McKinsey & Company, Inc.

Secrets of Software Success -

Management Insights from 100 Companies Around the World in One of the Most Dynamic Industries

ITAA Webcast

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February 8, 2000

ITAA WEBCAST, FEBRUARY 8, 2000

Introduction to Secrets of Software Success

Industry structure and history

Illustration of selected best practices

Future trends

Discussion

ITAA WEBCAST, FEBRUARY 8, 2000

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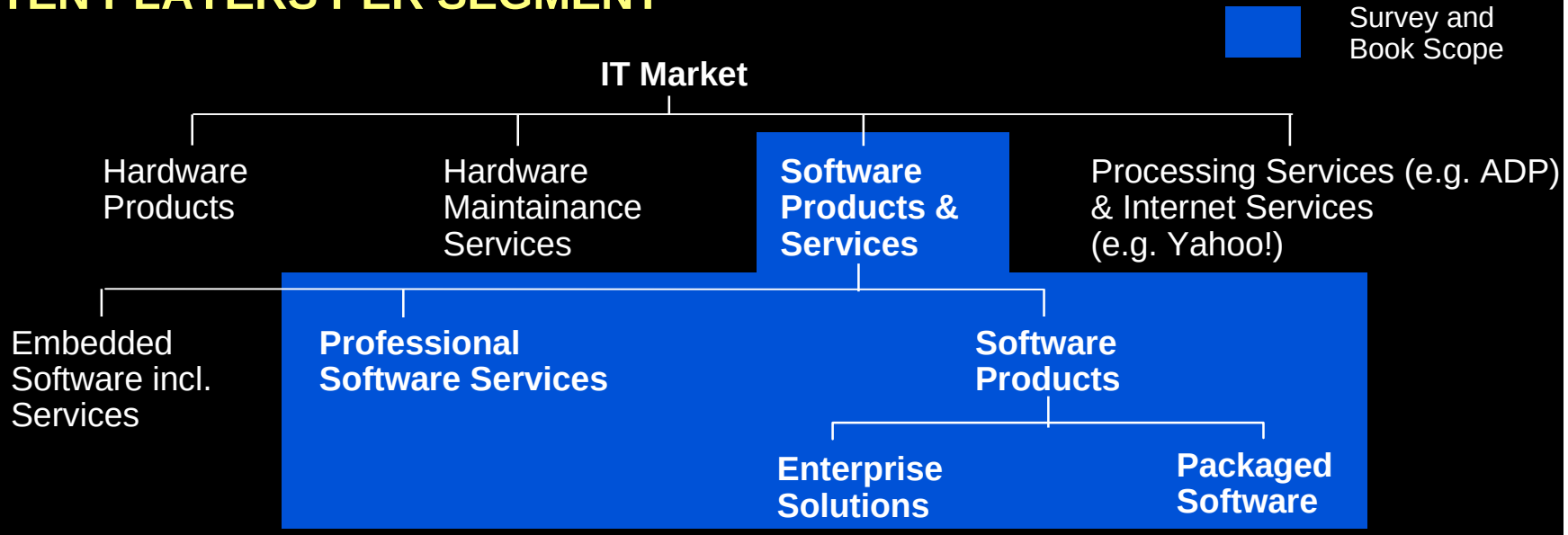
- Industry structure and history
- Illustration of selected best practices
- Future trends
- Discussion

TOP TEN PLAYERS PER SEGMENT



Top ten players in each segment

(1997 estimated revenues in specific segments)

	Revenues[1]	$ m	Revenues[2]	$ m	Revenues[2]	$ m
1.	Andersen Consulting	5,300	IBM	10,270	Microsoft	11,600
2.	IBM	4,920	Oracle	4,260	IBM	2,560
3.	EDS	3,750	Computer Associates	3,240	Computer Associates	1,080
4.	CSC	3,510	SAP	2,360	Adobe	760
5.	Science Applications	1,910	HP	2,190	Novell	710
6.	Cap Gemini	1,620	Fujitsu	1,810	Symantec	550
7.	HP	1,520	Hitachi	1,270	Intuit	520
8.	DEC	1,410	Parametric Technology	760	Autodesk	420
9.	Fujitsu	1,370	Peoplesoft	700	Apple	380
10.	BSO Origin	1,320	Siemens	680	The Learning Company	350
		26,630		27,540		18,930

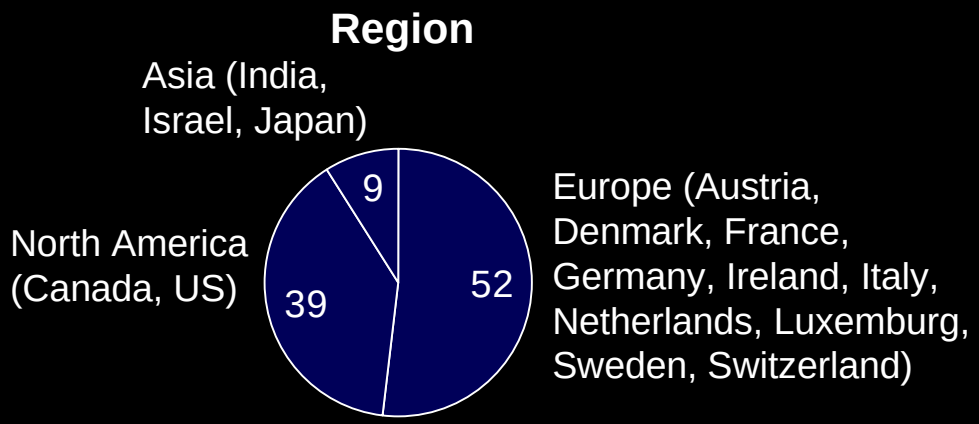
[1] Worldwide professional software services revenues

[2] Worldwide software licenses and maintenance/support revenues

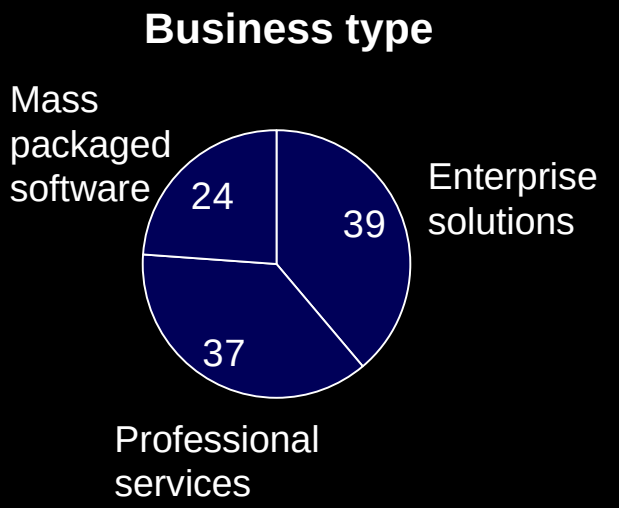
Source: IDC, McKinsey database, McKinsey analysis

DISTRIBUTION OF PARTICIPATING COMPANIES

Region



Business type



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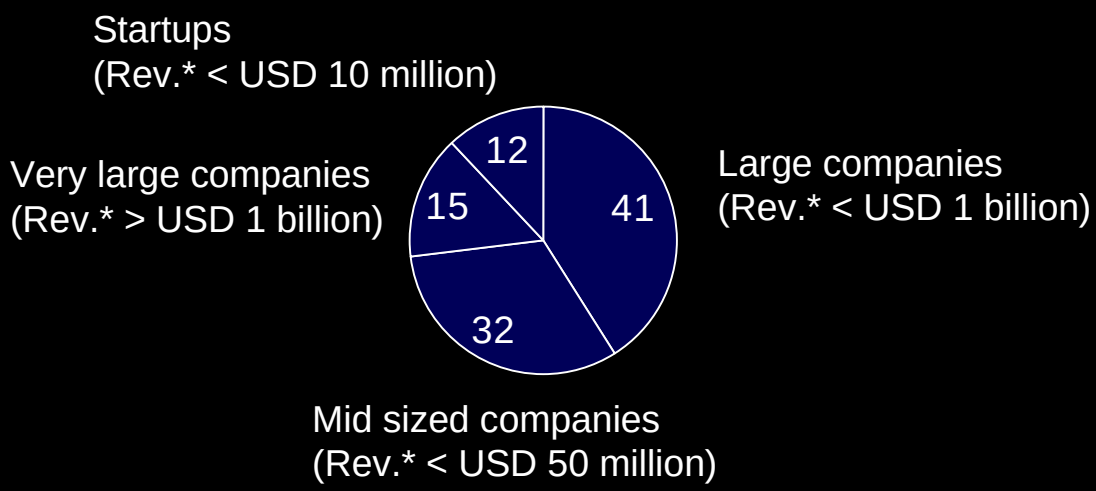


SCOPE AND METHODOLOGY OF SURVEY

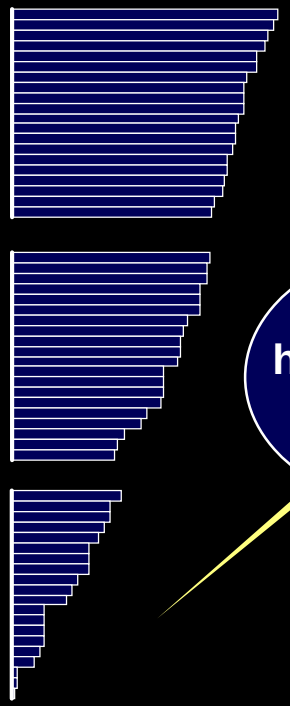
Interview partners

During the survey we did interviews with …

- … more than 450 executives
- … 100 companies in 15 countries on 3 continents
- … 6 of the 10 largest software companies in the world
- … firms of all 3 industry segments

Research methodology

Rank of companies by margin and CAGR*



Test of hypothesis with top and lower third

34 successful companies

32 average companies

34 less successful companies

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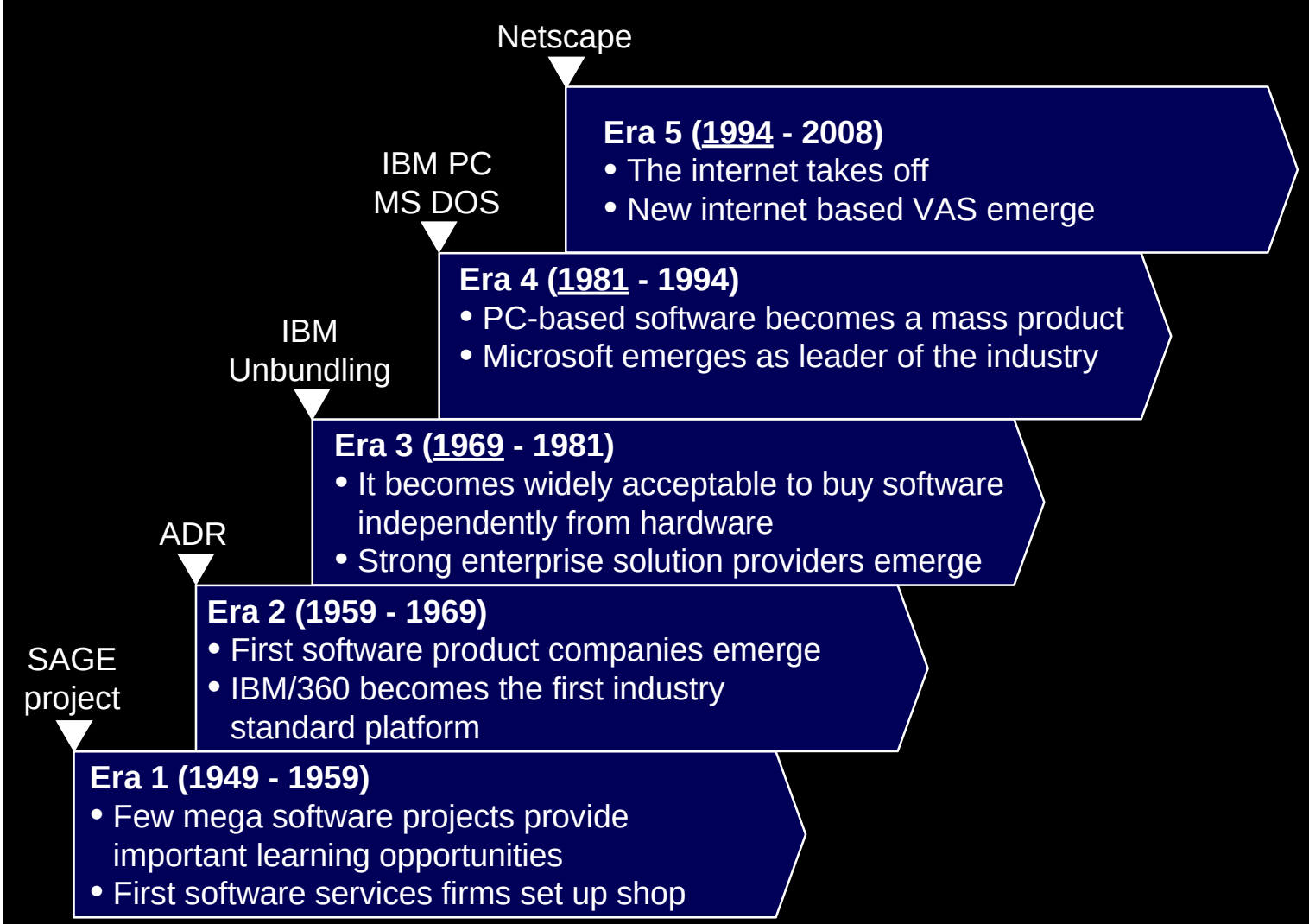
SOFTWARE INDUSTRY ERAS



Company examples

- Netscape
- Intersky
- BroadVision

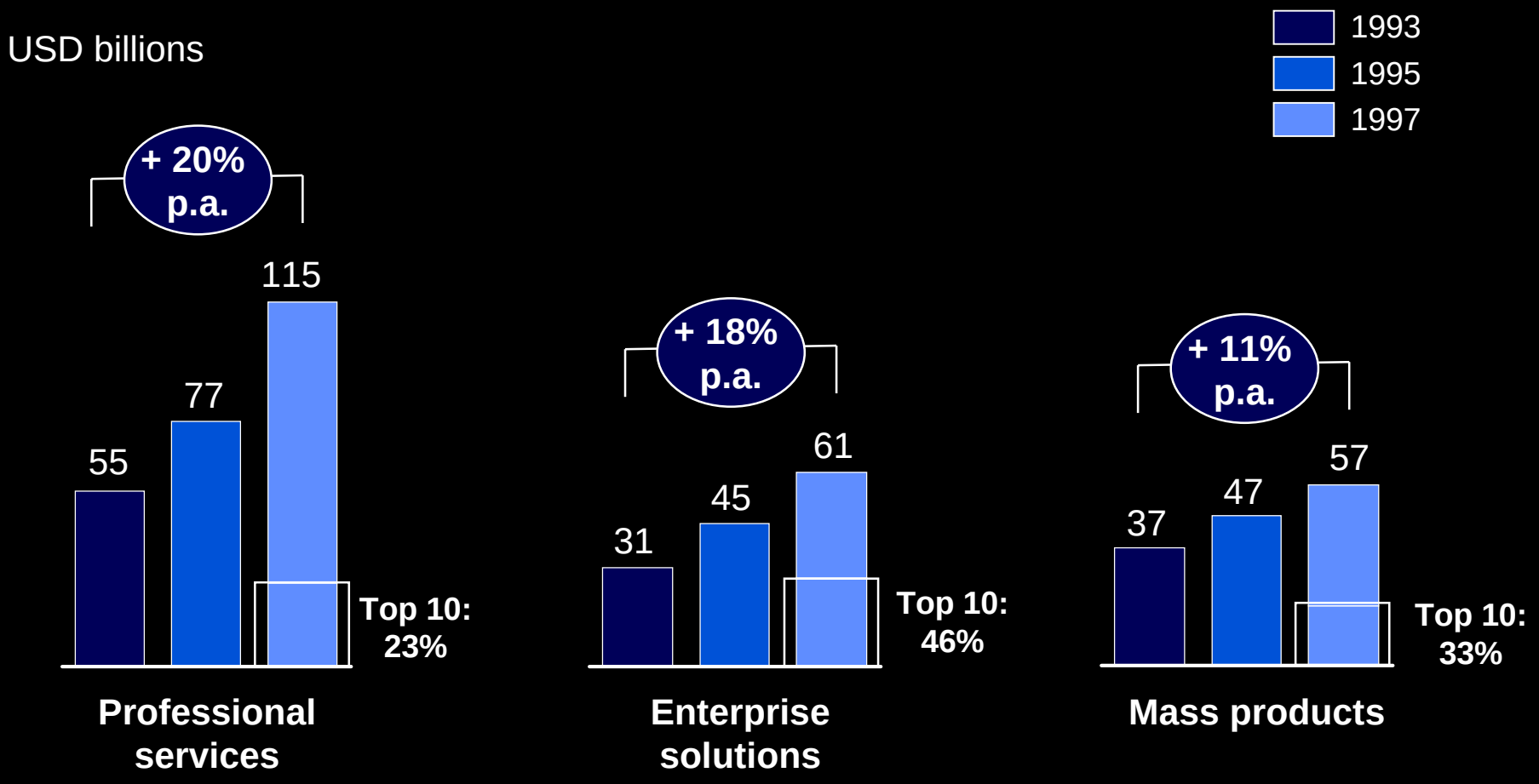
- Microsoft
- Novell
- Intuit

- SAP
- Oracle
- CA

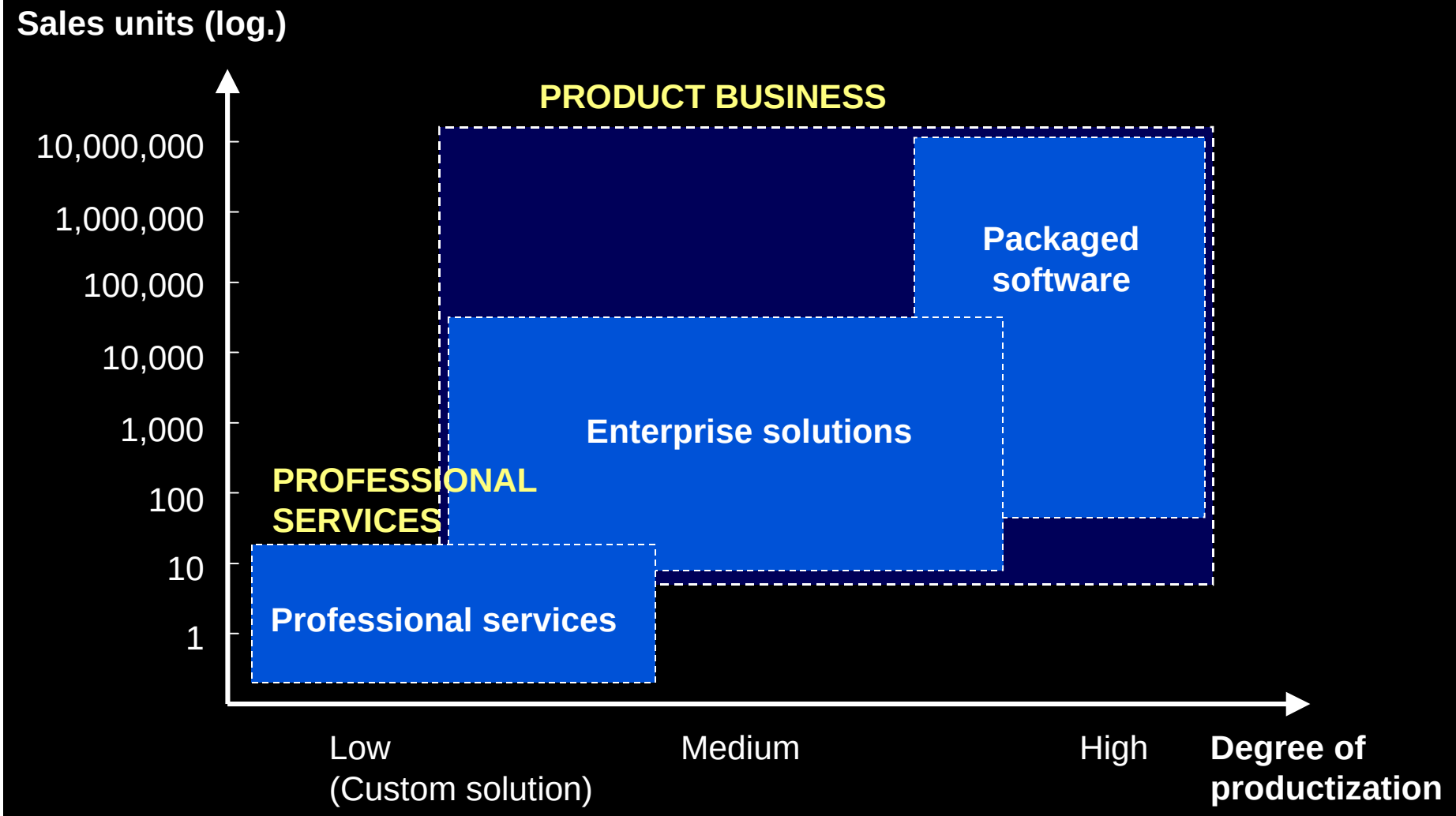
- ADR
- IBM
- Informat

- CUS
- CSC
- Sema

WORLDWIDE REVENUES AND GROWTH RATES IN THE THREE SOFTWARE INDUSTRY SEGMENTS



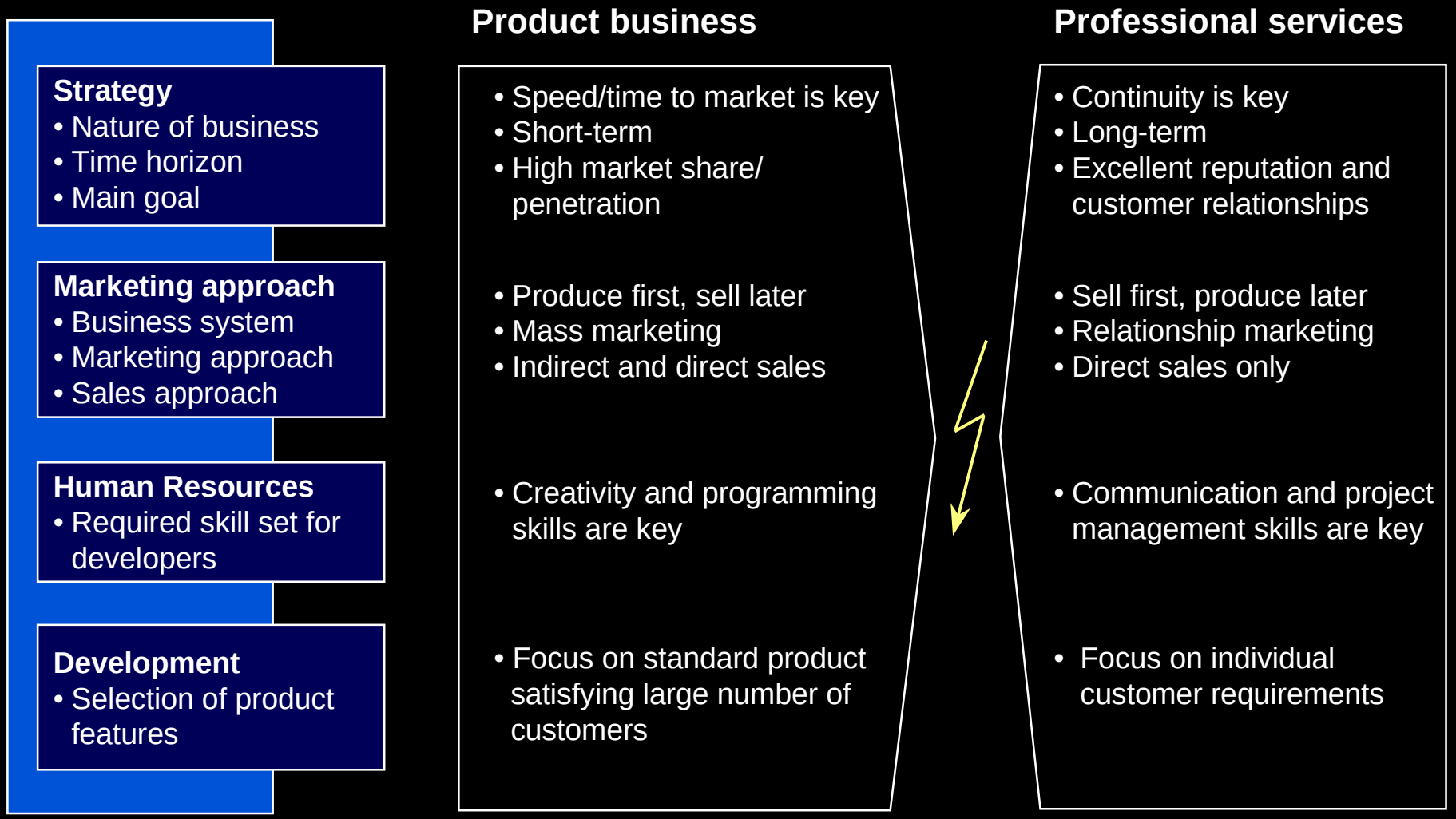
KEY DIFFERENCES OF THE THREE SW SEGMENTS



MAJOR DIFFERENCES BETWEEN PRODUCT AND PROFESSIONAL SERVICES BUSINESS

	Product business	Professional services
Marginal costs	Almost zero	Almost constant
Market structure	Drive to concentration	Highly fragmented
Regional appearance	Highly globalized	Mainly regional, with increasing tendency to globalization
Customer relationship	One-to-few, one-to-many	One-to-one
Most important number to watch	Market share (installed base)	Capacity utilization rate
Relevance of management areas*	1. Strategy 2. Marketing & Sales 3. Human Resources 4. Software development	1. Human resources 2. Software development 3. Marketing & Sales 4. Strategy

SOFTWARE PRODUCT AND PROFESSIONAL SERVICES BUSINESS - MANAGEMENT DIFFERENCES



Source: Secrets of Software Success

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BALANCE DECISIONS IN DIFFERENT MANAGEMENT AREAS

Management areas	Key balances to find within the top 5 areas		
Partnering	Grow the market, but share it with partners	…versus...	Focus on a smaller market, but “take it alone”
Service strategy	Grow revenues with products and services combined	…versus...	Maintain organizational focus on product business only
Marketing	Invest in personal trust-based relationships and keep “professional touch”	…versus...	Invest in more aggressive brand building
People management	Invest in developing and retaining people long-term	…versus...	Focus on short-term profitability by “utilizing people” efficiently
Development	Emphasis on creativity and flexibility (ad-hoc culture)	…versus...	Emphasis on processes and disciplined execution

BALANCE DECISIONS - PARTNERING

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NO ONE CAN GO IT ALONE IN SOFTWARE

Successful software companies have on average four times as many partners as the less successful ones

"Partnering is absol-utely fundamental to the success of a software company"

Graham Sharman, President Baan Investment*

Baan decided to hand 80% of the total value of Baan installations its partners

"In the ERP-software-business you cannot survive without partners"

Henning Kagermann, CO-CEO, SAP

SAP launched a global "SAP Partner Academy", an international institute of higher education** just to train its partners

"More than 50% of our success is due to partnering"

Richard Roy, General Manager Microsoft Germany

Microsoft spends more than USD 600 million every year just on coaching its partners, and hands out 96% of the total value to partners

"No one can do it by themselves anymore. The companies that do not understand how to truly parner will get left behind"

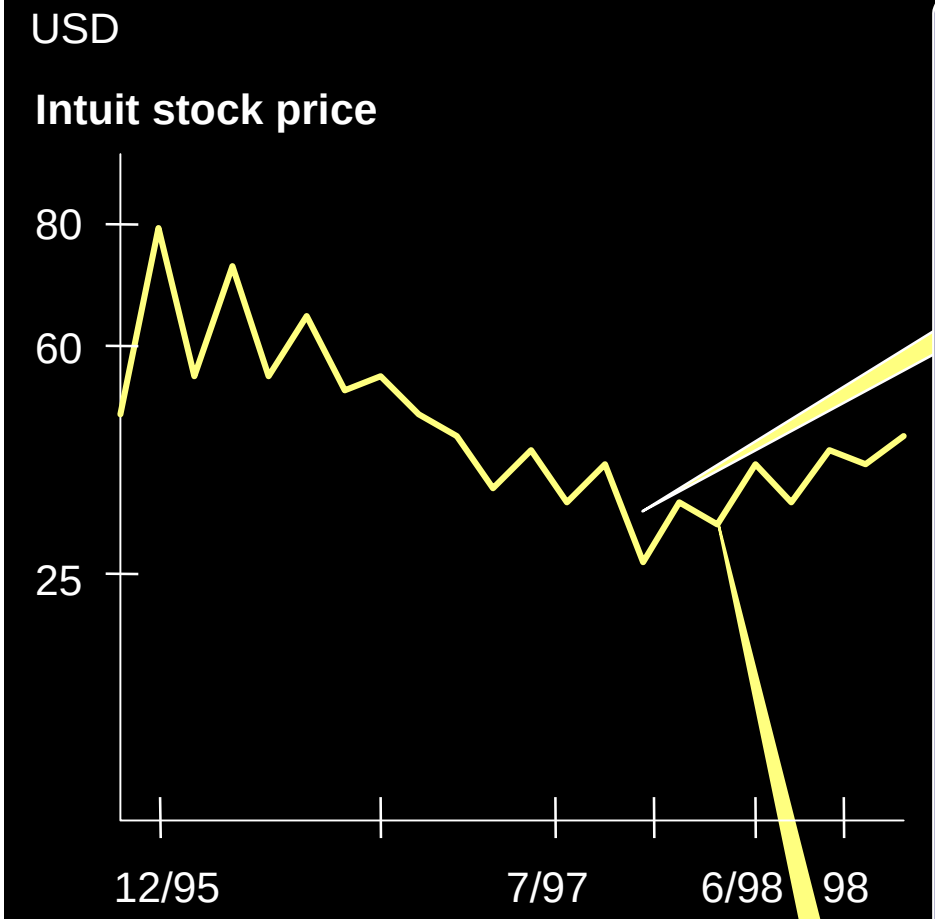
John Chambers, President Cisco

Cisco signs up so many allies per year that it hires new partnering managers almost every month

* New Vanenburg Venture
** First of such a kind worldwide

Source: Secrets of Software Success, New York Times, US securities firm Evessen

INTUIT'S PARTNERING MOVES



"It was either partner or perish"
Business Week
June 1998

- Intuit faced increasing threat from on-line financial services
- In 1997, founder Scott Cook decided to redirect Intuit from a stand-alone software company to an internet software and service provider

"We had to sublimate our ego and become part of sombody else's business"
William Ham's Jr.,
CEO Intuit

Similar threats from lack of partners for Software AG and Apple

- In the first six months of 1998 alone Intuit allied with 12 companies
- Examples: Excite, Financial Times, Standard and Poor America Online, CNNfn, banks

Source: Secrets of Software Success, Intuit, press clippings

PARTNERS ALONG THE VALUE CHAIN CLOSING CRUCIAL GAPS

Gaps to close \ Types of partners	R&D partners	Complementary product or service partners	Marketing partners	Implementation and maintenance partners
Requirements outside key competencies	• Andersen and SAP joint development in utilities and financial sector • Microsoft car PC Software joint development with car makers	• Oracle databases for SAP R/3 • Retail back office software from Naviplus for Navision ERP system	• Intershop software promotion via hardware experts HP and Silicon Graphics	• Professional services players Ernst and Young, Coopers and Lybrand Andersen Consulting etc. with SAP, Baan, Peoplesoft etc.
Keeping with extermely short time-to-market sequences	• Beta versions for early application building from Microsoft for KHK	• Distribution and logistics modules from Lanham for Navision	• Nice Systems voice logging software via IPC, Siemens, Aspect	• Beta releases by large product firms to professional services firms like TCS (India)
Building market penertration volume		• Financial Times and America Online infos for Intuit's web platform	• Sun Java licensing to Oracle, IBM, Netscape (750,000 Java developers in 1998) • Intershop product co-marketing with 20 core partners and 500 sales partners incl. HP, Sun, Silicon Graphics	• Professional service firms ad ERP players

PARTNERS FAR BEYOND TRADITIONAL SUPPLIERS

Partners listed in SAP's 1998 supplier conference booklet

ERP implementation consultants	Database manufacturers	Software implementation tool providers	Document management software firms	Hardware manufacturers
• Andersen consulting • Coopers and Lybrand • Ernst & Young • •	• Oracle • Informix • • •	• Intellicorp • IDS Scheer • • •	• IXOS • FileNet • Documentum • • •	• Compaq • Dell • IBM • • •

In the car industry, that would mean customers decide who makes the breaks, the seats and the engine of their BMW and who assembles it

Customers can select provider from each group

BALANCE DECISIONS - PEOPLE MANAGEMENT

Management areas	Key balances to find within the top 5 areas		
Partnering	Grow the market, but share it with partners	…versus…	Focus on a smaller market, but “take it alone”
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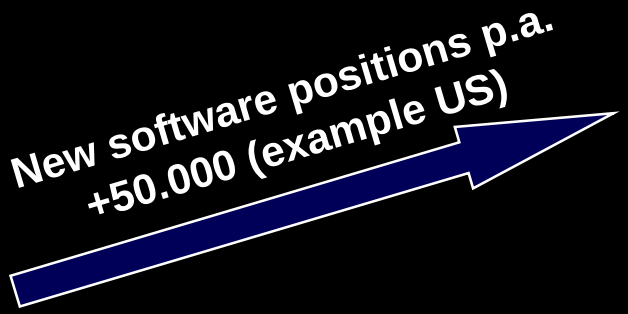
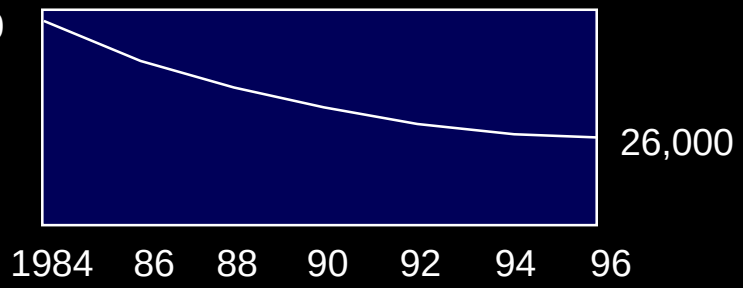
GLOBAL SOFTWARE WORKER SHORTAGE



Increasing demand for software workers driven by

- Strong growth in traditional software market (18% p.a.)
- Exploding new segments with high demand for software knowledge (e.g., internet)

Number of computer science graduates (example US)



Decreasing supply of computer science graduates until 1998

- Supply cycle several years behind demand curve
- Job prospects were significantly lower in the early 90s

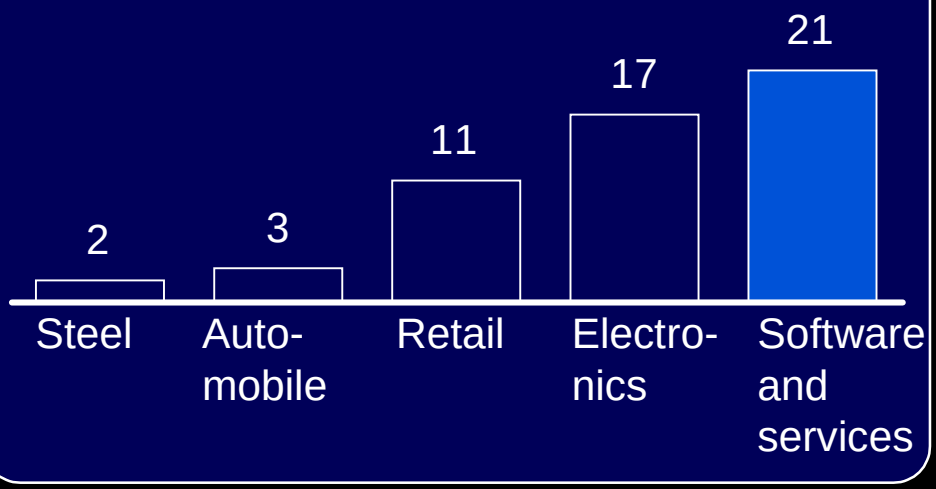
Global shortage of software workers

- 346,000 vacant IT positions in the US (200,000 in the Silicon Valley alone), approx. 500.000 in Europe
- Extreme high turnover rates (20% p.a.)
- Most important growth obstacle for software companies

Source: Secrets of Software Success, Estimations

HIGH TURNOVER

Average staff turnover
Percent p.a., (US, 1997)



Advantages

- (+) Desired refreshment/avoidance of legacy
- (+) Push innovation through new ideas
- (+) Facilitate change
- (+) New leads for recruiting candidates

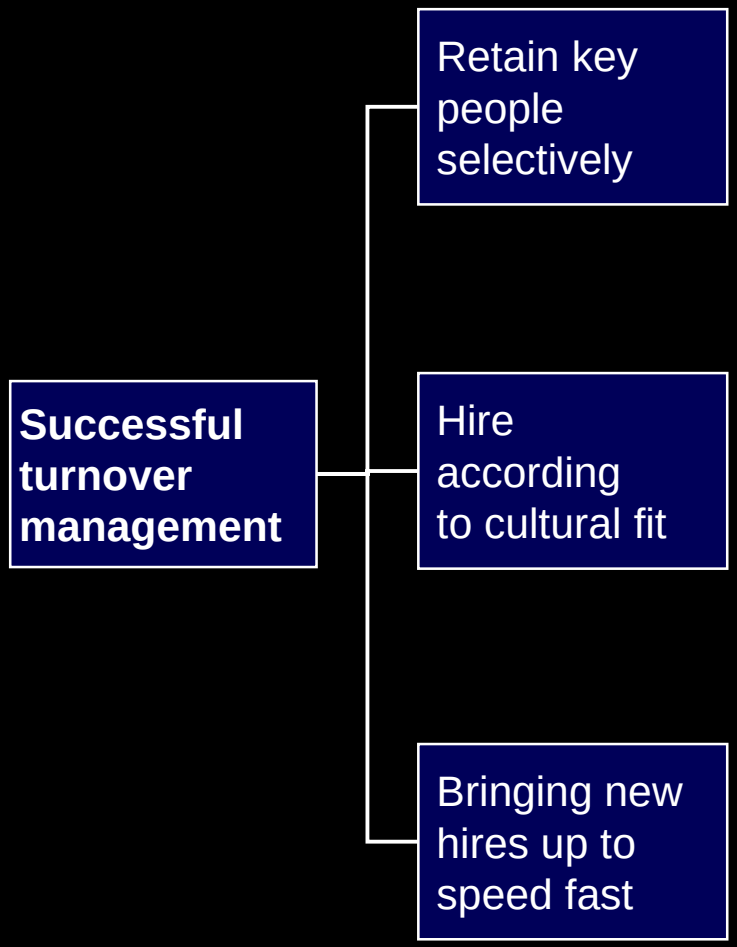
Disadvantages

- (-) Knowledge drain
- (-) Loss of personal relationships to customers
- (-) Replacement cost
- (-) Cultural erosion

"We do not regard a 20 percent turnover rate as being too critical. On the contrary, it helps us to constantly bring in new ideas and new fresh thinking"

Kerry Lamson,
VP Marketing Oracle Applications

TURNOVER MANAGEMENT



Examples

- A large SV company gives its managers a system to track the "walk-away-value" (i.e. the value of stock options an employee would lose if he left the company now) for their employees on a daily basis – if this value gets to low for key employees mangers can take counter measures

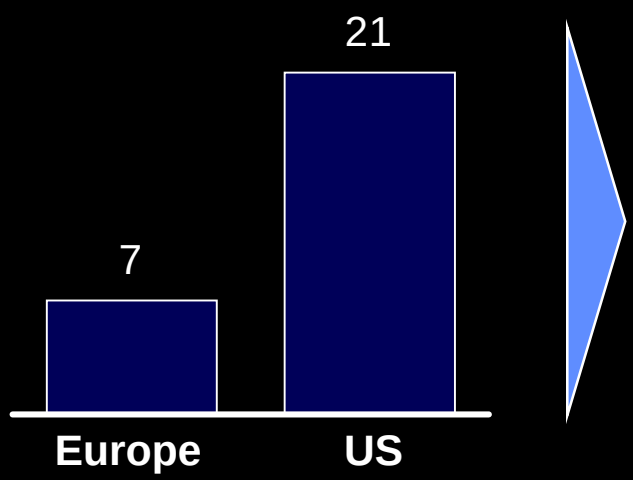
- At a Michigan based company the CEO introduced a "Typical profile of our company's employee" based on "Company-values" to support recruiting – since then turnover has decreased significantly

- CISCO introduced "Fast Start" a dedicated program to bring new hires up to speed including specialized "facilities teams" for setting up the infrastructure (e.g., Fax, phone, mail) as well as sophisticated systems of automated e-mails to managers to remind them of their duties with new employees

COMPARISON US - EUROPE

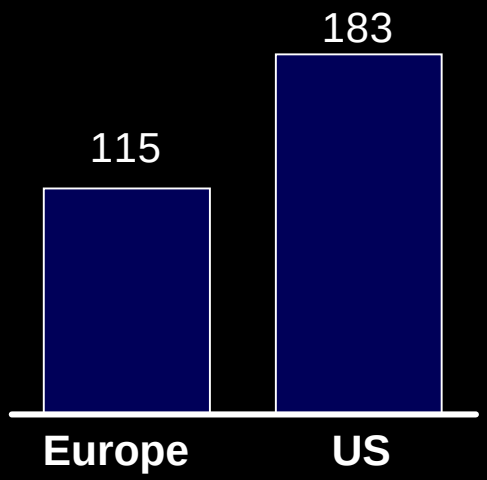
Staff turnover rates

in percent p.a.



Comparison of peak salary with average salary

Peak salary as percentage of average



Other retainment measures

- Stock options
- Top developer conferences (Platinum)

EXAMPLES OF SOFTWARE COMPANIES' CULTURES

"Fun place to work"

- Self run aerobic classes, company rock band, frequent beach parties, car races
- CEO even performed Hawaiian dance dressed in wig skirt to reward an employee

"Technology focus"

- Focus on cutting edge technology
- "Top developers club" with annual technology conferences featuring talks of reknown industry specialists

Great software cultures

"Living for customer value"

- Focus on business value
- "Low tech approach"
- Emphasis on high business ethics and standards
- Most important thing to look at when hiring new employees is "A balanced personality"

"Work hard – play hard"

- Claims to have highest combined compensation package in the industry
- Extremely bottom line oriented
- Special parties for top performers (like free boat rides with the company boat or spontaneous trips to the Carribean

Source: Secrets of Software Success

BALANCE DECISIONS - DEVELOPMENT

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SOFTWARE DEVELOPMENT - BALANCE DECISIONS

Creativity and flexibility

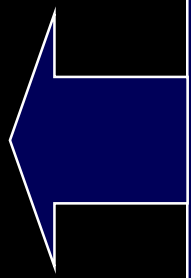
Practice (rationale or belief)

- Quick staffing (Start project faster)
- Limited planning efforts (Save time)
- Emphasis on coding not on design and testing (Only coding is "productive")
- No or few defined development processes (Processes hamper creativity and flexibility)
- Deliver all features possible (The more features the better)

Process and discipline

Practice (rationale or belief)

- Quality staffing (Having the best team is most important)
- Elaborated planning (Planning saves time later)
- Elaborated design phase - early start of testing (Good design and early testing make a better product)
- Strictly defined processes throughout the whole development process (Processes ensure quality)
- Disciplined feature priorisation (Avoid feature creep)

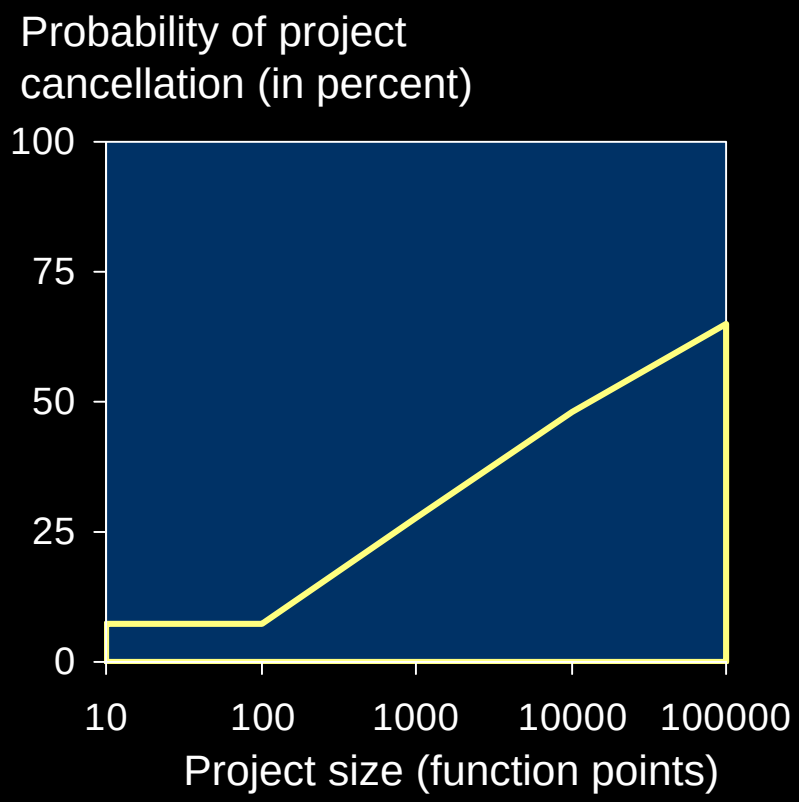


Balance is often shifted towards "creativity and flexibility" due to:

- Unexperienced managers
- Extreme time pressure
- Pressure from marketing, customers and competitors
- High uncertainty

SOFTWARE DEVELOPMENT - RESULTS

Probability of project cancellation (total failure) as a function of project complexity



Reasons

- Enormous complexity
  - e.g. Windows 95 = 11 Millions lines of code , SAP even 30 Million lines of code
  - „*Software products are among the most complex entities men ever built - maybe only the egyptian pyramids were comparable given the technical capabilities of their time*“

    Capers Jones

- Enormous uncertainty
  - Unclear (and changing) customer requirements
  - Design uncertainties (impact of small design changes on the final outcome can be significant - prediction is extremely difficult)
  - Changing technological environment (products using a certain platform, e.g. an operating system, usually must change, when the platform changes)

INVEST IN PROCESS

ILLUSTRATIVE

Real experience of projects that…

...pay little attention to process

Percent of effort

...focus early on process

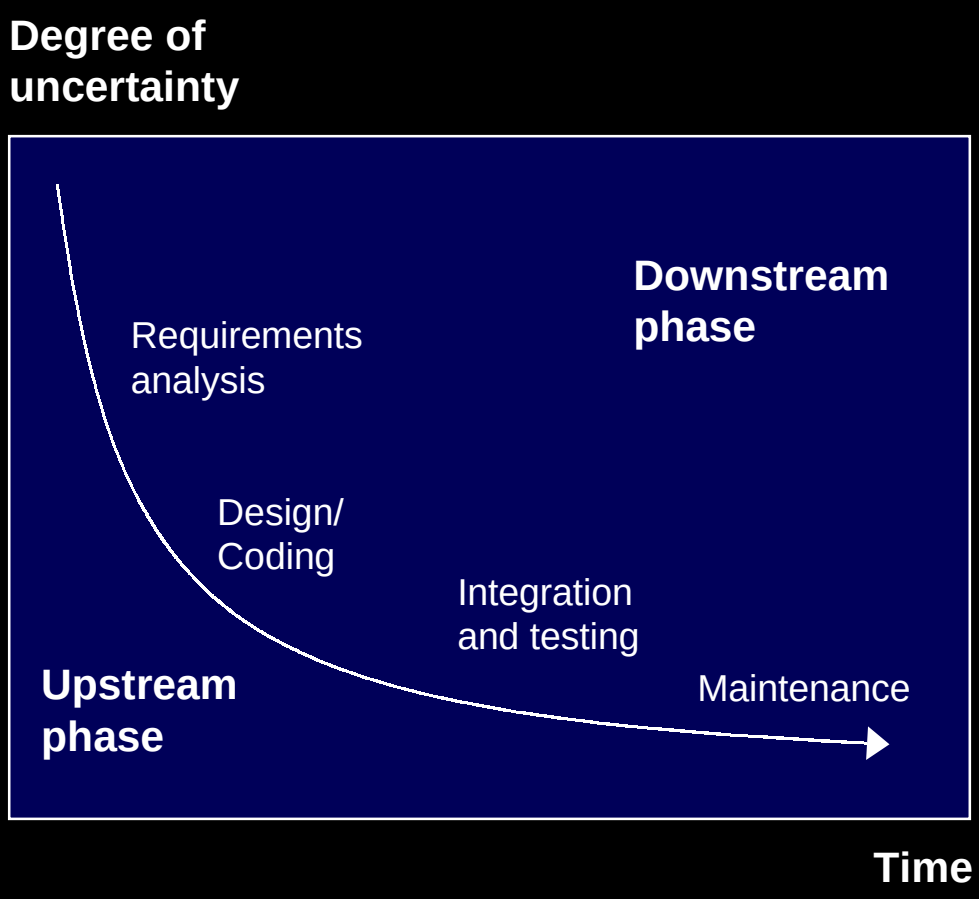
Elaborated development processes
- **shorten time to market**
- **decrease cost**
- **reduce defects - increase quality**
- **improve morale (contrary to common belief)**

Example Lockheed: After 5 years of process improvement defects were reduced by 90%, time to market by 40%, cost by 75%

Nevertheless...

On the CMM Scale of software process maturity more than 75% of all surveyed companies ranked 1 - CHAOS

TWO PHASES WITH VERY DIFFERENT EMPHASIS



Example company
2 phase process:

Idea&Design phase

- Idea creation is focus
- Playful and informal atmosphere (people talk in the aisles, coffee corners frequently used
- „*We are sitting in a circle and hold hands*“
  CTO

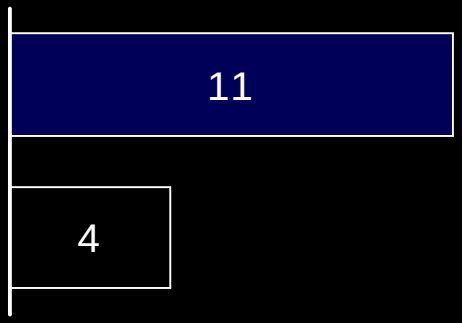
Implementation Phase

- Rigorous and disciplined implementation is focus - no distraction permitted

Successful companies are able to divide a large project into small sections that can easily be monitored

Share of defined development projects lasting less than 1.5 months

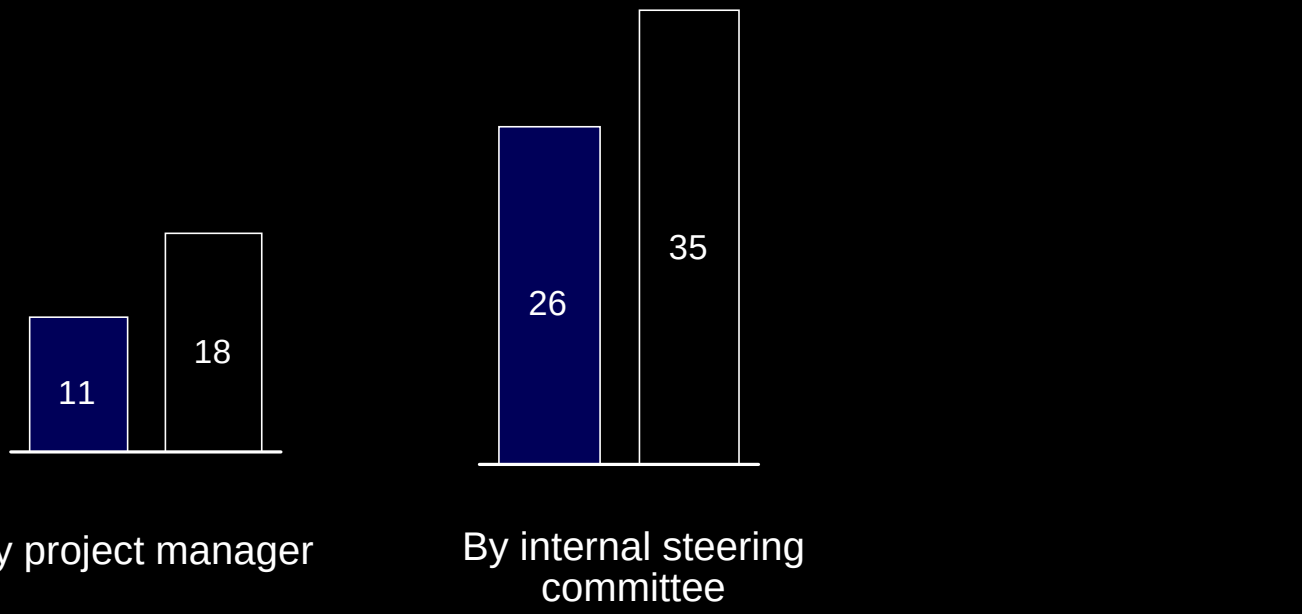
Percent



Successful companies
Less successful companies

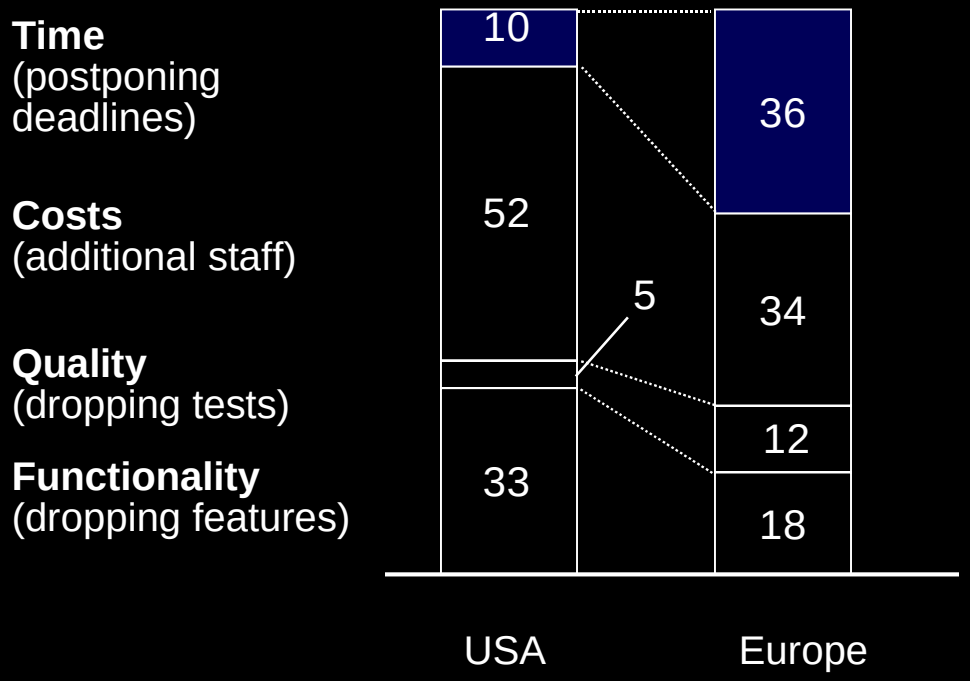
Successful companies have tighter project management

Frequency of comparison of target vs. actual project performance
Days



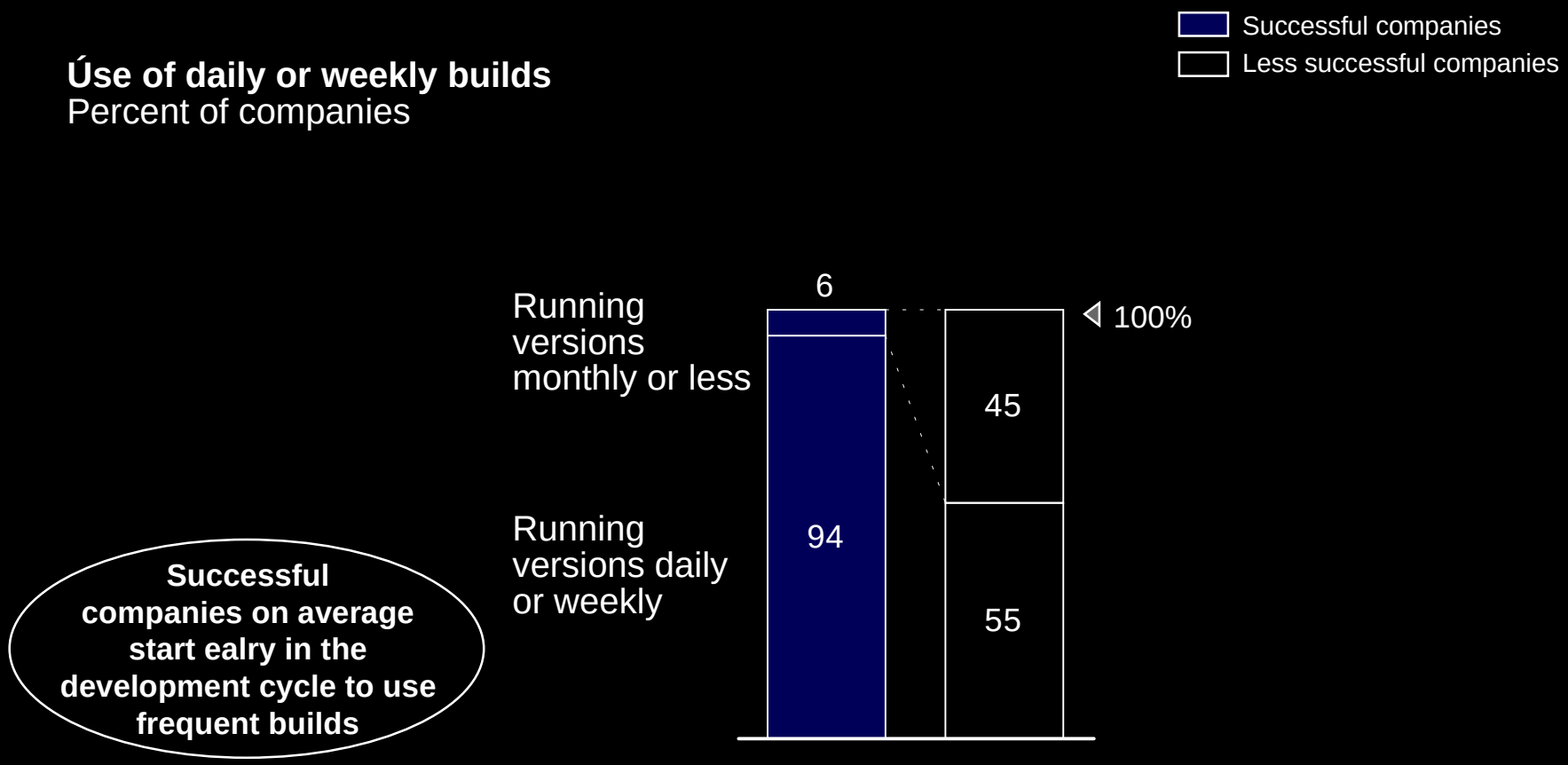
Professional services providers in the US try much harder to meet deadlines

Areas in which project schedules are updated in case of deviations between target and actual performance
Out of 100 deviations



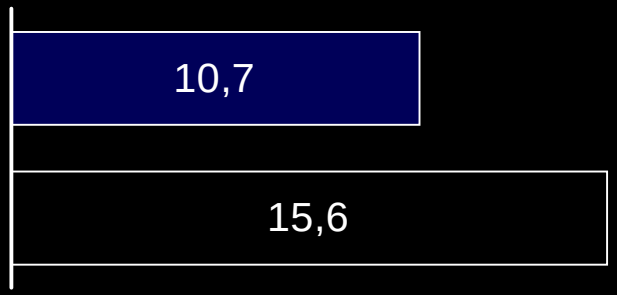
Interesting cultural differences reflected

Successful companies generate running versions of the program code more frequently (frequent builds)



Successful companies discover more coding faults before implementation at the customer

Discovery rate of coding faults during first year of use
Percent

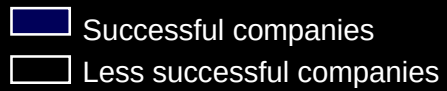


Successful software companies
Less successful software companies

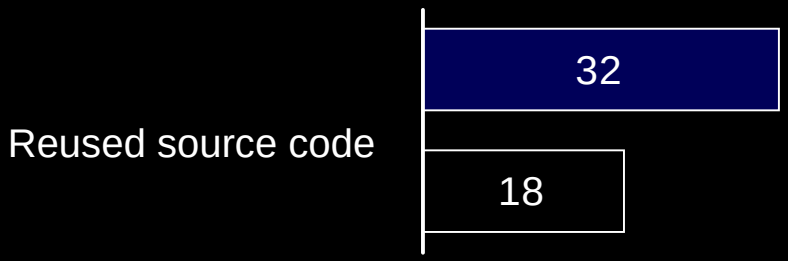
Less successful company:
1/3 of coding faults discovered during the first year (only 10% of customers are extremely satisfied)

Successful companies reuse source code much more frequently

Software with higher reusability



Percentage of reuse for new tasks* per total development effort



Reusability examined in two case studies

Successful companies

- Install basic technical requirements
- Inform and convince people
- Ensure that source is easy to find

* New products, new modules, etc.

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TENDENCIES THAT WILL SHAPE THE FUTURE OF THE SOFTWARE INDUSTRY

1. Enormous further growth potential
2. Productivity gains
3. A new coopetition balance between products and services
4. Industry consolidation

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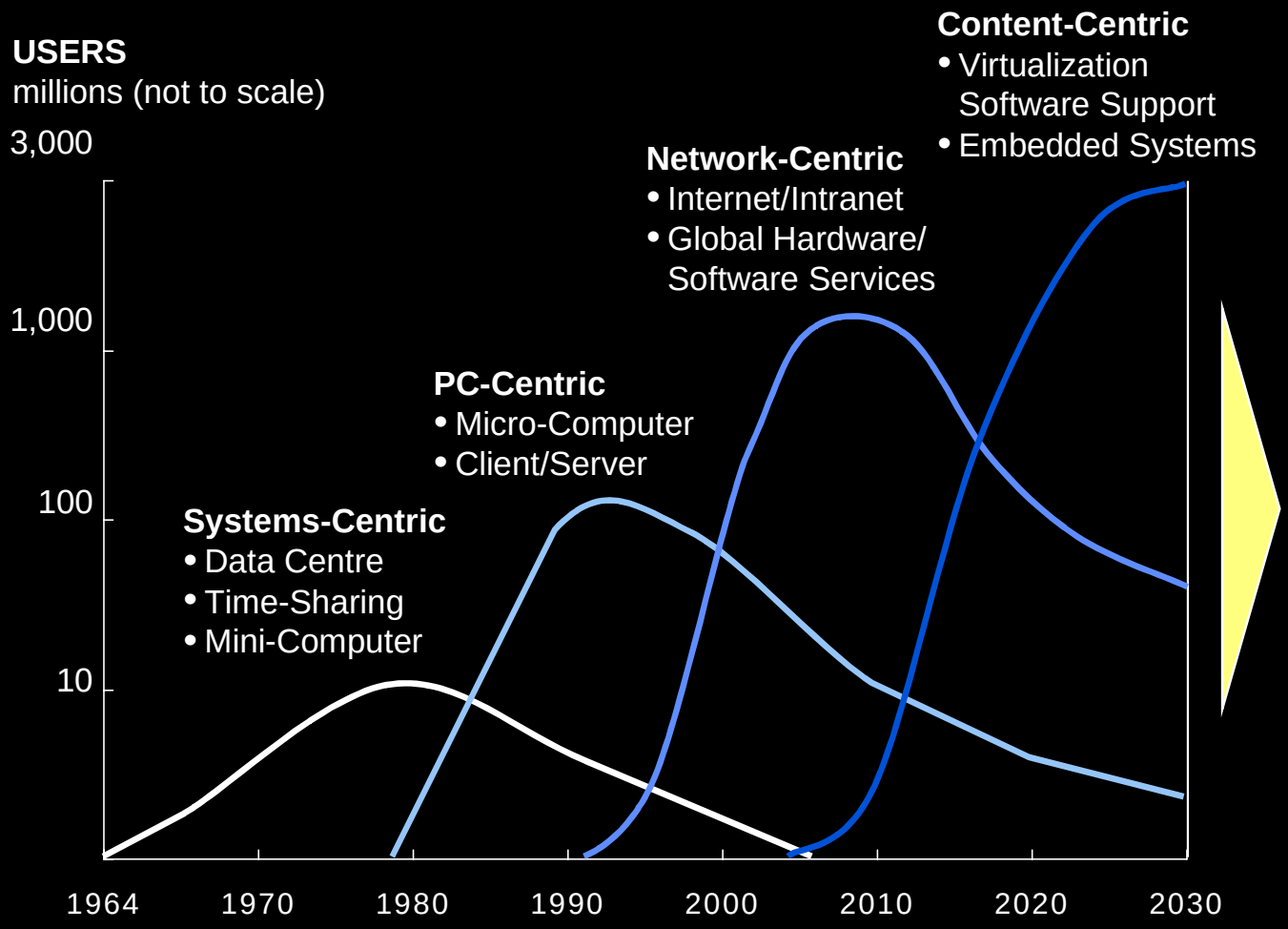
GROWTH THROUGH NEW SOFTWARE NEEDS: IT INVESTMENT CYCLES



Huge demand for …

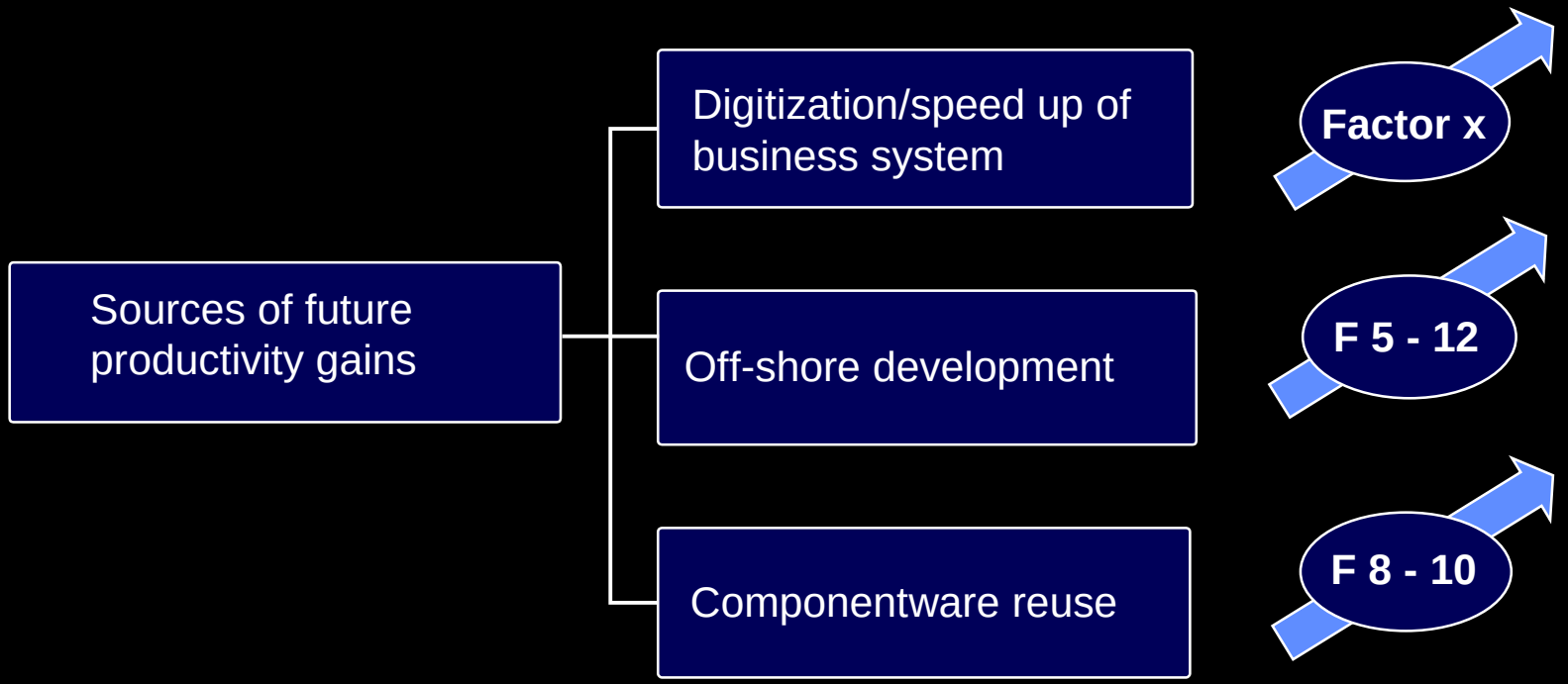
- … more powerful and flexible software
- … new areas of software functionalities

Source: European Management Journal Vol. 16, No. 3, June 1998 (adapted from Moschella, 1997); McKinsey adjustments

TENDENCIES THAT WILL SHAPE THE FUTURE OF THE SOFTWARE INDUSTRY

1. Enormous further growth potential
2. Productivity gains
3. A new coopetition balance between products and services
4. Industry consolidation

SOURCES OF FUTURE QUALITY AND PRODUCTIVITY GAINS



* Note: According to Fred Brooks, author of The Mythical Man Month, a silver bullet is anything which potentially improves SW development productivity by an order of magnitude or more!

PRODUCTIVITY GAINS AT SOFTWARE PRODUCT COMPANIES THROUGH DIGITAL BUSINESS SYSTEMS

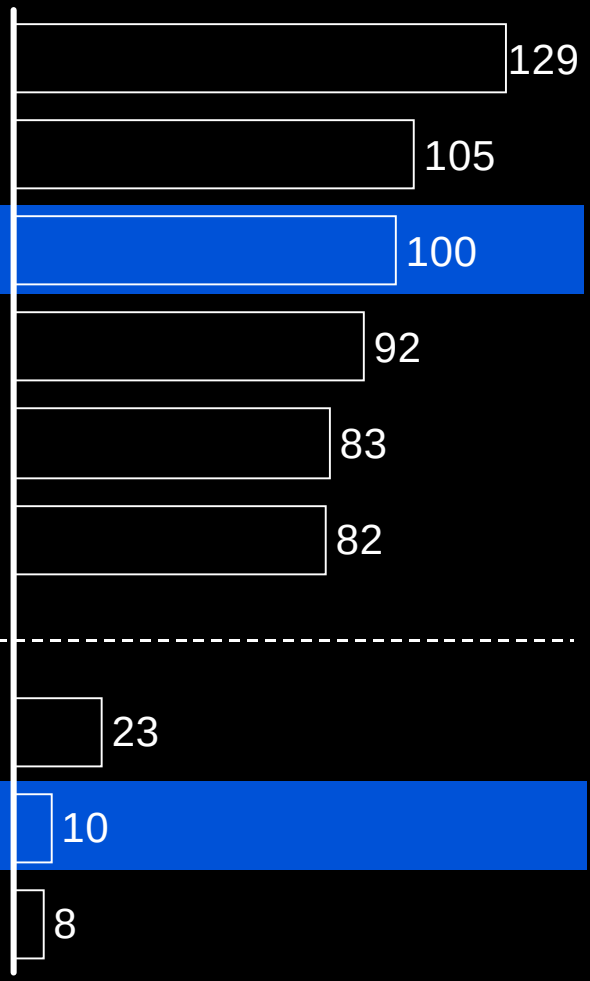
ILLUSTRATIVE

	Create/ Design	Make/ Develop	Market/ Sell	Service/ Maintain	Manage/plan, administer
Effects of Digi-tization	• Knowledge database for reuse of designs and specs • Online incor-poration of customer feed-back • Iterative product design with online customer involvement • Online exchange with concept partners on new ideas	• Knowledge database for reuse of source code • Bug database incorporating online customer feedback • Distributed development with central source code base (coding and testing)	• Online marketing – Product & company information – User communities • Online sales – Ordering – Configuration – Downloading – Payment • Software “test drive”	• Online support for customers & developers – Documen-tation – FAQ – Interactive database – Test code • Online mainte-nance – Upgrade download – Diagnosis/fix – System management	• Fully integrated MIS • Full-service intranet – HR Manage-ment (Admin-istration, training) – Internal com-munication • Online recruiting • Acquisition of partners • New release cycles, pricing models

PRODUCTIVITY GAINS THROUGH OFFSHORE DEVELOPMENT

Costs for a 1000 Function Points Project

Country	Cost per work hour (USD)	Cost per function point (USD)	Percent of US
Germany	57.56	1,151.2	129
France	46.92	938.4	105
United States	**44.74**	**894.8**	100
United Kingdom	41.09	821.8	92
Italy	37.30	746.0	83
Japan	36.70	734.0	82
Russia	10.08	201.6	23
India	**4.46**	**89.2**	10
China	3.70	74.0	8



Source: Capers Jones, 1997

PRODUCTIVITY GAINS THROUGH REUSE OF COMPONENT WARE

Component Technology vs. Traditional System Integrator Solution - retail banking

Value proposition*

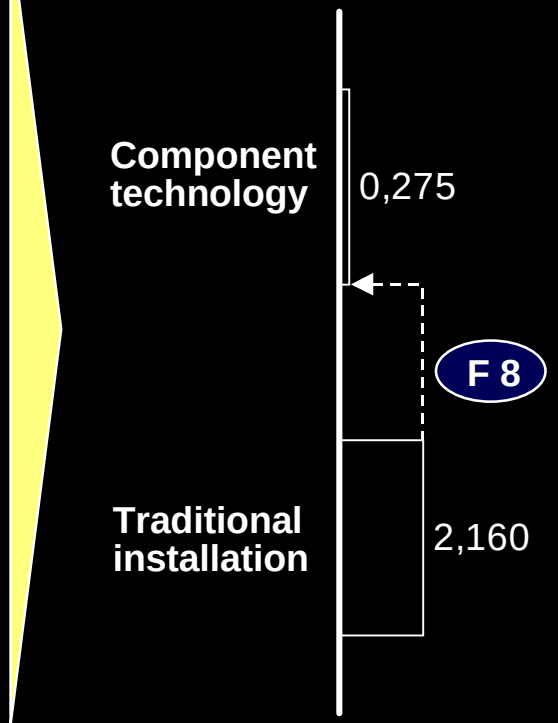
Description

C/S retail banking application

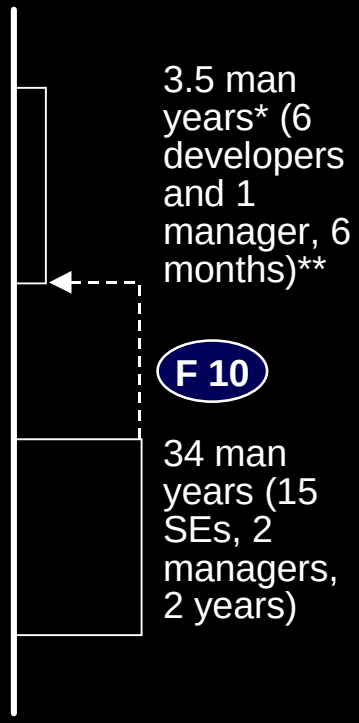
- Customer services management
  - – New accounts
  - – Customer information
    - Product usage
    - Profitability
- Current system mainframe-based/transition to PC solution
- Key careabouts
  - – Maintenance
  - – Real-time replication

Cost

USD millions



Time



Flexibility

- Scaleability
  - – Distribution of services/data
  - – "Unlimited"
- Increased ability to upgrade business functionally
  - – Data views

x times more flexible

- Hard coded to specs
- Not scaleable beyond original specs

* Functional specs/performance same for both

** 12-14 hour days, may be 4-4.5 man years

Source: S3 team Texas 3/98, life case study within third party

TENDENCIES THAT WILL SHAPE THE FUTURE OF THE SOFTWARE INDUSTRY

1. Enormous further growth potential
2. Productivity gains
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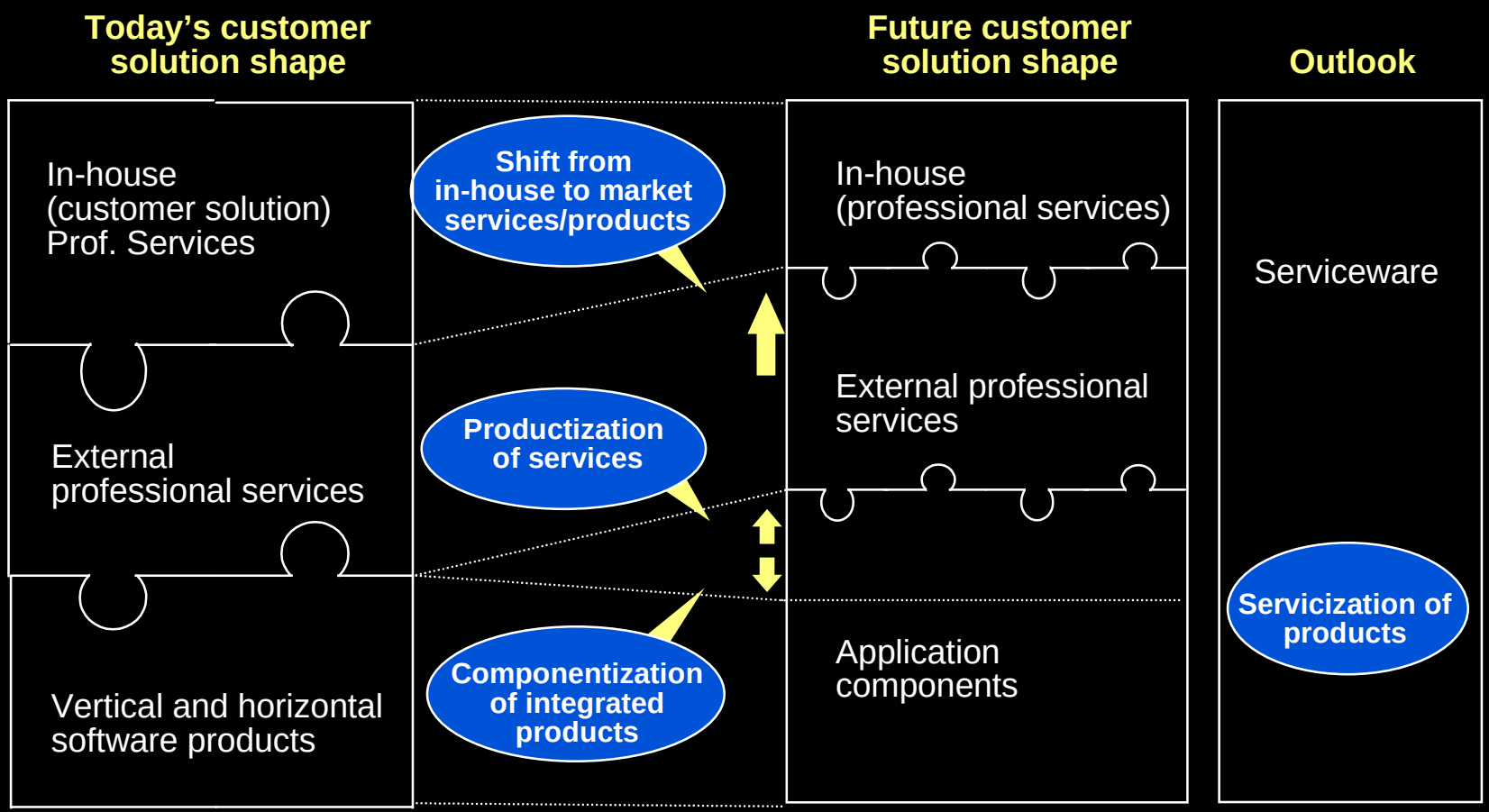
PRODUCTIZATION OF SERVICES VS. SERVICIZATION OF PRODUCTS



TENDENCIES THAT WILL SHAPE THE FUTURE OF THE SOFTWARE INDUSTRY

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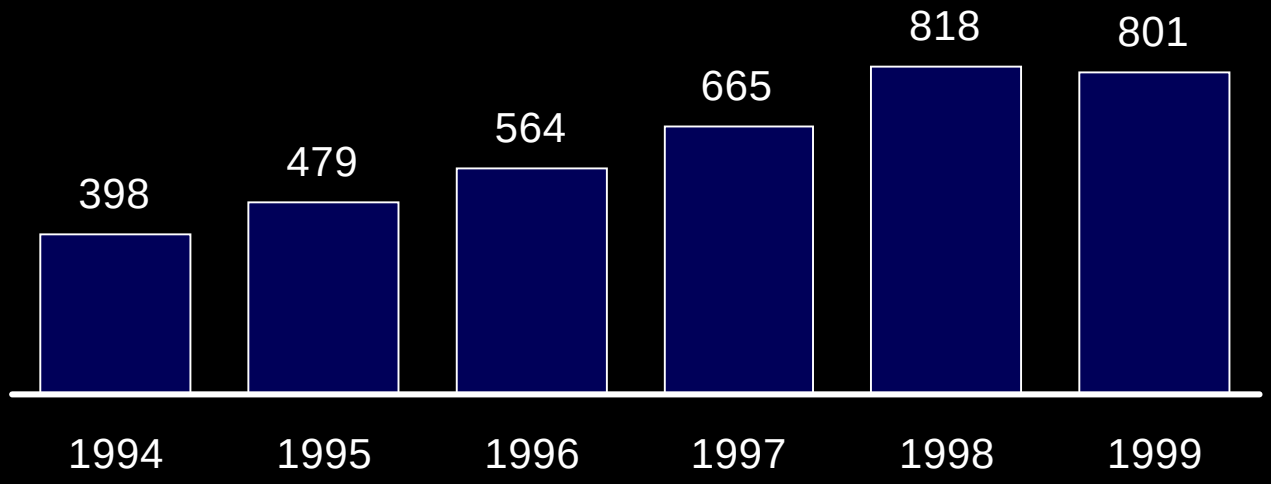
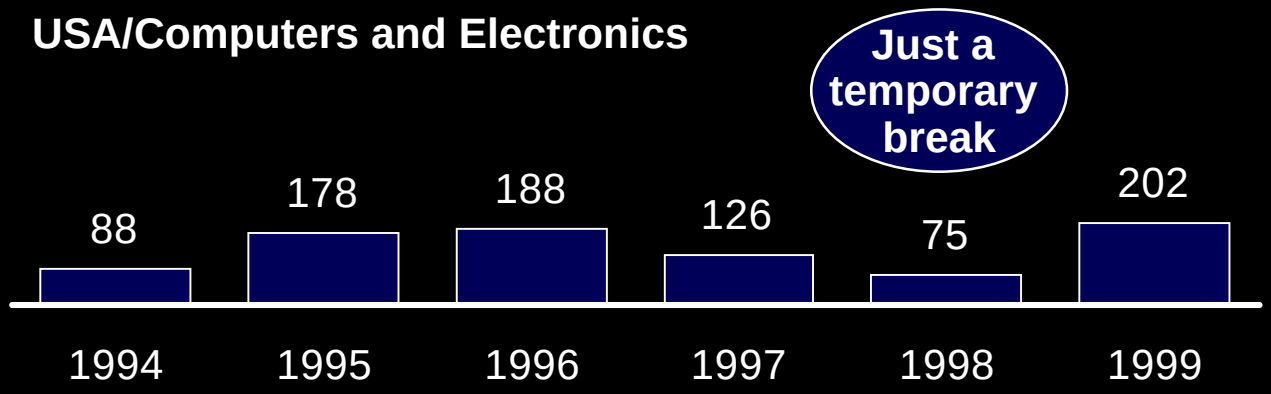
INDUSTRY CONSOLIDATION YET TO BE SEEN

No. of M & A transactions
USA/Computers and Electronics



No. of IPOs
USA/Computers and Electronics



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Introduction to Secrets of Software Success

Industry structure and history

Illustration of selected best practices

Future trends

Discussion

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