Software Process: a roadmap

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Goals of the presentation

• Propose some reflections on the state of the art in software process research.
• Identify possible research directions for the future.
Contents of the presentation

• Some quick comments on the history and areas of concern of software process research
• Failures and successes
• The road ahead

Disclaimer

• My very personal opinion.
• Just a few general comments that can fit in a short presentation.
• I’ll try to be provocative.
The starting point

• There is some evidence that better processes are instrumental to deliver better products.
• This has motivated research devoted to study, improve, automate processes.
• Indeed, we should question this assumption.
  ▶ Is it always the case?
• Anyway, let’s see the most important achievements.

The notion of process

• Developing software is not just a matter of buying tools.
• Areas of concern:
  ▶ Development technology.
  ▶ Methods and techniques.
  ▶ Organizational behaviour and social sciences.
  ▶ Marketing and economy.
• Increasing importance of the interplay of organizational, cultural, technological, and economic factors.
Process modeling and support

- Languages and environments for
  - Process understanding
  - Process design
  - Training and education (on processes)
  - Simulation and optimization
  - Process support

Process improvement

- Models to evaluate the maturity of a software process:
  - CMM, ISO 9000, MBA
- Methods to guide the process improvement activity:
  - IDEAL
  - SPICE
Metrics and empirical studies

- Definition of metrics and metrics selection techniques.
- Empirical methods: how to carry out experiments.
- Empirical results: “X is better than Y”.

Processes, eventually!

- Best practices. Two examples:
  - Personal Software Process.
  - Unified Software Process.
Summing up ...

- Certainly, relevant achievements.
- However, there are also several problems.
- It is necessary to assess and evaluate what has been done so far.

SW processes are processes too

- Certainly, software processes have their specific characteristics and facets.
- Nevertheless, they are “processes” with strong similarities with many other engineering processes.
- Sometimes we have reinvented the wheel and not reused existing experiences.
PML/PSEE must be re-thought

• Modeling languages are often too complex to support effective process description.
• Also, sometimes we want to support what can’t be supported.
• Existing technology is too complex, intrusive, and pervasive.

Empirical studies are a means not an end

• Sometimes, empirical studies are just statistical exercises.
• Fishing for results.
• What about
  • Significance?
  • External validity?
Software process improvement is process improvement too

- We have often considered SPI just from an engineering viewpoint.
- We have almost ignored economic, organizational, and strategic factor.
- In addition, existing approaches are focus on process improvement of stable and structured processes/companies.

F. Cattaneo, A. Fuggetta, and D. Sciuto. Pursuing coherence in SPI. To appear on *Software Process Improvement and Practice*.

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Looking for research directions

- Incremental modeling and support.
- Inconsistency management.
- Non-intrusiveness of process support.
- Process management from different viewpoints.
- Enlarge the scope of process improvement.
Enlarge the scope of SPI

- Three main directions:
  - Take into account non-engineering issues.
  - Exploit techniques, methods, and approaches developed in other disciplines.
  - Consider highly-dynamic, non-classical software companies.

Conclusions

- Software is the key constituents of modern products and services.
- Software process research is central.
- However, we need to rethink the way we do research in software process.