

Shifting Paradigms in Innovation Management – Organic Growth Strategies in the Cloud

Richard Messnarz, Gabriele Sauberer, Micheal Mac an Airchinnigh, Miklos Biro, Damjan Ekert, Michael Reiner

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“Always design a thing by considering it in its next larger context. A SW architecture on an electronic control unit, a connected service function in a central car computer, a connected vehicle function in the cloud, the cloud supporting artificial intelligence, a cloud intelligence on a planet, a planet connected with planets” – Eero Saarinen – “Extended”.

The whole is more than the sum of the items, Aistoteles

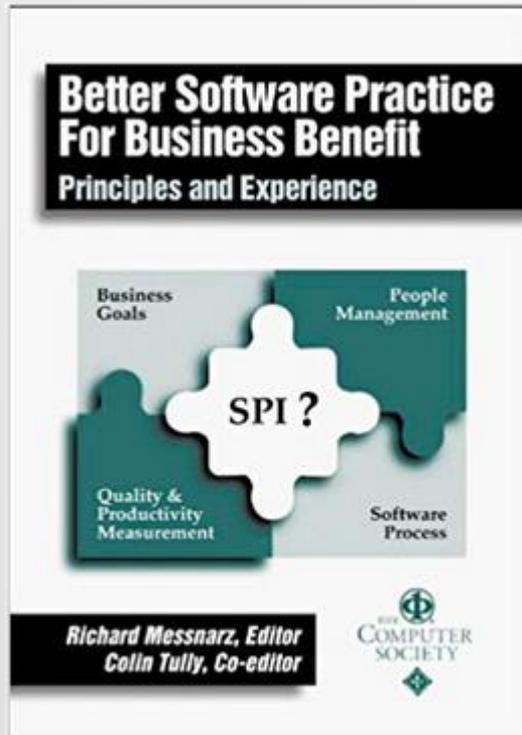
SW Engineering Philosophy

“Can we survive technology?” John von Neumann

Book 1997

SW Engineering Philosophy Chapter

- Ideal structure (Plato)
 - Object oriented paradigm (Aristoteles)
 - Communication between nodes that change their behavior (radical constructivism)
- World of non deterministic programs predicted



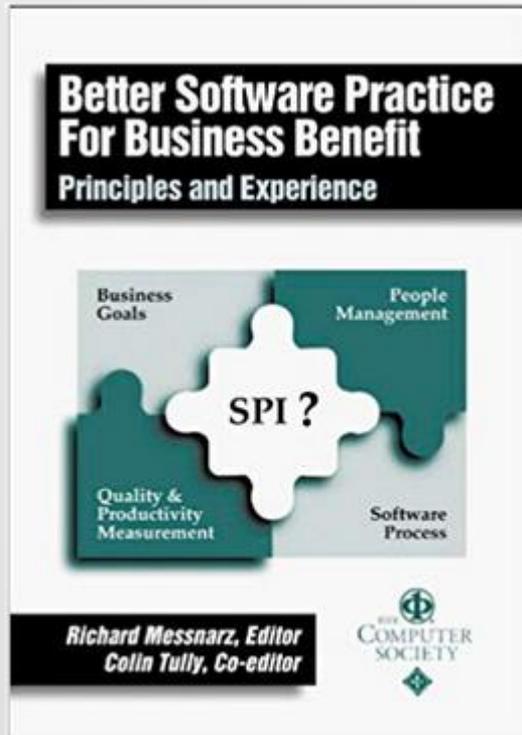
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Currently

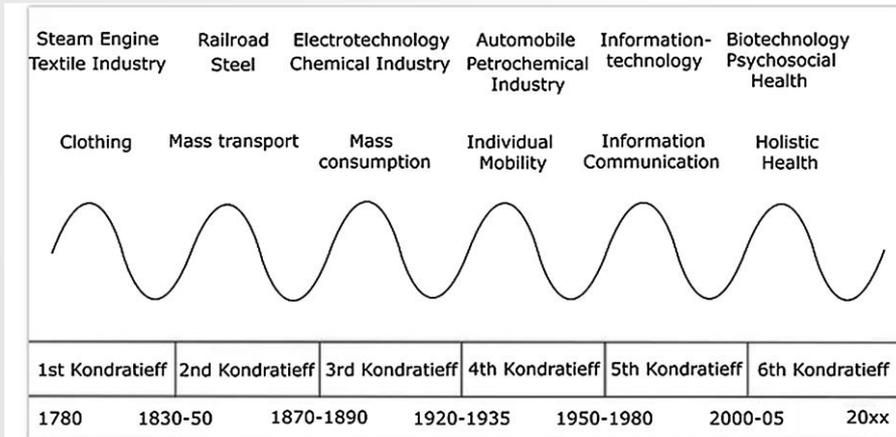
- Non deterministic and probabilistic algorithms in the cloud
- AI based algorithms deciding based on the most probable of the results
- Learning systems / machine learning

→ World of non deterministic programs is real

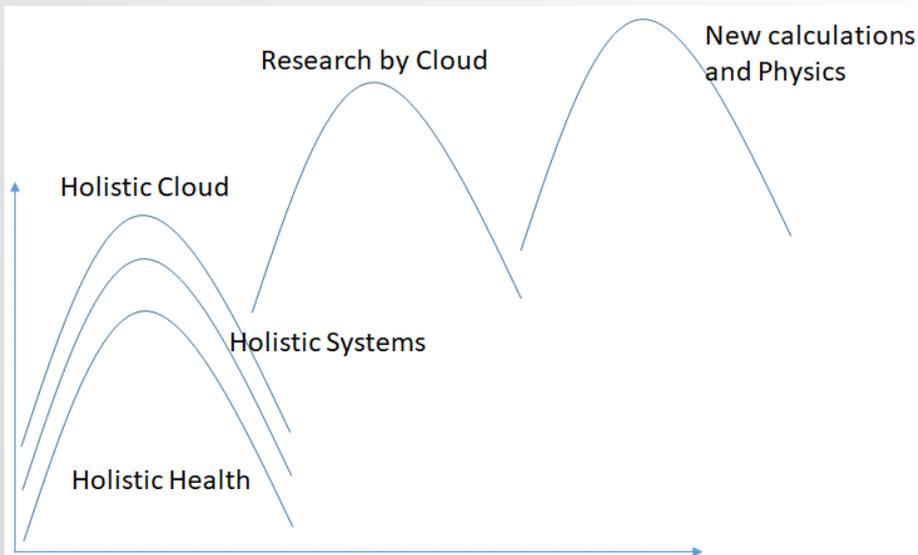


What is next?

“Can we survive technology?” John von Neumann



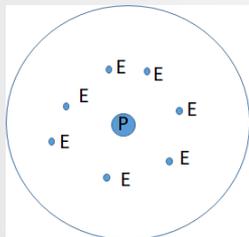
- Kondratieff (structural thinking)
- Still deterministic behavior



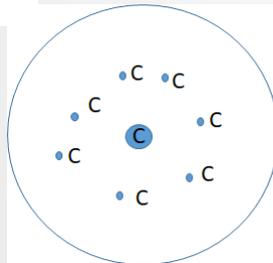
- Radical constructivism
- No behavior
- Growing from
 - **holistic Internet of Things,**
 - **holistic systems** (people from 2030 can only buy self driving cars),
 - and finally a **holistic cloud with intelligent digital livings**

What is a living being?

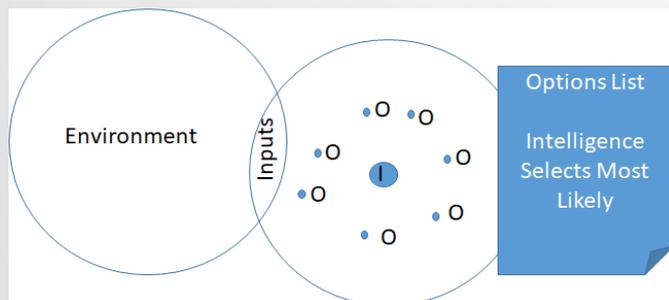
“Can we survive technology?” John von Neumann



Expertise Bundling



Calc Power

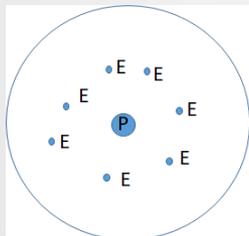


Acting like a living being

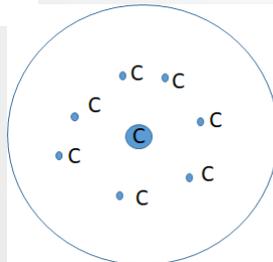
- SW becomes a living being
- Definition
 - A living being is a unit that can learn, learn from its mistakes, and can reproduce itself.
- Why SW
 - A cloud is an immense network of knowledge, computers, programs, and relationships. If we define software solutions for problems as a unit, and if these units can use data to increase their own functions or to create further units in further computers, the units within the cloud become digital living beings (according to definition).

What is a living being?

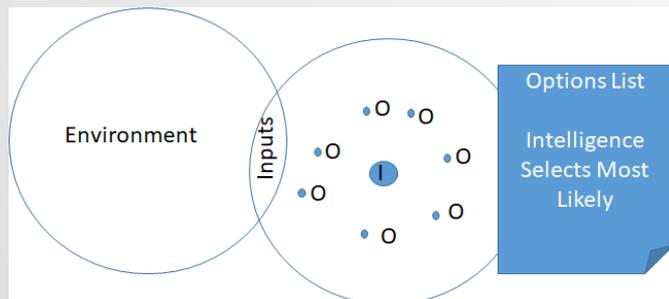
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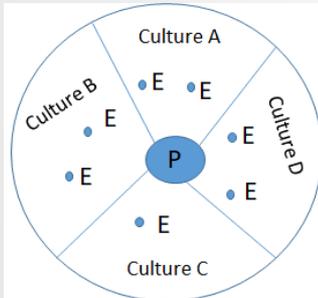


Acting like a living being

- Radical constructivism
 - Cloud SW acting like an intelligent living being
 - Same question resulting in different answers depending on learning parameters
- New generation will act differently
 - Learn differently
 - Trust fully in technology – get totally dependent?
 - Swarm behavior generation

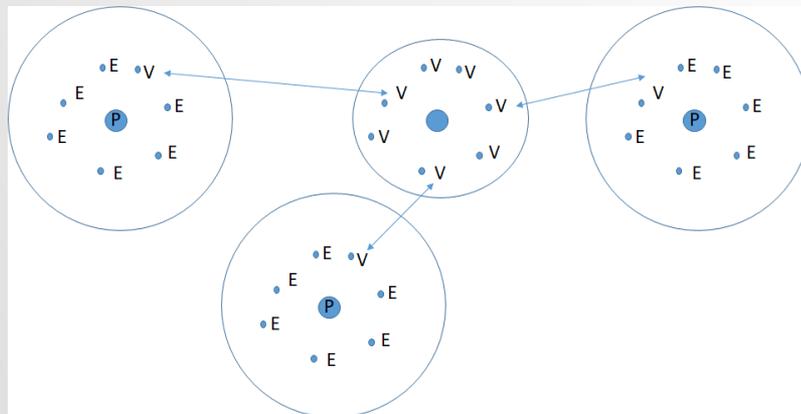
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Planet culture? Or do we fall back to national culture? Technology will drive us.

- New generation will communicate differently
 - No borders
 - Automatic translation
 - More innovation by different views

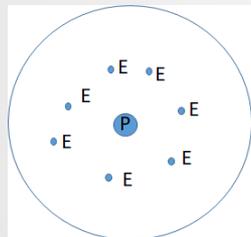


Network of networks snow ball strategy

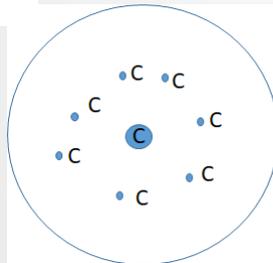
- New strategies for innovation projects will come up
 - Creating big mass swarm influence
 - You see it in politics recently (media strategy in networks)
 - Infection spread strategies

What is a living being?

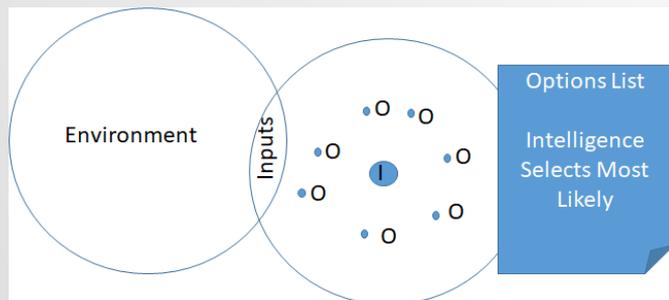
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 - Still deterministic behavior
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GOOD OR BAD?

It is a wave and a trend, it is a human evolution.

- **Can we really stop evolution?** In history always those lost which did not go with the evolution.
- **Can we control evolution?** Radical constructivism speaks against it, no control long term possible.
- **Can we use it?** Yes, we can create a critical mass of research and calculation power and let AI propose solutions (additionally to single human minds).
- **Will it change programming for SW engineers?** Definitely, we will interface the cloud and work on probabilistic models for coming up with results of SW functions.

Cross-Cutting Approach to Integrate Functional and Material Design in a System Architectural Design – Example of an Electric Powertrain

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The whole is more than the sum of the items, Aistoteles

“Everything should be made as simple as possible, but not simpler.” –Albert Einstein

“If you feel no resistance you have not done real research.” –Richard Messnarz