Software Sourcing Strategies

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Aldo Ventures – Twenty Years in Silicon Valley

- Independent consultants to software publishers & software services firms
  - Market analysis, product positioning, business development, finance, technology strategy
- Advisors to software startups and investors
- Directors of a six-year, Sloan Foundation study of the global software industry at Stanford's Graduate School of Business

SCIP's Software Study 1993-1999

- Analysis of the Japanese software industry
- Improving US government data collection
- Software project management study
- Globalization of the software industry
  - The search for talent to meet rising global demand
- Skills & education of software professionals
- Comparison of national software industries and software entrepreneurism
  - US, Japan, India, Israel, Ireland, Taiwan and Korea
- Implications of early-stage, "R&D" acquisitions

Topics for This Afternoon

- What is Software?
- Sourcing Alternatives
- Software Talent
- Recruiting
- R&D Acquisitions

What Is Software?

Software Quiz

1a. Suppose one day you came to work and every computer was gone.

Assuming you have backups of all files, how long would it take, in weeks, to get back in business?

Possible steps...
- Critical systems identification
- Hardware procurement & installation
- Systems and data restoration from backup
- Systems testing and troubleshooting

Software Quiz, Continued

1b. Now, suppose you come to work one day
  – all your hardware and data files are OK
  – but all your software is gone.

  No source code, no backups, no vault...

How long would it be until everything
was back to normal?

A "Software First" World

- Prof. Edward Feigenbaum, while Chief Scientist for the US Air Force, pointed out that, historically, hardware & "platform" considerations dominated IT decisions.
- Nowadays, everyone has the same computers and networks – it is the software that creates competitive advantage & business value.
- Every new idea of how to use computing for social or financial gain requires new software.

Software Teams Produce Wealth in Many Ways

Total Software Capacity
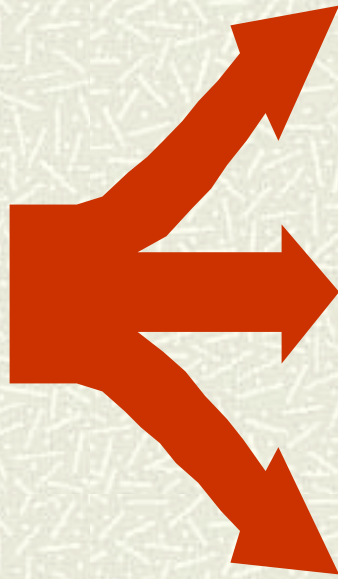
Software products and "titles" publishing

Services to business & government

Operations & strategy in traditional firms

New, software-enabled businesses

SW embedded in products of all sorts

Software technology licensing

Services to software publishers

IT-Empowered Business Vision

- Whichever business strategy you choose ...
  - Price via efficiency (supply chain management)
  - Price via economies of scale (global markets)
  - Product quality
  - Time to market
  - Product variety and customization
  - Database marketing
  - Service quality
  - Sales force automation
  - Customer loyalty, customer relationship management
  - Knowledge management
  - E-commerce is an extreme example

Legacy Attitudes —
Not Just Legacy Systems

- Information Technology was not originally introduced as a strategic weapon.
  - Clerical: Efficiency, labor reduction, management reports
  - Manufacturing: speed, capacity, labor, quality
  - Office work: communication, global coordination, BPR
- Organizational, technical and psychological artifacts remain as barriers to re-deploying IT assets to take a strategic role in the business.
- The most important misconceptions involve software.

Sourcing Alternatives

Software Quiz

2. What's the best way to obtain the software your company needs?

- Buy an off-the-shelf product and modify it
- Hire an in-house development team and build it
- Outsource development to a software services firm
- Form a joint venture with software company
- Use in-house project management with a team of specialists hired as contractors
- Find a team in India who can do the job
- Buy a software company

Software: The Work Involved

Conceive	Business opportunity requiring automation Opportunity to apply a new technology Respond to competitors' moves
Specify	Architecture and interoperation Design for: ■ OTS technology & products, existing systems ■ Software development and maintenance (change) ■ Users' whims, market trends
Build or Buy the Software	Available products and publishers Available talent and services providers
Deploy	Acquire and maintain platform(s) Integrate with existing systems & databases BPR, user training & support, change management Maintain software for life of system

Software Sourcing Alternatives

	1980	Additional in 2000
Conceive	IS Consultants	OTS products like ERP Corporate technologists
Specify	IS Consultants	End users Business managers Market pressures
Build or Buy the Software	IS Systems integrators	Boutique shops, contractors Publishers' services groups Offshore services vendors Joint venture Functional outsourcing R&D Acquisition
Deploy	IS	ASP

Software Talent

Software Quiz

3. On a professional sports team, who has a higher salary, the coach or the players? Why?

What Is Software Talent?
A Multitude of Skills

- Analysis — needs, vision, and requirements
- Architecture — form and function
- Design — usability, construction, maintenance
- Development —craftsmanship, concentration
- Debugging & maintenance — skill, temperament
- Testing — still undervalued
- Documentation, training and support
- Project management — key to success

Worldwide Demand for Software is Exploding

- All markets for software are growing at least 10-15% annually, some much faster.
- Dramatic expansion of demand and emergence of entirely new platforms (of the magnitude of the PC and Internet) are likely again, soon.
- There is already a global shortage of software, and of software talent.

What Generates the Need for More and Better Software

- The number and variety of software ideas
  - When software is used to compete, in business or in war, it has to work, it has to be better than theirs, and it has to be ready in time.
- Quality
  - "Minimally acceptable" quality is really difficult
  - Systems and device failures — litigation
- Complexity
  - Functionality, integration, tools, amount of code, platform complexity, distributed systems, old code
  - This is rocket science!

Demand for Talented Software People Has Outstripped Supply

- Good software people are born that way – software involves talent as well as skill.
- The shortage is not local to Silicon Valley or the US.
- The shortage is not specific to "hot" technologies
- The shortage is not limited to high-tech, and will not abate with economic cycles.
- No forthcoming technology will suddenly make software easy to create.

Professional Jobs in US
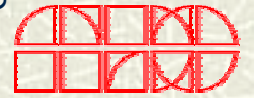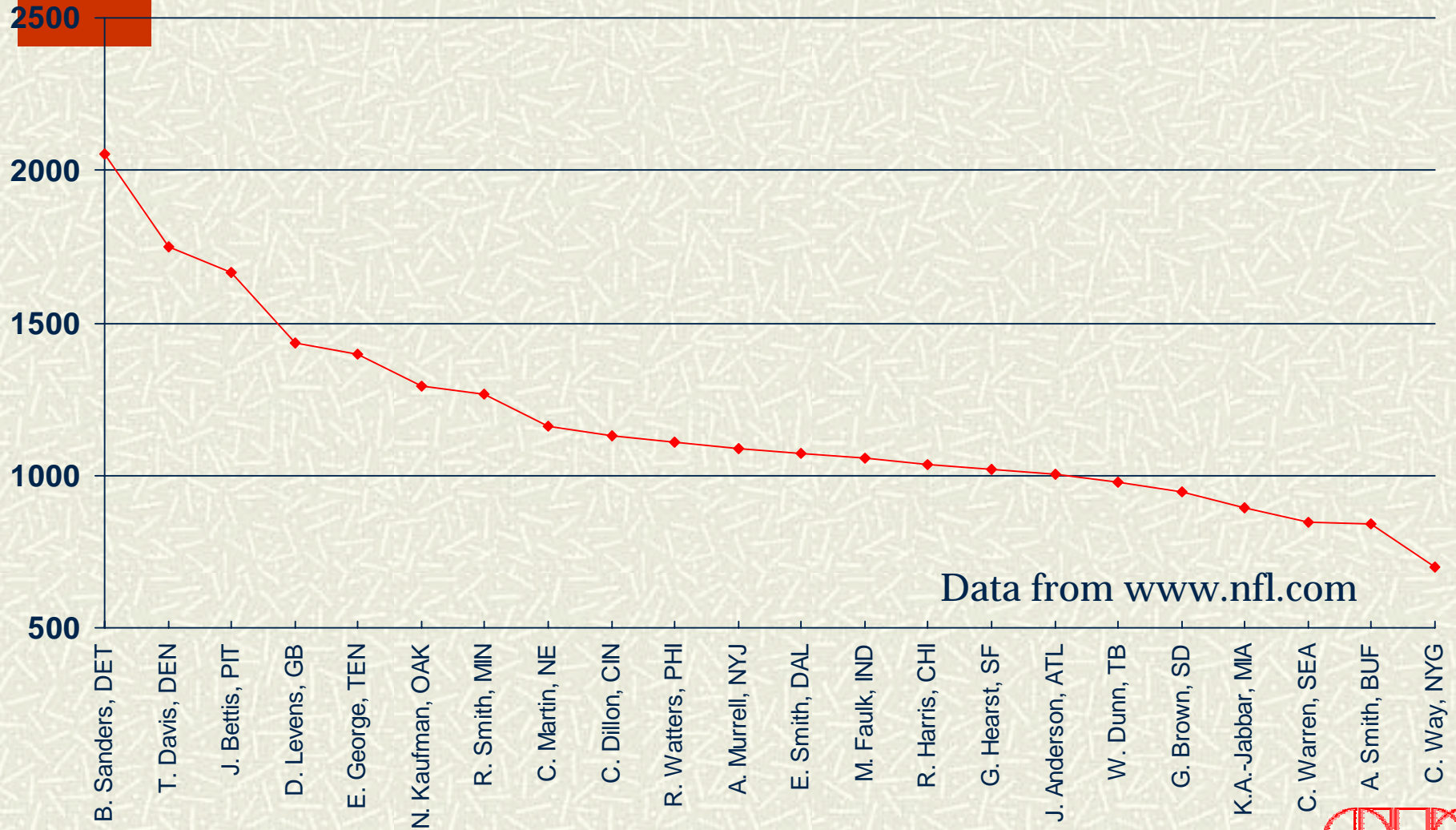
- Rocket scientists   14,920
- Air traffic controllers   28,470
- Physicians and surgeons   463,870
- Programmers, systems analysts
  and computer scientists   1,114,440
  - (This represents about half of the SW professionals)

- The supply of adequately talented people interested in software development careers had to run out, eventually.
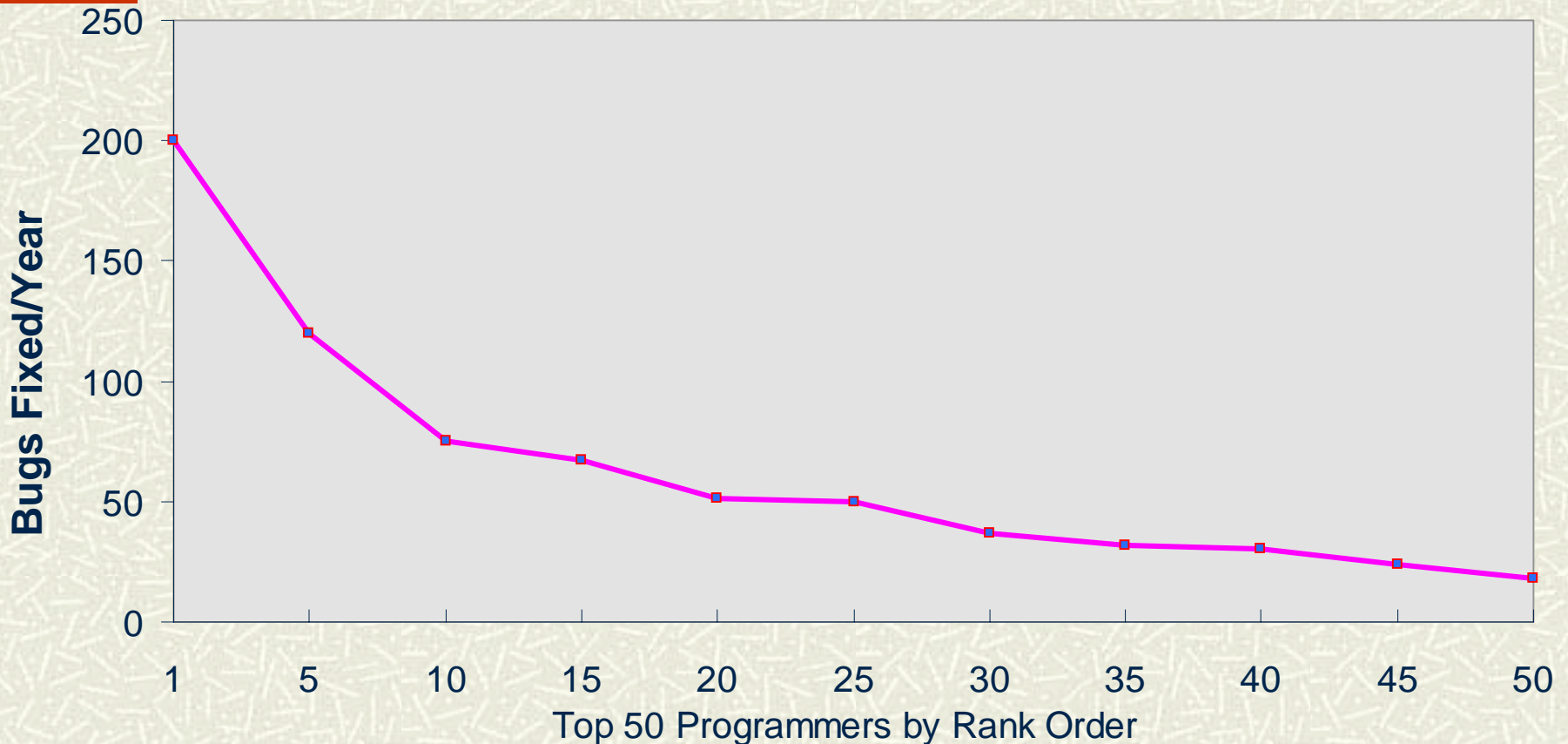
BLS Data, 1997

1997 NFL Regular Season Rushing Statistics

Data from www.nfl.com

Y-axis: 500, 1000, 1500, 2000, 2500

X-axis labels: B. Sanders, DET; T. Davis, DEN; J. Bettis, PIT; D. Levens, GB; E. George, TEN; N. Kaufman, OAK; R. Smith, MIN; C. Martin, NE; C. Dillon, CIN; R. Watters, PHI; A. Murrell, NYJ; E. Smith, DAL; M. Faulk, IND; R. Harris, CHI; G. Hearst, SF; J. Anderson, ATL; W. Dunn, TB; G. Brown, SD; K.A.-Jabbar, MIA; C. Warren, SEA; A. Smith, BUF; C. Way, NYG

Software Talent —
The Best are Significantly Better

"Not All Programmers Are Created Equal," G. Edward Bryan, IEEE, 1994

"A" Software People

- For many software projects, including especially strategic projects, if you don't have enough "A" people, it doesn't matter how many "B" people you have:
  - Newest technologies
  - Complexity of system and environment
  - Time to market
  - User intolerance: bugs, user interface, …

The Software Workforce: Who's Getting the Top Talent?

**Tier 1 — Hot software companies**

    Software start-ups & boutique services firms

    Software publishers

    Wall Street

    R & D (corporate & university)

Tier 2 — Software-aware companies

    VARs, consulting firms, systems integrators

    Software intensive industries (computers, communications, financial services)

    Aerospace systems firms

Tier 3 — Everyone else

    Other industries with incidental software

    DoD, federal, state & local government
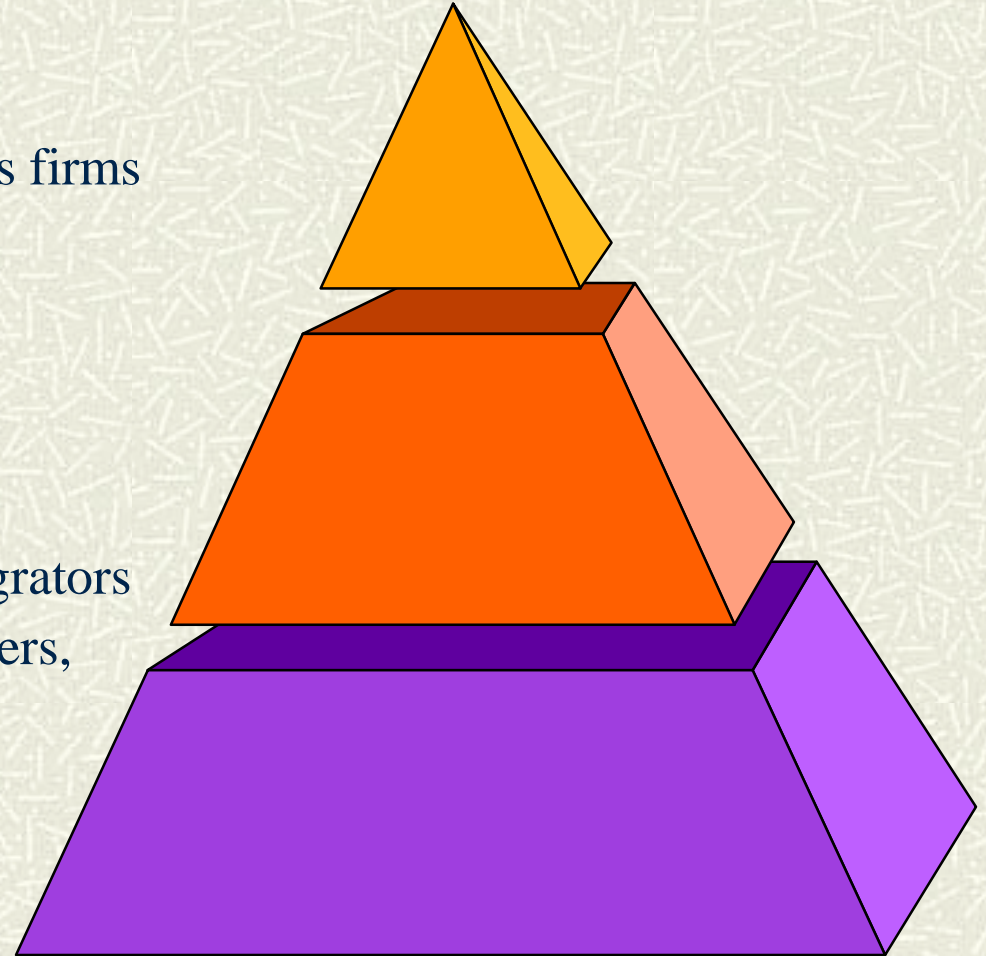
Recruiting

Software Quiz

4. What do "A" candidates look for in a software shop?
   - Hint: What should "B" candidates look for?

Recruiting

- Recruit as if the firm's future depends on it
- Recruit senior SW people — others will follow
- The best young talent is no longer applying
  - Recruit the kind of talent Microsoft is hiring
  - Infiltrate local schools
- It's not just money
  - Challenging projects, new technology, and inspiring bosses and co-workers are top-cited job attributes
  - Recognition, prestige, and a piece of the action
- Re-engineer the recruiting and hiring process

What Are You Doing to Attract and Keep Top IT Talent?

- Competitive compensation   84%
- Access to advanced technologies   69%
- Generous training opportunities   50%
- Expanded responsibilities   47%
- Career path into non-IT positions 19%

John Davis & Associates, 1997
Survey of 300 top-level IT executives

Importance of Job Attributes, Top 10 in Rank Order

- Quality of boss
- Technology direction of IS department
- Ability to use new technologies
- Job security
- Faith in financial stability of company
- More challenging assignments
- Geographic location
- Decision-making responsibility and authority
- Quality of IS peers
- Access to resources & funding needed to satisfy goals

Computerworld survey of 200 IS employees, 1997

A "Winner" Software Shop — What Does a Candidate See?

- Morale: Who's leaving for better jobs
- The CIO and CTO report directly to the CEO and at least one of them sits on the Board
- Technical interviewers were impressive
- Interviewed by a top executive who knew how important the project was
- Toys: New PCs, cool development tools, …
- Job offer ready at the end of the interview day

R&D Acquisitions

The Way That Corporations Get Their Software is Changing

- Hiring and retaining talented software teams has gradually become quite difficult.
- An increasing percentage of new systems are supplied by software services firms.
  - Packaged software, e.g. ERP, is a fraction of demand.
  - A tiny but increasing contribution sourced overseas.
  - Time to market is critical for strategic applications.
- For high-tech firms, a new strategy has emerged: acquisition of software startups.

Outsourcing R&D – Drivers in the Acquiring Firm

- Everything can be outsourced
  - Prof. Mendelson's example – the HP Pavilion
- Innovation costs $$$ – Wall Street likes "lean"
- Innovation is hard to manage
  - Speed, rapid market entry, short product lifecycles
  - Hard to build & maintain internal R&D org.
  - Rapid technology change requires parallel R&D projects, close contact with market (co-invention)
- Innovation outsourcing is not uncommon:
  - E.g., Biotech, Semiconductor, Hollywood, Networking Equipment, Computer Games, Internet

Why Startups Are Important in High Tech

- Innovation, risk (diversified approach)
- Speed, responding to rapid change
- Flexibility: technology, platforms, partners
- Cooperation with competitors
- Co-invention with customers
- Giving innovators a bigger piece of the pie

Reasons for an Entrepreneur to Prefer Acquisition Over IPO

- Earlier liquidity, risk reduction, "bailing"
- Acquiring firm has complementary assets
  - Additional technology, established channel, economies of scale, global reach, brand,
- Barriers to market entry for small firms
  - Must capture market share quickly
  - Sometimes successfully entering a market is prohibitively expensive

R&D Outsourcing – External Drivers

- A burst of invention required by the Internet
- Readily available venture capital
- Surges in stock prices of particular market segments
- Limited supply of top technical talent, relative to number of ideas and to the size of investment funds

Case Study: The New York Times Acquires Abuzz

- The NY Times is a media company, trying to position itself as a major portal
  - Speed was critical – other portals developing fast
- Abuzz had 3 patents and 12 beta sites
  - Email-based system for asking questions within a community
  - Connecting people with questions to people with answers
  - Positioned as enterprise knowledge management software
  - $5M in venture financing in 1997
- On acquisition, Abuzz's enterprise software strategy was abandoned
  - The technology will be applied solely to the Times' community-building effort