Why people misunderstands IT
OR
The maintenance is the implementation

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Mechanization: an old story

- Traditional tasks requiring lot of people (and possibly animals)
  - Harvest a huge field
  - Assemble thousand of pieces
  - Execute millions of calculations

- Traditional mechanization approach
  - One machine and few specialized persons
  - The machine does the physical work
  - Persons drive it and provide cognitive processing
    - Stone in the field, broken piece, meaningless number
  - The machine has no need of recognizing and adapting to a changing environment since people intelligence takes care of it

- Once you have mechanized and automated a task 80% of the job is done. It just remains a 20% maintenance job.
Mechanization in the computer era (1)

- Computers allow mankind to solve a different kind of tasks: “problem solving”
- Mechanization of tasks where human intelligence is required, not strength or ability
- A completely different scenario in conceptual terms:
  - Mechanization of almost purely cognitive tasks (“services”)
  - Now we are replacing intellectual capabilities of human beings with machines (i.e. mechanizing intelligence)
Mechanization in the computer era (2)

- We have some success here
  - Mechanical devices control tasks (self pilots)
  - Low complexity clerical tasks (managing bank accounts)
- They accounts for most of the industrial productivity increase in the last 30 years
- But when truly substituting the human intelligence with a machine we have not had so much success
  - Complex IT systems are late and over budget in a proportion embarassingly higher than any other industrialized field
A dramatic change of paradigm (1)

- Not just a slight shift in the meaning of word “mechanization”
- Human intelligence has
  - Capability to adapt to a changing environment
  - Flexibility to cope with new/modified requirement
  - Ability to learn from errors and experience
- Computers don’t!
- But the world around an organization is constantly changing
- Hence people expects IT systems to do something they don’t know how to do
A dramatic change of paradigm (2)

- IT professional/scientific community knows maintenance absorbs the largest share of resources.
- Society at large is not aware of this, since this was not true for all previous mechanization efforts in the history of mankind.
- Building an IT system is only 20% of the job. The real one is adapting it to ever changing environment.
  - An economic motivation for open source software?
What are we doing (1)

• Using “agile approaches”
  • Build a system a piece at a time, without detailing too much too early
  • Analyze results and adjust to errors
  • Like a person learns to do her job a bit every day

• Producing application development environments for “end-user development and maintenance”
  • Gartner: “citizen developers” by 2014 will build >25% of all business applications
  • Google’s App Inventor
What are we doing (2)

• Researching *self-adaptable software*
  • Situational computing
  • Self-managing situated computing
  • Using probabilistic models and reasoning tools to deal with changing environments
  • Using the web as a source of knowledge

• Focusing on *evolving information systems*
  • The evolution of IS is a continuous process and an inherent system property
We could and should do more...

- After 20++ years from
  - Parnas declaring SDI system could not be built
  - Brooks stressing the need for incremental development and good designers
- Society still considers IT systems just a sophisticate descendant of the plow... instead of a radically different new species
- Hence we have to educate society that:

  The maintenance is the implementation