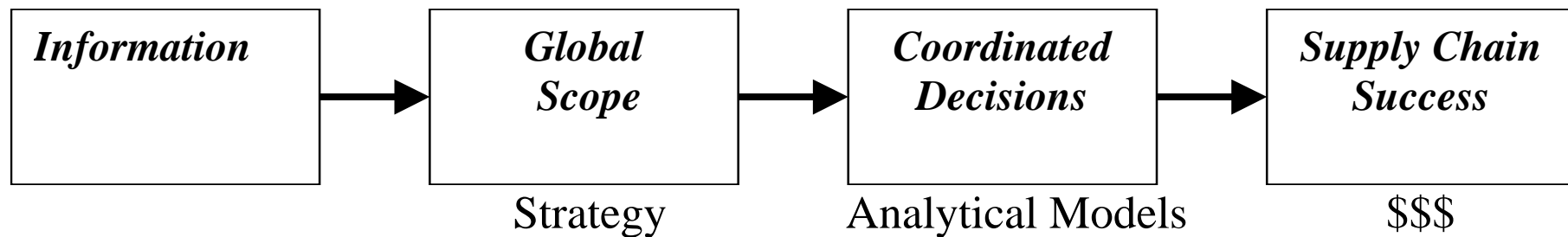

Information Technology and E-Business

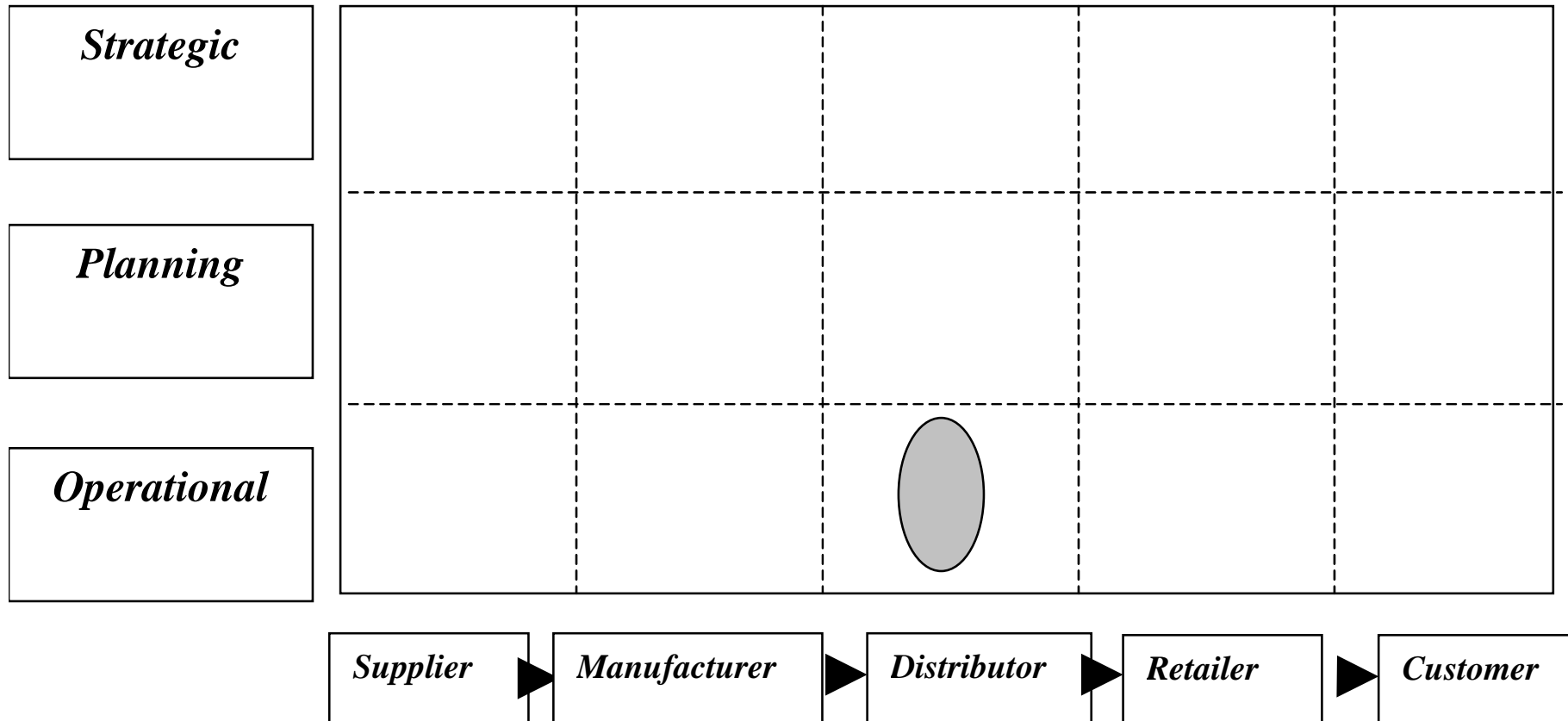
Role of Information in Supply Chain Success



Information

- ◆ Accurate?
- ◆ Accessible?
- ◆ Up-to-date?
- ◆ Correct form?

Information Technology in a Supply Chain: Legacy Systems

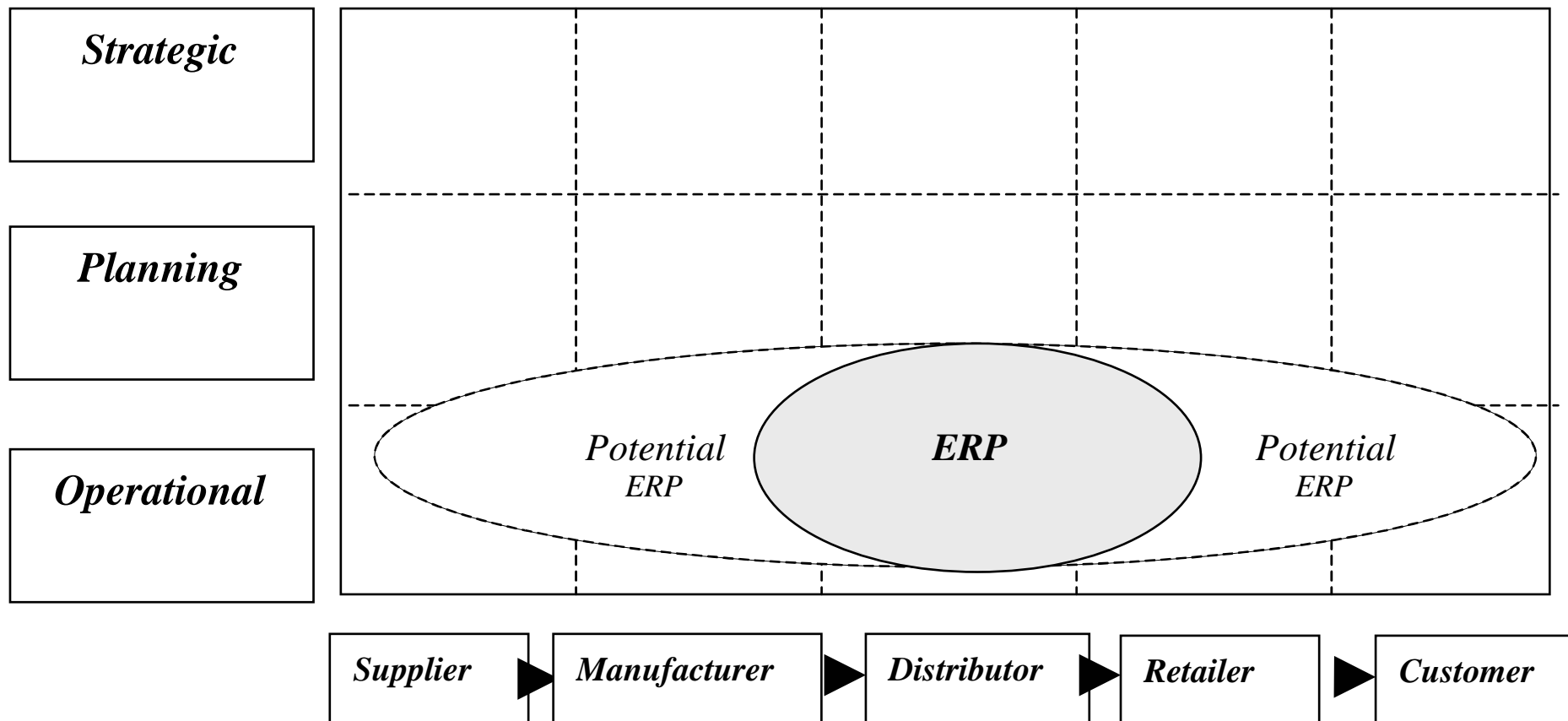


Legacy Systems

- ◆ Reliable
- ◆ Cheap

- ◆ Small focus in SCs
- ◆ Transactional IT
- ◆ Mainframe technology

Information Technology in a Supply Chain: ERP Systems

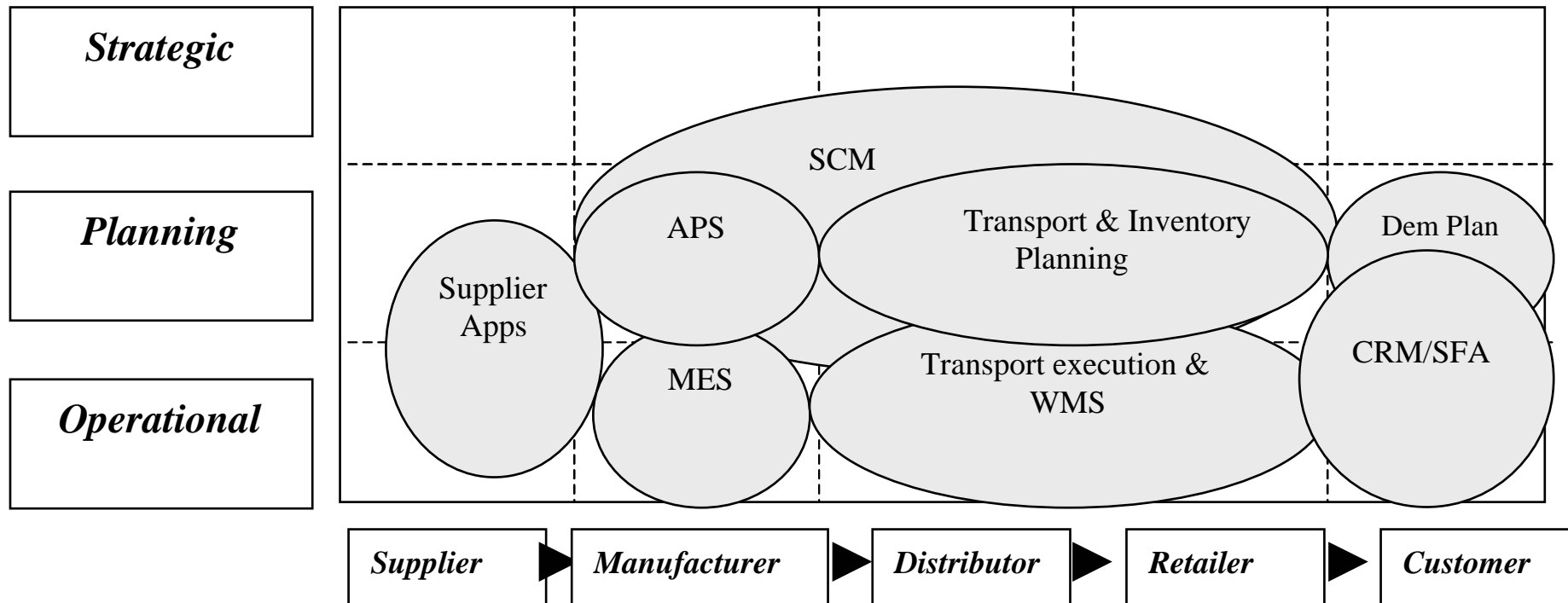


ERP Systems

- ◆ Wider focus
- ◆ Real-time information
- ◆ Information sharing

- ◆ Transactional IT
- ◆ Expensive and difficult to implement
 - About 25% of ERP installations are cancelled within a year
 - About 70% of ERP installations go over the budget

Information Technology in a Supply Chain: Analytical Applications



Information Infrastructure: Required Technologies

- ◆ Basic EDI communication system
- ◆ Technology to share forecast information
- ◆ Sales incentives will have to be transferred from shipment driven to consumption driven (EDLP between supplier and retailer)
 - Volume based vs. lot size based discounts
 - Coupon based discounts

Transportation Infrastructure: Cross Docking

- ◆ The movement of materials directly from receiving to shipping with minimum idle time in between.
- ◆ Required information
 - What is coming? How is it coming?
 - Quantity and configuration? Markings and identifications?
 - Where is it to be moved when unloaded? Interim and final destination?
 - Any special handling?
- ◆ **Advance Ship Notice (ASN):** Key to improving cross docking efficiency

Receiving Infrastructure: Automated Receiving Technologies

◆ DEX (Direct EXchange)

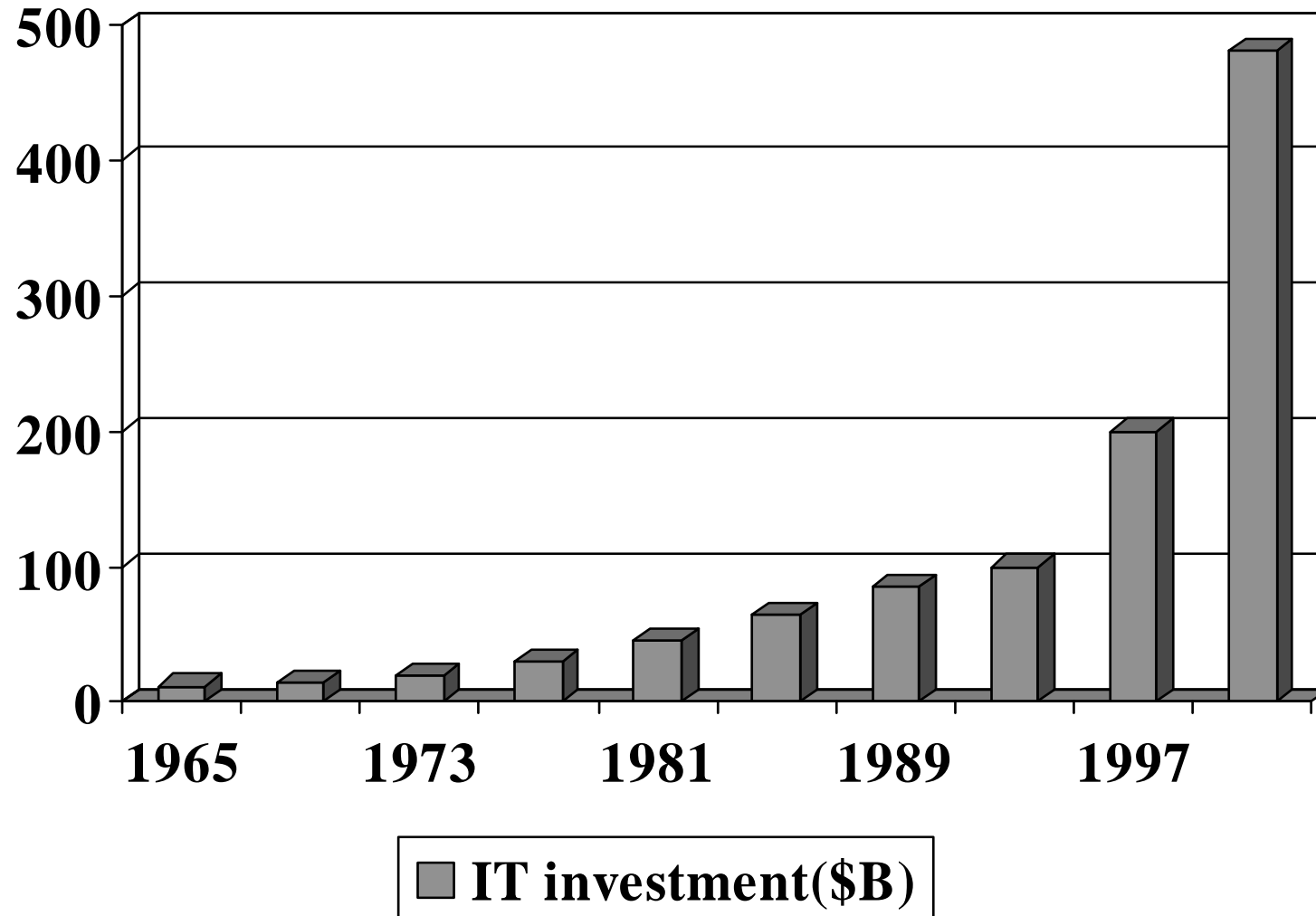
- Supplier uses hand held terminal to build delivery invoice as product is being delivered.
 - » Truck driver uses a hand held device to prepare an invoice
 - » Transmits to receiver who verifies delivery.
 - » Used for direct store delivery since it provides flexibility.

◆ NEX (Network EXchange)

- Automated invoices transmitted electronically from supplier headquarters and available to receiver when delivery shows up.
 - » Truck driver does not create the invoice

◆ Which is faster or reliable?

IT Push



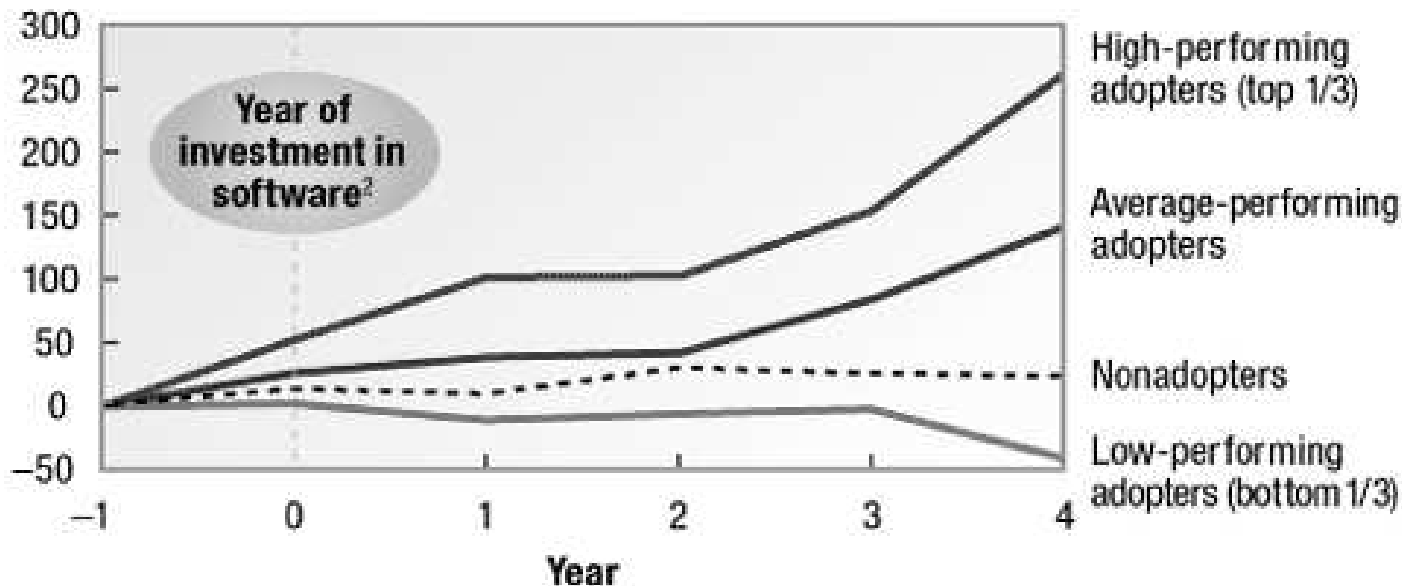
Supply Chain Software Push

See Top 100 under /articles.html

EXHIBIT

Supply chain software is not a silver bullet

Change in inventory turns,¹ percent



¹For 62 high-tech companies in Fortune 1000 (exhibit excludes 1 outlier) over the period 1995–2001; 22 invested in supply-chain-management (SCM) software at various times during period; inventory-turns analysis begins in 1995 for nonadopters.

²For those who adopted SCM software.

Source Kanakamedala, Ramsdell, Srivatsan (2003). McKinsey Quarterly, No 1.

Hegel's Framework applied to IT

- ◆ Thesis: Data needed
- ◆ Antithesis: Transactional IT
 - Acquire, Process, Disseminate raw data
 - Overburdened with data
- ◆ Synthesis: Analytical IT
 - Decision making capability
 - Modeling systems and supporting databases
- ◆ Avoid: Fancy interfaces with inferior analytic modeling

Transactional vs. Analytical IT

	Transactional	Analytical
Time Frame	Past-Present	Future
Purpose	Observing-Storing	Decision making
Scope	Myopic	Hierarchical
Databases	Row	Refined-Judgmental
Responsiveness	Real time	Real time and batch

Transactional IT Investment

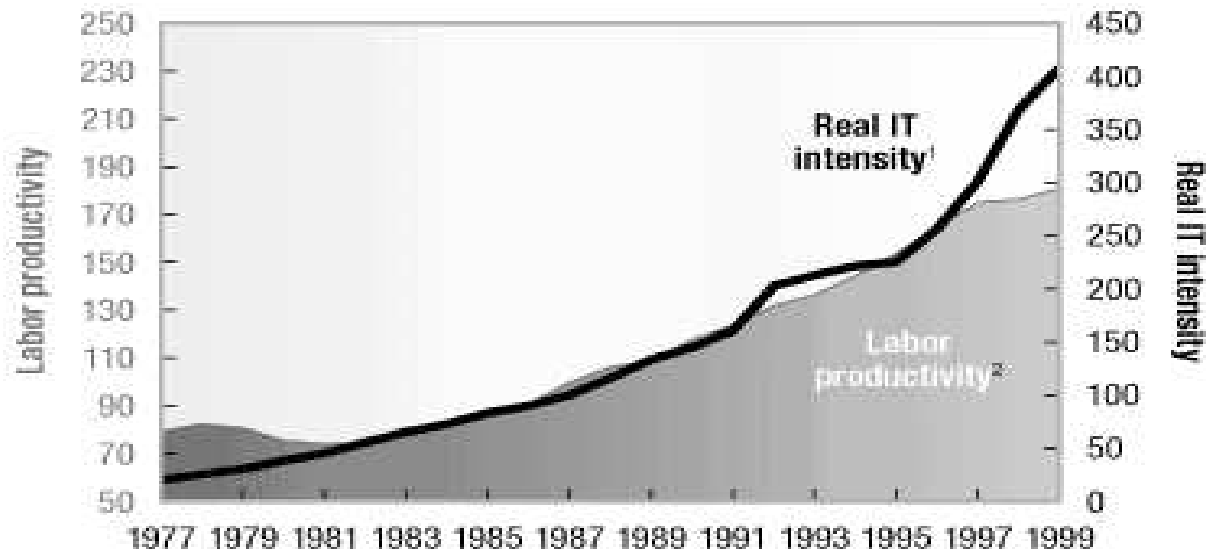
◆ No correlation between transactional IT investment and company success

- » “The same dollar spent on the same [transactional IT] system may give a competitive advantage to one company but only expensive paperweights to another.” – Erik Brynjolfsson of MIT
- » “Elevating computerization to the level of a magic bullet may diminish what matters the most in any enterprise: educated, committed, and imaginative individuals ...” – Paul Strassmann author of *The Squandered Computer* (Economic Press 1997).
- » The [banking] industry’s information technology investments accelerated substantially, but its labor productivity growth rates, though higher than the economy-wide average, actually declined (*The McKinsey Quarterly* 2002)

EXHIBIT 1

Paradoxical productivity

Index: 1987 = 100



Compound annual growth rate, percent

	1977-82	1982-87	1987-95	1995-99
Labor productivity	-1.1	6.1	5.5	4.1
Real IT intensity	21.5	12.6	11.4	16.8

¹Measured as real IT capital stock ÷ PEP (people employed in production); analysis based on US Bureau of Economic Analysis sector data for depository institutions.

²Measured as real output (transactions + loans + fiduciary activities) ÷ hours worked.

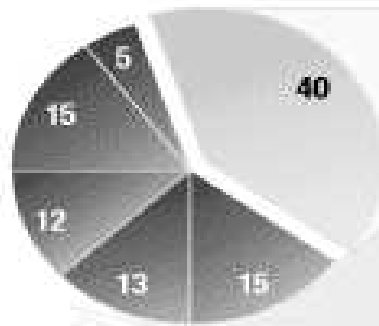
Source: US Bureau of Economic Analysis; McKinsey analysis

Where did the Bank's IT Investments Go?

EXHIBIT 2

Retail banks: Investing in the customer

CIO¹ allocation of investment by business strategy, percent



Business strategy

Major IT initiatives,³ percent

40%	Customer-information-management and marketing tools ²	Call management, customer support, marketing analytics, and sales automation	15
15	Mergers	Customer database and systems integration	40
13	Multichannel approach	On-line banking	13
12	Product proliferation	Other new functionality, such as check imaging	27
15	Other applications		
5	Disaster avoidance	Y2K investment ⁴	5

Total = 100

¹Chief information officer.

²Includes investments in additional mainframe processing power required by increases in transaction volume.

³Estimates include all direct and indirect capitalized IT investments in hardware, software, and communications equipment.

⁴Represents only half of total Y2K costs; remaining half was expense.

Source: International Data Corporation; *InformationWeek 500*, 7:996-99; TowerGroup; interviews; McKinsey analysis.

IT Investment Strategy in Retail Banking

- ◆ ~~Problem: Customer information flow among divisions not smooth~~
- ◆ Solution: Integrated database and single customer interface
- ◆ Improvement: CRM to retain customers and product bundling
 - Cross-selling: Selling home insurance to a mortgage seeker
 - Product proliferation: :
 - » "In ... 1995, there were a couple of credit cards [at my bank], one at 17 percent interest and the other at 19 percent interest. When I left [in 1999] there were 43,000 pricing combinations." A US bank executive.
 - » 43,000 choices are too many. Customers care more about reliability, service and trust than this many choices.
 - » "A mini-mall in your ATM" see Time magazine 03/31/2002 issue.
- ◆ Bank mergers: Larger complex databases to merge.
- ◆ Over investment into IT.
 - » "Our bank has enough computing/storage capacity to handle entire Europe." An IT professional at a Turkish Bank.
- ◆ Potential future success: On-line banking, electronic transactions.
 - My bank deposits \$10 to a customer account if that customer sets up an electronic account.

Time for High-Tech Shakeout

Source T.M.Nevens McKinsey Quarterly, No 2, 2003

◆ ~~Extra IT demand during 90's \$1 Trillion~~

- » Popularity and transition to ERP, e-CRM, Millennium bug, Internet related computer/software updates, Demand for telecommunication gadgets: cell phones, digital assistants

– Number of IT companies increased by 15% but demand buy 12%

◆ Obstacles to restructuring of the IT industry

- » IT companies favor IT-people as board members. Board-members share a common interest with CEOs: Delay restructuring as much as possible.
- » Investment bankers do not advocate mergers not to destroy relationships with IT company executives.

◆ Mergers

– In history, most IT mergers were unsuccessful. But now

- » A big portion of revenues come from licensing so more predictable
- » Savings in sales force (25-30% of revenue)
- » Savings in R&D(10-15% of revenue)
- » Clients favor a single IT company to deal with
- » IT companies are trading below their cash reserves! Savoring investment bankers' appetite.

◆ Who remembers junk bond king Michael Milken, of Drexel Burnham Lambert defaulted in 90s

◆ Prediction

– Mergers are likely to be initiated by aggressive buyers

» Case in mind: Mesa Oil company (of Dallas) and T. Boone Pickens' adventures in Energy

Explore with Analytical IT and Exploit with Transactional IT

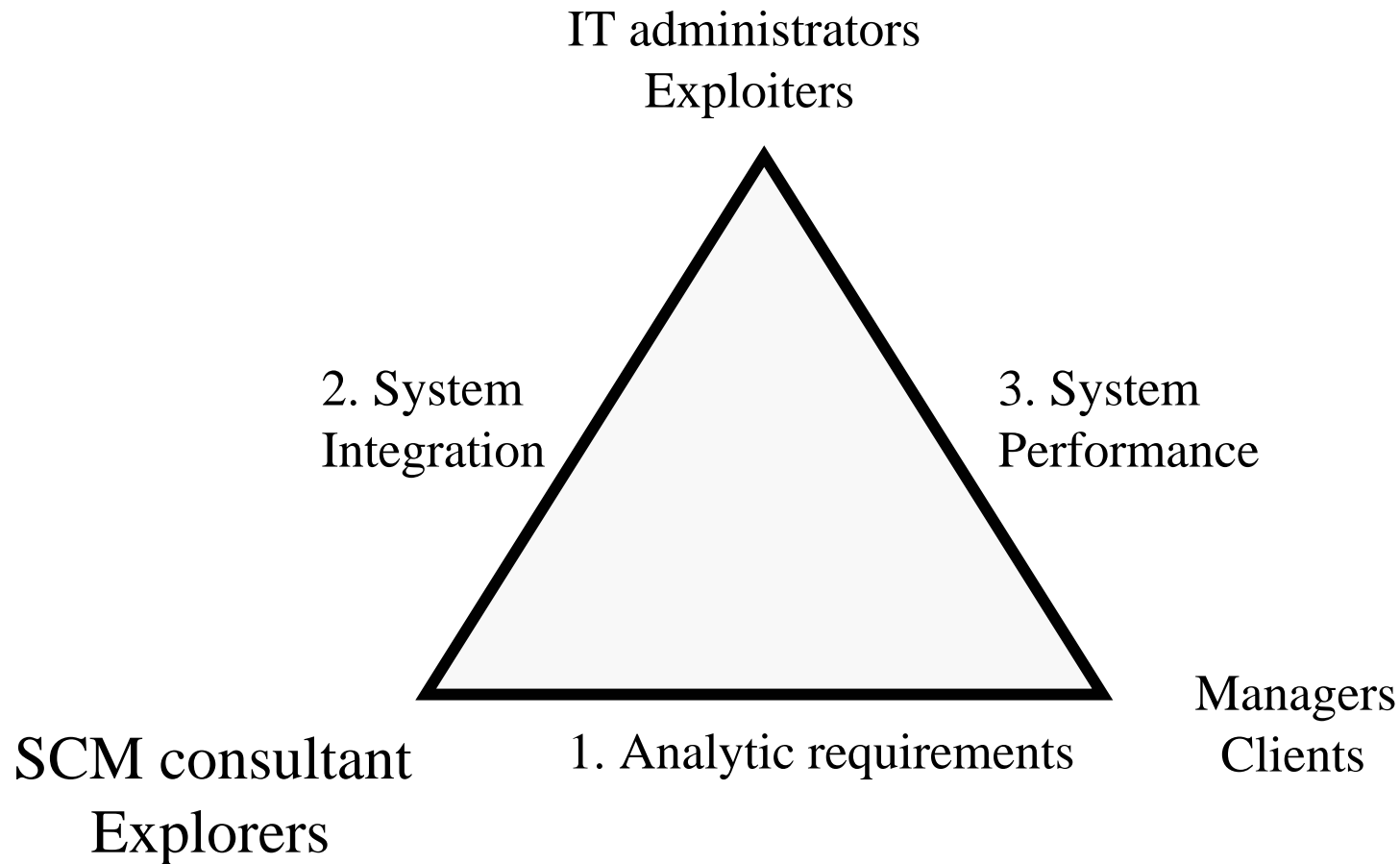
- ◆ Exploration: Search, discover, experiment, take risk
- ◆ Exploit: Refine, reproduce, aggregate

- ◆ Over-emphasizing exploitation is common
- ◆ Over-emphasizing exploration: Xerox

- ◆ Future Trends and Issues
 - Best of breed versus single integrator
 - The role of application service providers
 - » Software leasing is preferable for start ups
 - The role of the Internet and B2B exchanges

SCM Consultants

Get along well with IT administrators



Success with E-Business

◆ Furniture:

- living.com purchased Shaw Furniture Gallery in March 99.
- \$70 M investment, featured at Amazon.com.
- Bankruptcy on Aug 29, 2000

◆ On-line grocery

- Shoplink.com and Streamline.com retired from life after a short life.
- Peapod.com declared a loss of \$29 M in 99. Bought by Royal Ahold whose market price has recently suffered from Enron type accounting (Dutch accounting regulations are not as strict as USA's.)

◆ Amazon.com lost \$720M in 99.

E-Business Applications

◆ Internal Information Flow

- » Morgan Stanley saves about \$500K for each info publishing
- » OPRE 6366 web page

◆ B2B interaction

- » The “largest net dealer” (80% of \$18.8B sales) Cisco.com saves \$250M per year by taking orders online
- » Cisco trains and certifies customers
- » GEPlastics.com facilitates customer innovation and promotes sales

◆ Effective use of resources

- » Amazon.com aggregates its inventory
- » Amazon.com creates customer profiles, effective marketing

Business Transactions

◆ Search

- Fast, attribute based keyword search
- Lower customer loyalty

◆ Pricing

- Anderson Consulting's BargainFinder for CD's
- Amazon's price comparison engine Jungle
- English Auction: Max price for a given item
- Dutch Auction: Min cost subject to specifications
 - » Multi-dimensional auctions: Bid for Price, Quality together
 - » A simple method to evaluate bids?
 - » Termination conditions: when a preset price reached, after a certain deadline, after 100th bid.
- Marketplaces

Business Transactions

◆ Shipments

- Fedex.com locates your package
- Globberanger.com uses wireless technology to locate products in the SC
- Ship thru internet: e-books, music, films, newspapers

◆ Payment and Settlement

- Security (course by Wei Yue), encoding
 - » Access keys (codes)
- Electronic money cybercash.com

◆ Buyer-seller authentication

- Trusted authorities to authenticate
- Encrypted codes; e-signature is legal since 2000

Business Transactions

◆ Standardization

- Only low touch – low feel products are suitable now such as books

◆ Legality

- What is an e-commerce contract?
- When becomes binding? Information transfer time
- Taxing of transaction
- Whose jurisdiction: Nazi memorabilia on yahoo.com against French laws.
Bluenotes of Manhattan and Missouri.

◆ Visible reputation

- Power back to the masses, vendors watch out.
 - » “If 1000 prospective buyers of Toyota Camrys knew of one another’s existence, they’d have enormous potential clout.” Forbes Magazine April 99
 - » An end to information asymmetry favoring vendors.

E-powered strategies

- ◆ Compete with scale
 - Amazon.com
- ◆ Compete with coordination
 - Linux operating systems
 - Movie-house type companies
- ◆ Compete with branding
 - Customer segmentation to catch fragmented attention
 - Customer loyalty, less but still exists
 - » People tend to visit same web sites over and over. Ease of navigation, getting used to are still factors but definitely to a smaller extent.
 - Small companies gain global presence

E-powered strategies

- ◆ Thesis: Push - Antithesis: Pull – Synthesis: Push-Pull
 - Push is applied to the portion of the SC where forecasts are certain
 - » Dell computers: Push component inventory, demand pulls assembly
 - » Amazon.com: Push high demand items to regional warehouse; demand pulls from regional warehouses
 - » Peapod.com with pure pull service was about 90%. With several warehouses, service is more than 98%.
 - » Wal-Mart launched Wal-Mart.com in 99. An existing SC helps the transition to a push-pull SC.
 - » Challenge: How to handle returns? Supply chain or Supply cycle?

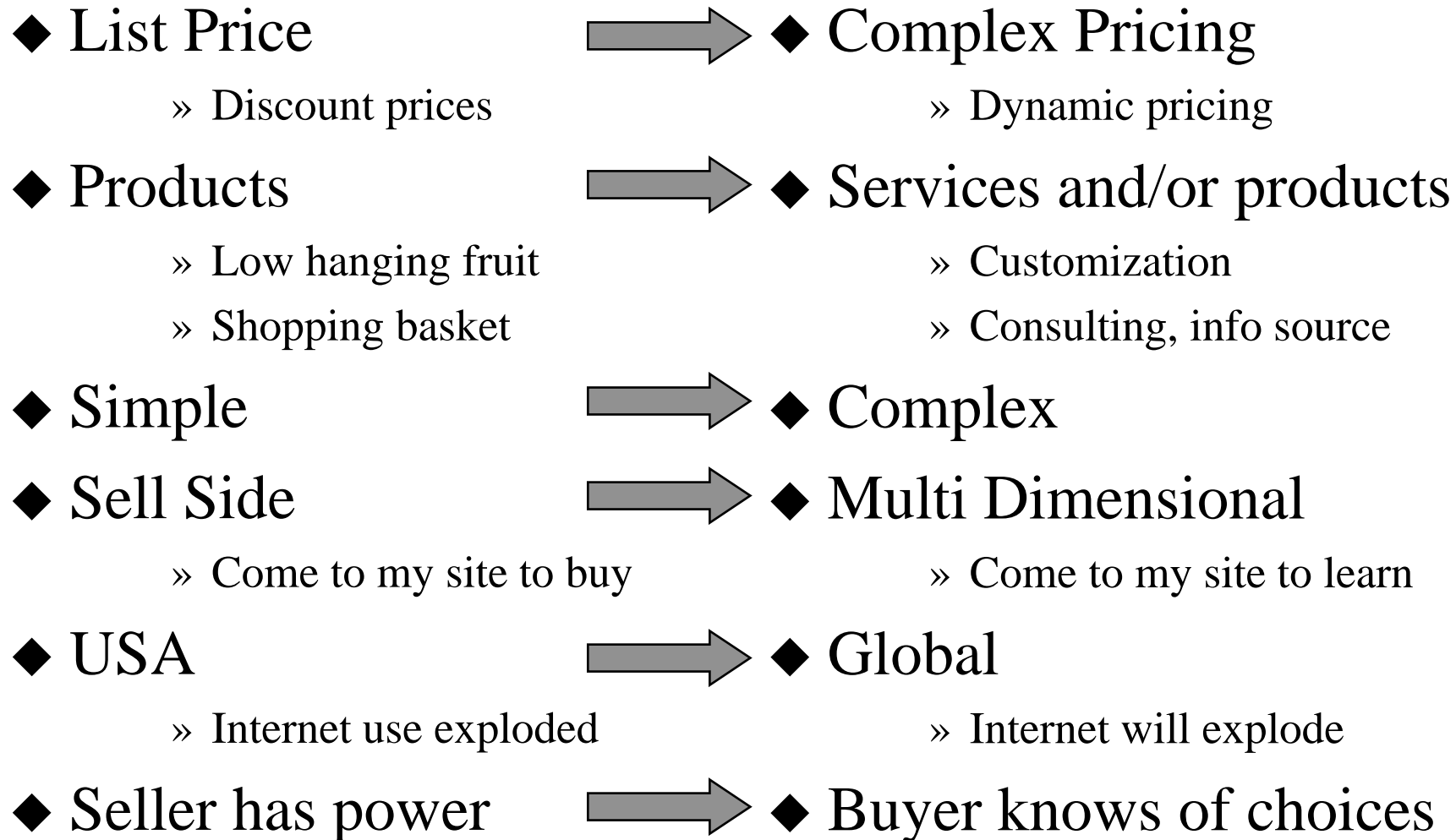
E-business Challenges

- ◆ Integrate Internet to existing SC = Clicks and Mortar as opposed to Bricks and Mortar.
 - W.W. Grainger vs. Gap
- ◆ Delivery costs?
 - %98 of customers want free delivery when buying on-line
 - Somebody must pay for delivery. Who? Venture capitalists are not willing to volunteer anymore.
- ◆ Shipment consolidation
- ◆ Returns?
 - Gap customers return merchandise to stores
- ◆ Keep customers Informed
 - Fedex
- ◆ In the final analysis, does e-commerce alter commerce profoundly?

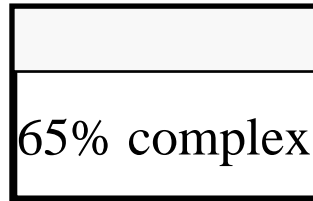
Calico (= California Company)

- ◆ In early 2000,
 - Calico Commerce B2B e-commerce package
 - » For sales of complex products
 - » Powers exchanges for trading communities
 - » Offers customer convenience, value and choice
 - » Strives for mass customization, dynamic pricing and customer loyalty
 - » In short, a CRM package
 - 101 corporate customers in 7 key industries
 - 320 employees headquartered in San Jose, Ca
 - Became public in late 1999.
- ◆ Alan Naumann, CEO of Calico talks on
 - Trends in e-commerce in the context of supplier and buyer relationships

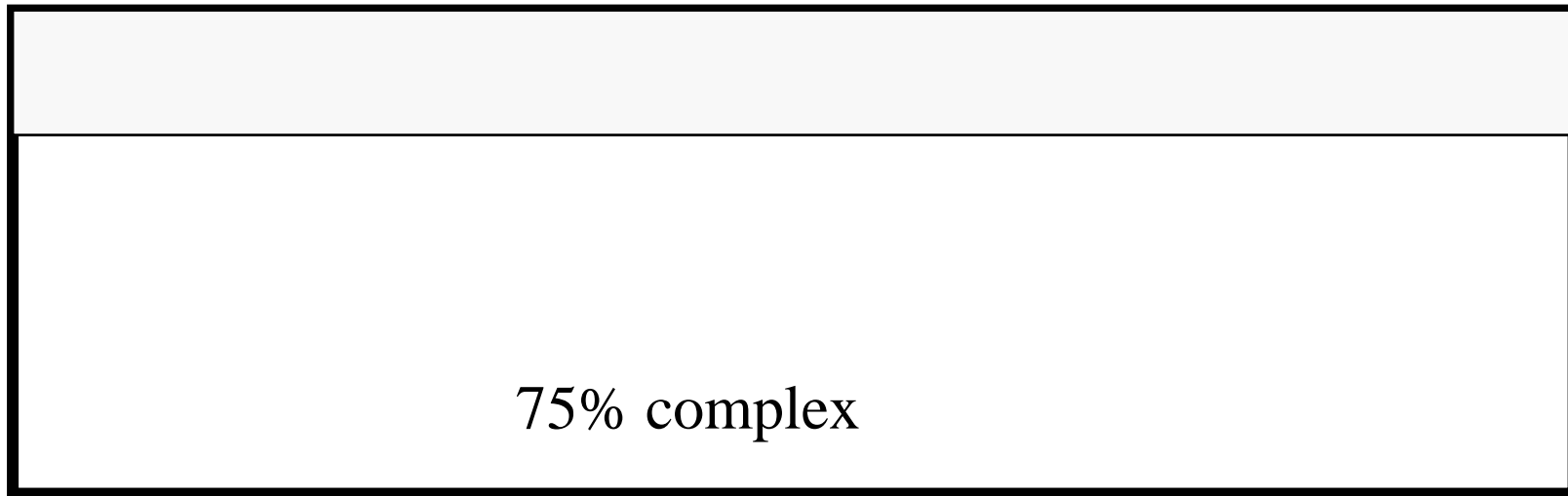
Evolution of Commerce with Internet



Complexity Dominates E-commerce

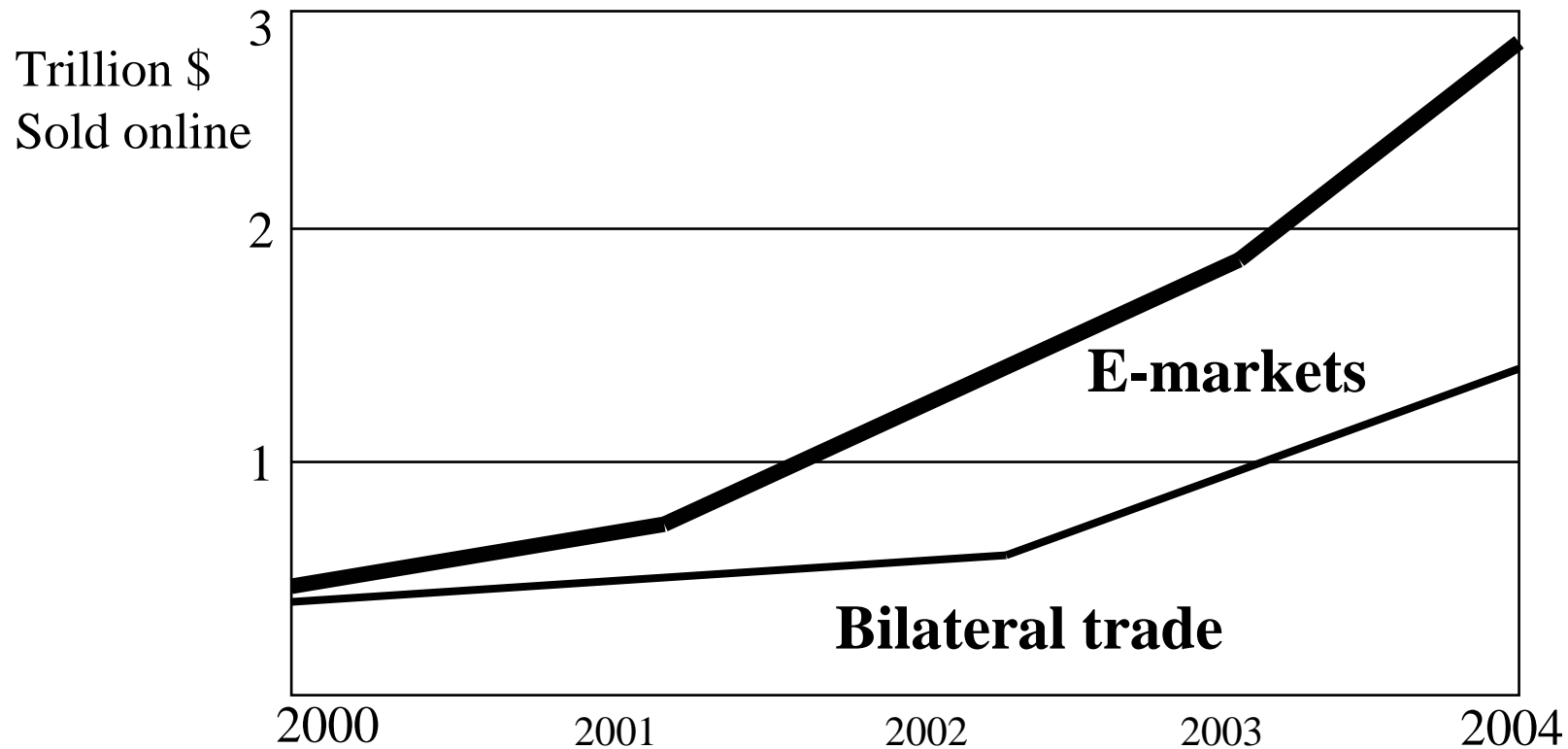


B2C revenue growth to \$110B (estimate)



B2B revenue growth to \$1,800B (estimate)

Bilateral Trade vs. e-markets



B2B Commerce Evolution

Sell side

Simple Web page only

Supply Networks

Suppliers together make up
a supply market place

Contemporary version of Hay Market

Trading Exchanges: Marketplaces

Procurement

To simplify buying, e.g. Ariba

Virtual Purchase Networks (VPN)

Buyers together make up
a demand market place

GM-Ford-Daimler Chrysler plans to buy
from auto parts suppliers

Buyer – Seller Relationship

◆ Buyers want

- Personnel content
- Advice
- Customized solution
- Multi-vendor shopping
- Easy procurement
- Electronic relationships

◆ Sellers want

- Tune down marketing to 1 person
- Solve customer's problem
- Differentiate not to compete to avoid price competition
- Sell more than customer wants, cross-sell, product bundling
- Efficient contract implementation/sales

Future outlook in 2000: Naumann is optimistic about e-commerce, especially emphasizes experimentation with e-commerce capabilities.

In retrospect from 2002

- ◆ Market went down
- ◆ Economy slowed down
- ◆ Many e-commerce companies could not get beyond web pages
- ◆ Venture capital run out
- ◆ Even 6 month project span became too long

- ◆ Calico filed Chapter 11 of the US Bankruptcy Code on Dec 14, 2001. It was sold to Peoplesoft for \$5M. Naumann became the CEO of CoWare in February 2002.

- ◆ **Calico died but ideas survive.**
- ◆ **Implementation is the challenge!**