What is Research Impact? How to Assess it?

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Where Does Software Technology Come From?

- Who should get the credit?
 - What credit should they get?
- How to award credit?
 - -What measures?
 - -How to determine them?
- Does this really matter?
 - -To whom?
 - -For what reasons?

Facile answers are misleading

- It comes from:
 - -Sun, Microsoft, IBM, Rational, the web,
- Yes, but!
 - -Where did they get it from? And how?
- It comes from Dr. X's research
 - -Published a seminal paper
- Yes, but!
 - -Someone else cleaned it up, crafted code
- It was "in the air"
 - -How did it get there? Who nurtured it?

Why should we care? (as users, beneficiaries)

- Some technology isn't great
 - -Why are we stuck with it?
 - -Why isn't it better?
- Some technology seems useful
 - -How can we get more of same?
 - -How can we speed its appearance?
 - -Are there institutions that need to be
 - Strengthened
 - Demolished

Why Should We Care? (As Researchers)

- Altruistic reasons
 - More effective tech transfer
 - -Better technologies in use
- More self-serving reasons
 - Self-image
 - Academic status
 - -Positive Attitude
 - -Funding prospects

The Impact Project: Tracing the Source(s) of Technology to its Origins

- Focus is on Software Technology
- Start with technologies in widespread use
- Trace back to how they came into widespread use
- Document and analyze
 - What facilitates/inhibits technology flow?
 - How to make more good things happen more easily and more often

Credit is due to:

- Commercializers
- Researchers
- Tech Transfer agents
- Early adopters
- Scientific and Technical Communities
- Students with new degrees
- New Hires
- ETC.

What are the natures of their contributions? How to value them?

Contributions Differ

- Initial conceptualization of idea
- Evangelism
- Prototype demonstration
- Public promulgation
- Nurturing by community activities
- Indoctrination and training (students)
- Product commercialization

How to Evaluate These?

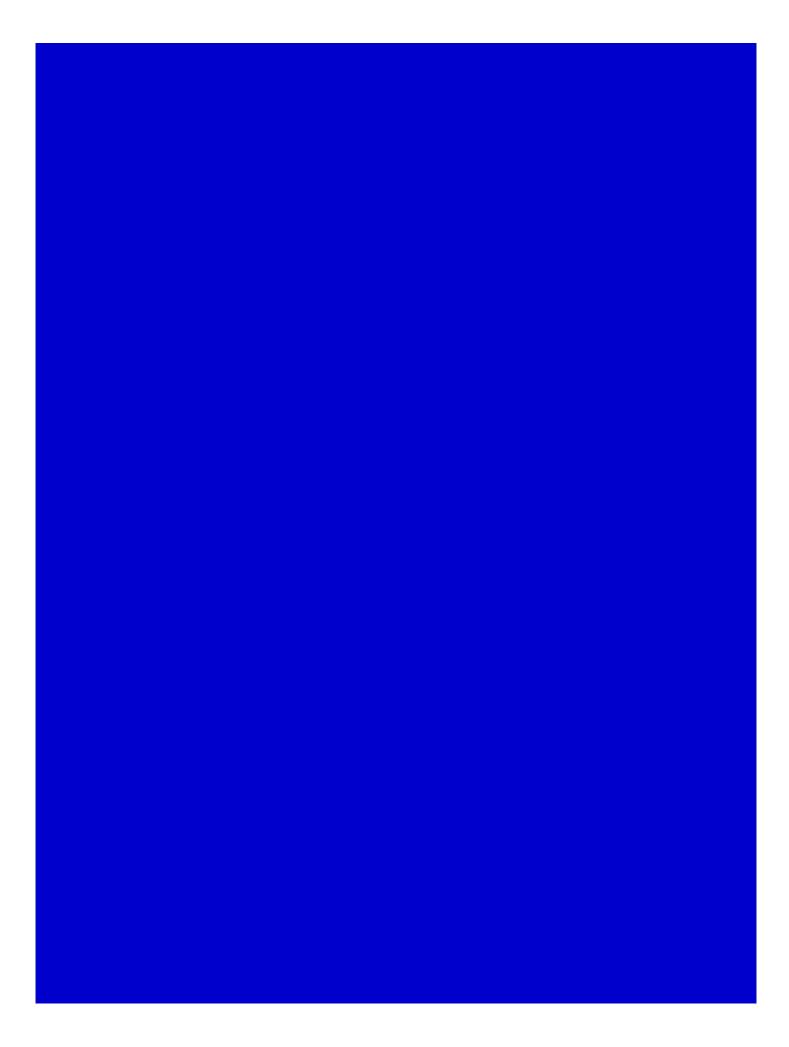
- Qualitatively
- Quantitatively
- Different perceptions by different parties
- Difficulties in assessing contributions

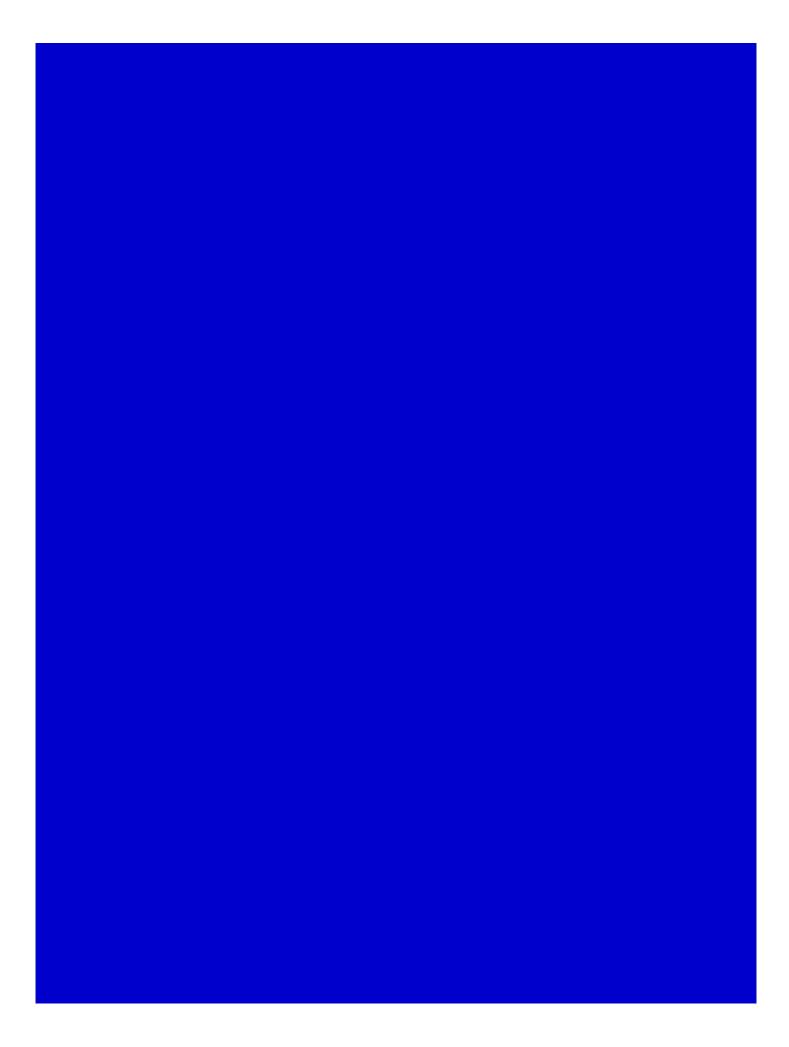
Addressing These Difficulties

- History is hard
 - -Especially for non-historians

Our Panel

- Mike Mahoney, Historian (!)
 - A historian views the Impact Project
- Dieter Rombach
 - Assessing Impact in Reviews/Walkthroughs
- Jacky Estublier
 - Assessing Impact in Config. Management
- Barbara Ryder
 - Assessing Impact on Modern Programming Languages





Some Broader Lessons

- Vendors tend to see value (impact) in
 - algorithms (e.g., differencing)
 - pieces of reusable code (e.g., RCS)
- But not in
 - concepts (e.g., hierarchical workspaces)
 - architectures (peer-to-peer repositories)
 - Which are often seen as "engineering common sense"
 - "Research had very little influence ..."
 - "We do not sell ideas, but tools. We (re)invented everything we needed…"

More Lessons

- Researchers tend to see impact in
 - Precedence
 - Concepts
 - Prototypes
- But tend to devalue importance of
 - Efficiency
 - Usability
 - Reliability
 - seeing as "engineering common sense"
 - "We invented almost everything ..."
 - "Tools are only an engineering issue ..."

Still More Lessons

- Both are right, both are wrong
- A good idea is had more than once
- Vendors have disincentives for distributing credit for ideas
- Researchers have incentives for claiming credit for ideas
- Research and productization both require engineered creativity

"Those who refuse to study history are doomed to relive it"

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"History teaches us that History teaches us nothing"