Software Engineering Economics (CS656)

Business Case Analysis – I

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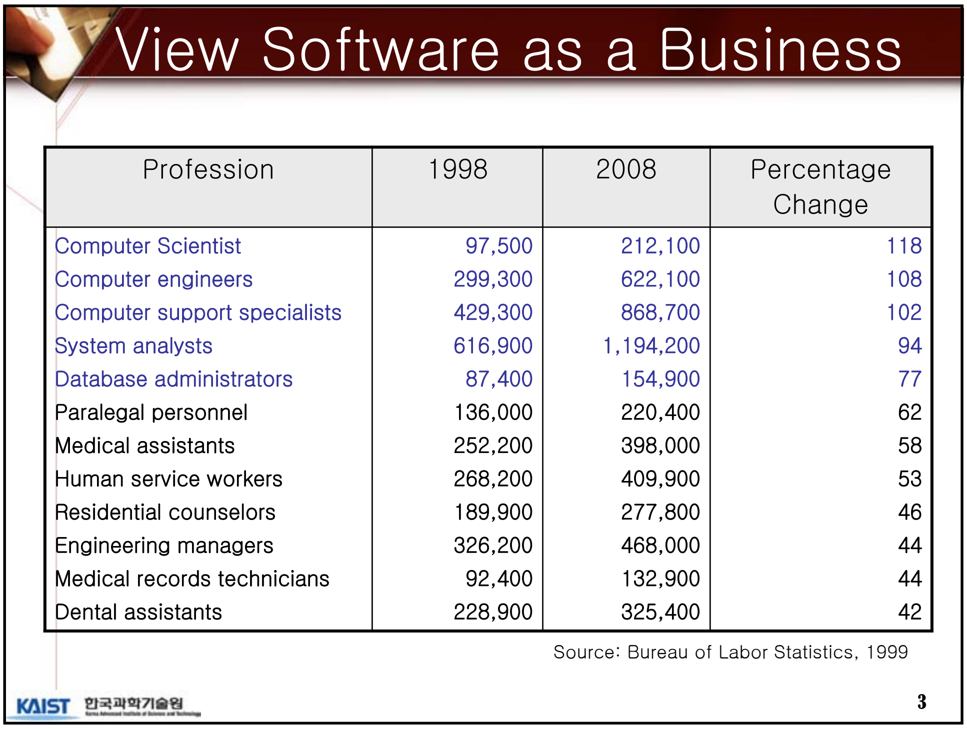
What is a Business Case?

"Materials you would use to show decision makers that the idea under consideration is a good one and that the numbers that sound it make financial sense"
"Improvement by Numbers"
– Making the Software Business Case

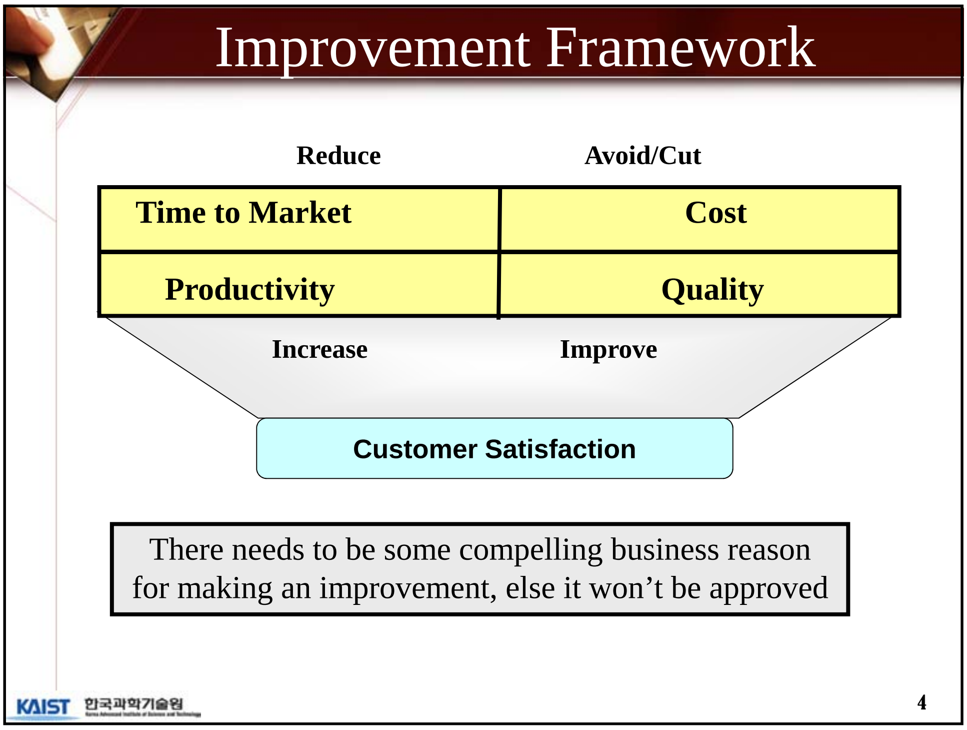
"A structured proposal for business improvement that functions as a decision package for organizational decision-makers. A business case includes an analysis of business process performance and associated needs or problems, proposed alternative solutions, assumptions, constraints, and a risk-adjusted cost-benefit analysis. [GAO]"
– www.ichnet.org/glossary.htm



View Software as a Business

Profession	1998	2008	Percentage Change
Computer Scientist	97,500	212,100	118
Computer engineers	299,300	622,100	108
Computer support specialists	429,300	868,700	102
System analysts	616,900	1,194,200	94
Database administrators	87,400	154,900	77
Paralegal personnel	136,000	220,400	62
Medical assistants	252,200	398,000	58
Human service workers	268,200	409,900	53
Residential counselors	189,900	277,800	46
Engineering managers	326,200	468,000	44
Medical records technicians	92,400	132,900	44
Dental assistants	228,900	325,400	42

Source: Bureau of Labor Statistics, 1999

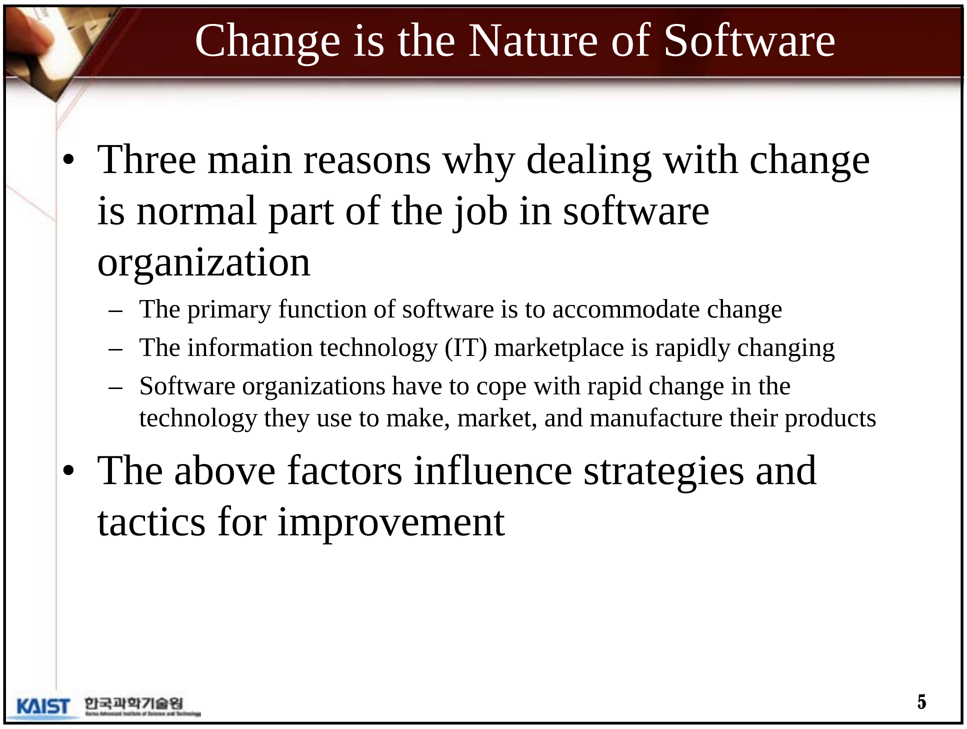


Improvement Framework

Reduce	Avoid/Cut
Time to Market	**Cost**
Productivity	**Quality**
Increase	Improve

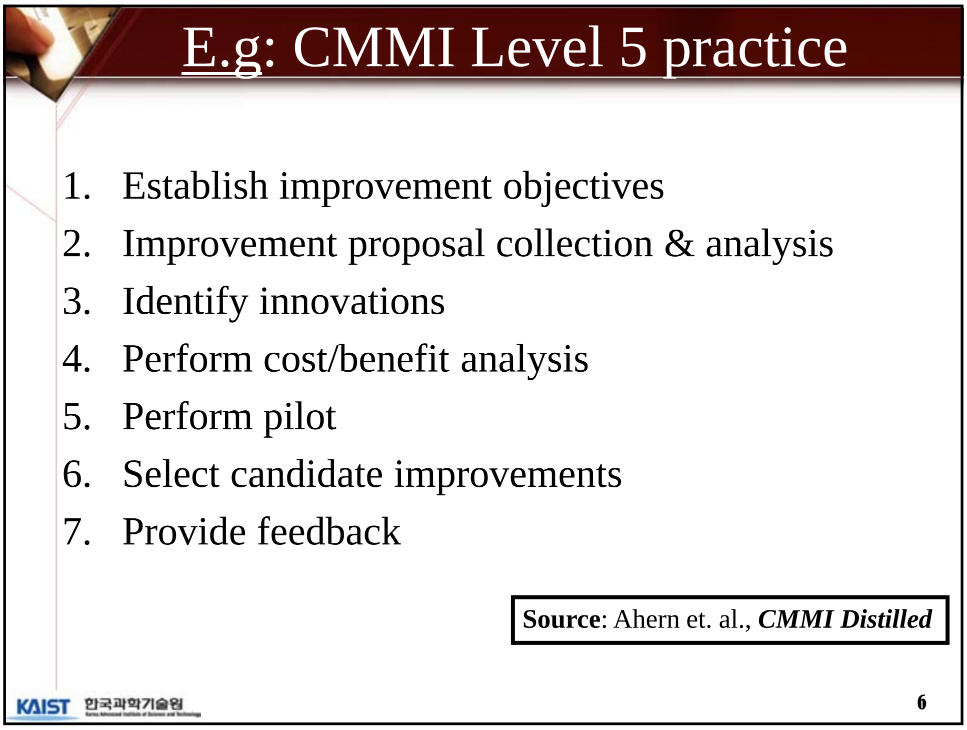
Customer Satisfaction

There needs to be some compelling business reason for making an improvement, else it won't be approved



Change is the Nature of Software

- Three main reasons why dealing with change is normal part of the job in software organization
  - The primary function of software is to accommodate change
  - The information technology (IT) marketplace is rapidly changing
  - Software organizations have to cope with rapid change in the technology they use to make, market, and manufacture their products
- The above factors influence strategies and tactics for improvement



E.g: CMMI Level 5 practice

1. Establish improvement objectives
2. Improvement proposal collection & analysis
3. Identify innovations
4. Perform cost/benefit analysis
5. Perform pilot
6. Select candidate improvements
7. Provide feedback

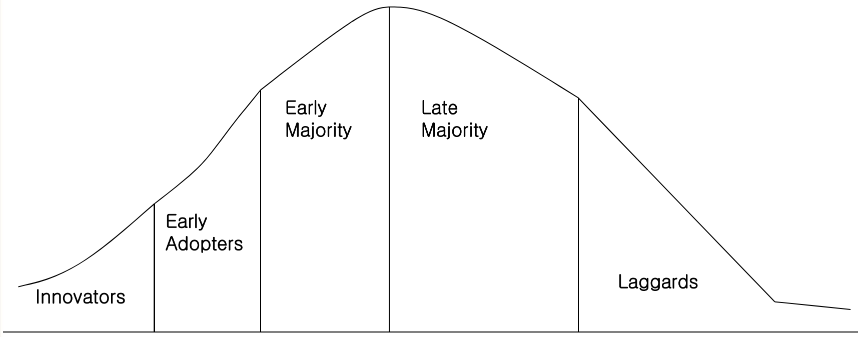
Source: Ahern et. al., ***CMMI Distilled***

Challenges for Organizational Change

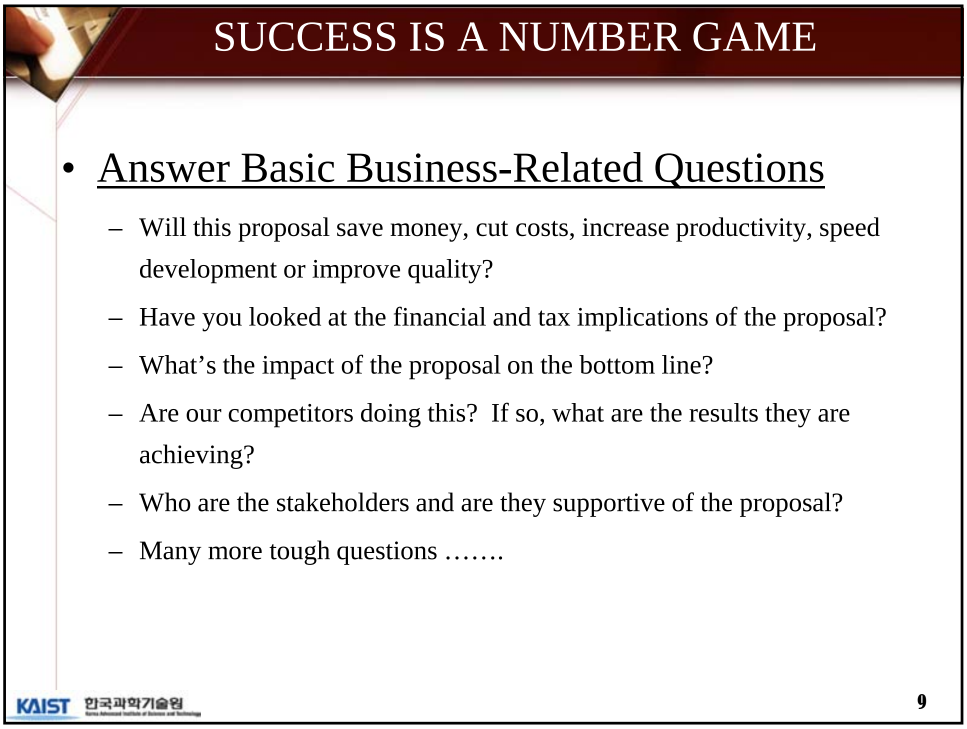
Challenges	Explanation
Lack of Incentives	The reward system must be changed to show that management is 100 percent behind the initiative
Good of the firm versus Good of the project	The reward system needs to be changed to emphasize "Good of the firm"
Infrastructure shortfall	Policies, processes and decision making structure changes
Few meaningful metrics	Collect data to quantify the impact of changes
Limited cash available	To get funded, make compelling business case

Moore's Technology Adoption Life Cycle

Change takes time and is hard to accomplish

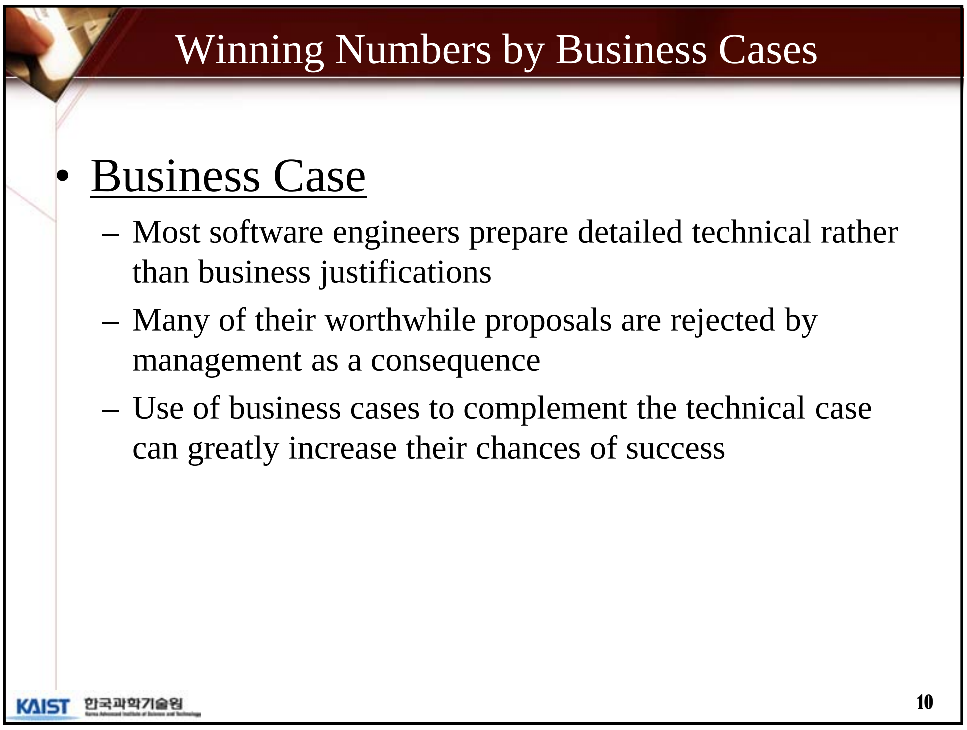


Source: G. Moore, ***Crossing the Chasm***



SUCCESS IS A NUMBER GAME

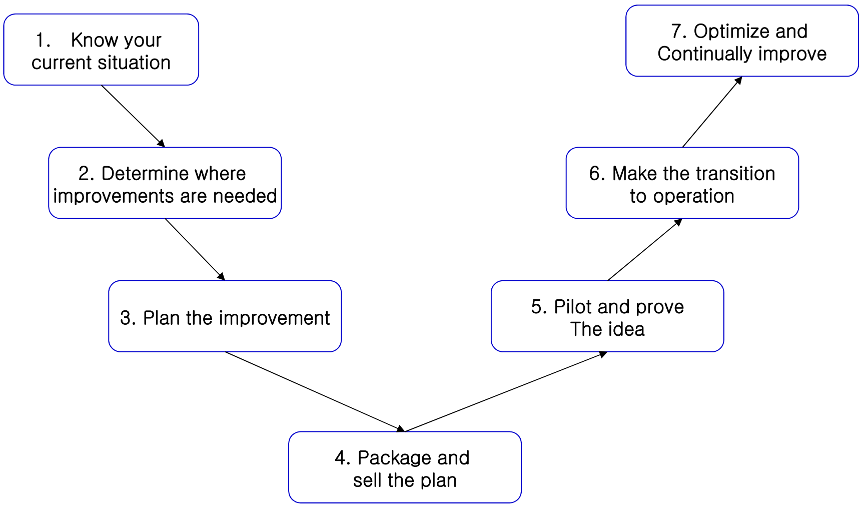
- Answer Basic Business-Related Questions
  - Will this proposal save money, cut costs, increase productivity, speed development or improve quality?
  - Have you looked at the financial and tax implications of the proposal?
  - What's the impact of the proposal on the bottom line?
  - Are our competitors doing this? If so, what are the results they are achieving?
  - Who are the stakeholders and are they supportive of the proposal?
  - Many more tough questions …….



Winning Numbers by Business Cases

- Business Case
  - Most software engineers prepare detailed technical rather than business justifications
  - Many of their worthwhile proposals are rejected by management as a consequence
  - Use of business cases to complement the technical case can greatly increase their chances of success

Improvement Cycles

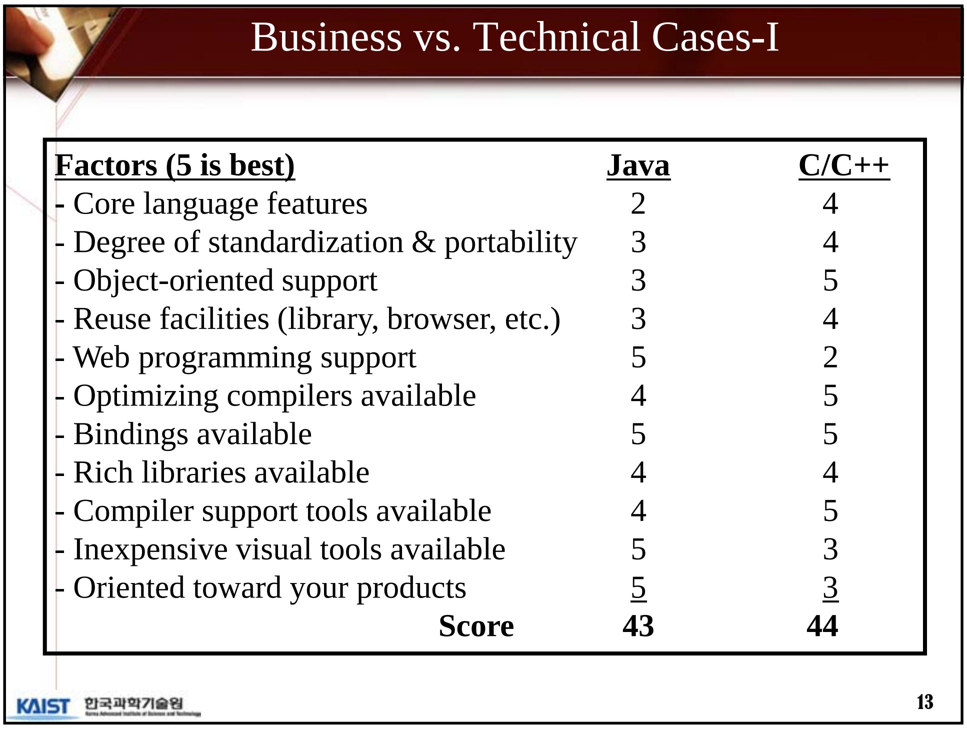


1. Know your current situation
2. Determine where improvements are needed
3. Plan the improvement
4. Package and sell the plan
5. Pilot and prove The idea
6. Make the transition to operation
7. Optimize and Continually improve

Basic Principles of Software Process Change

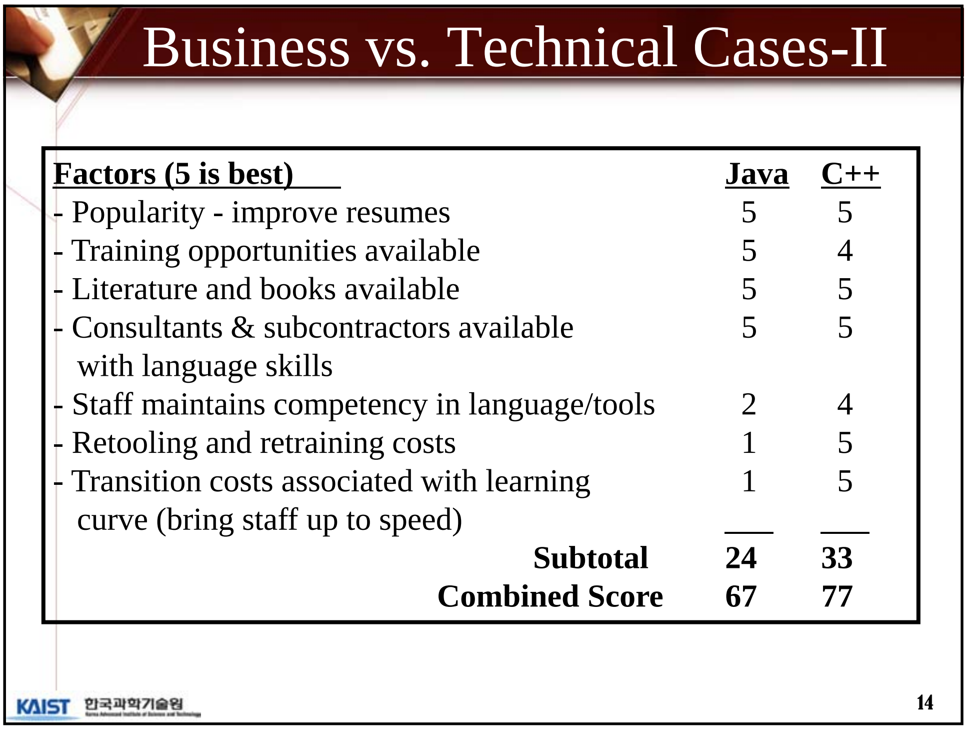
- *Major Changes must start at the top*
- *Everyone impacted by the change must be convinced that it makes sense*
- *Improvement can take place only when you have a baseline against which you can make a comparison*
- *Improvements is a continual effort*
- *Improvement must be sold continually; otherwise, you will lose your support*
- *Improvement requires serious investment*

[Source: Humphrey 1989]



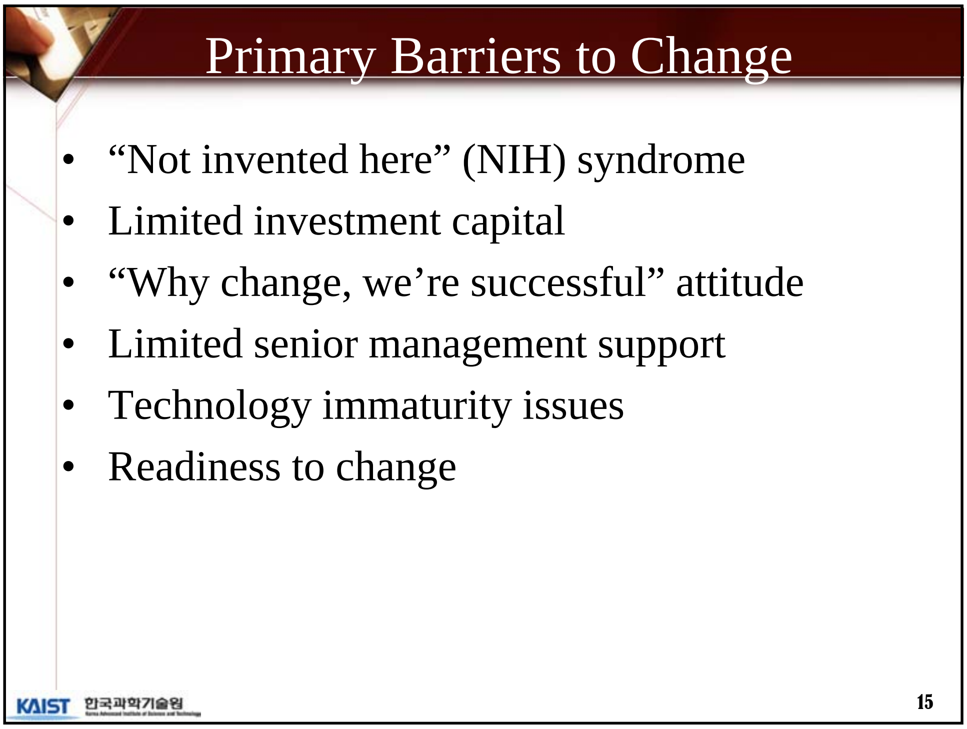
Business vs. Technical Cases-I

Factors (5 is best)	Java	C/C++
- Core language features	2	4
- Degree of standardization & portability	3	4
- Object-oriented support	3	5
- Reuse facilities (library, browser, etc.)	3	4
- Web programming support	5	2
- Optimizing compilers available	4	5
- Bindings available	5	5
- Rich libraries available	4	4
- Compiler support tools available	4	5
- Inexpensive visual tools available	5	3
- Oriented toward your products	5	3
Score	**43**	**44**



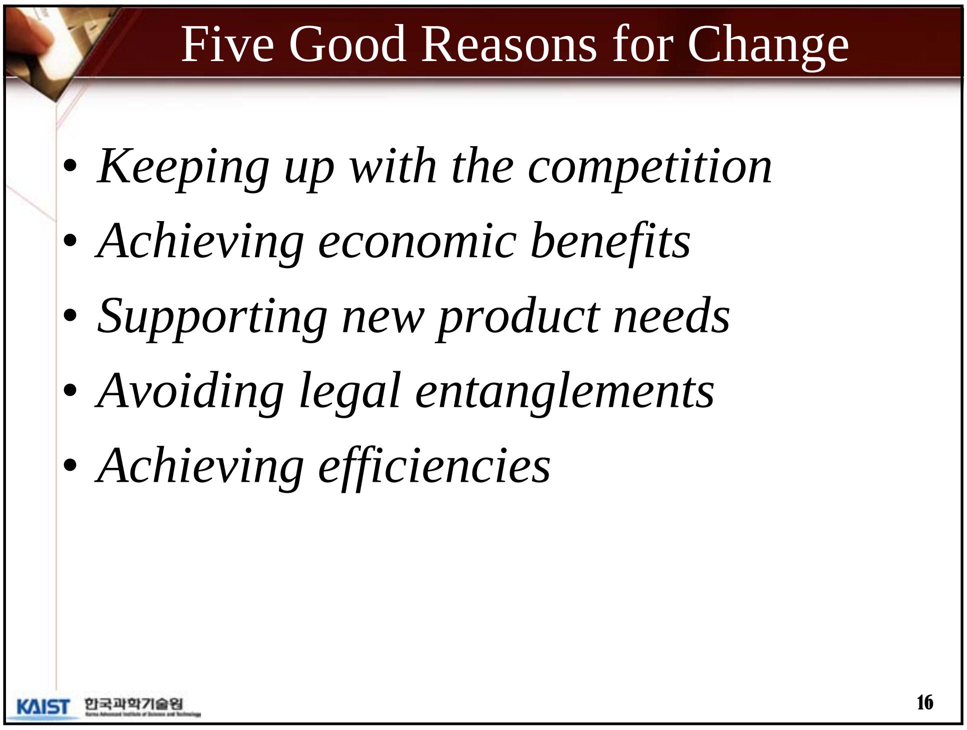
Business vs. Technical Cases-II

Factors (5 is best)	Java	C++
- Popularity - improve resumes	5	5
- Training opportunities available	5	4
- Literature and books available	5	5
- Consultants & subcontractors available with language skills	5	5
- Staff maintains competency in language/tools	2	4
- Retooling and retraining costs	1	5
- Transition costs associated with learning curve (bring staff up to speed)	1	5
Subtotal	**24**	**33**
Combined Score	**67**	**77**



Primary Barriers to Change

- “Not invented here” (NIH) syndrome
- Limited investment capital
- “Why change, we’re successful” attitude
- Limited senior management support
- Technology immaturity issues
- Readiness to change



Five Good Reasons for Change

- *Keeping up with the competition*
- *Achieving economic benefits*
- *Supporting new product needs*
- *Avoiding legal entanglements*
- *Achieving efficiencies*

Are You Ready to Change?

- Examine the following criteria:
  - *Consistent with business goals*
  - *Compatible with level of process maturity*
  - *Consistent with corporate culture*
  - *Compatible with investment strategies*
  - *Achievable within desired timetable*

Characteristics of Corporate Cultures

Entrepreneurial Culture	Old-Fashioned Culture
– Seeks opportunity for improvement	– Prefers the status quo
– Action-oriented and willing to take risks	– Avoids change and risk
– Team-oriented	– Territorial by nature
– Rewards innovation	– Rewards followers, not innovators
-Learns from failure	– Penalizes failure
– Creative, imaginative, pliant and flexible	– Persistent, authoritative and rigid

Summary

- Software is the fatest growing business in the world.
- To survive, Continually search for better ways of doing business
- Change is neutral in the software business
- The major barriers to change: psychological, political, and managerial
- Making change is a number game: Justify a reason to do so with numbers
- To succeed, tie the change to business goals and ensure that the change is achievable

Q & A