AGILE RESEARCH AND DEVELOPMENT

an introduction for scientists and engineers
I. The Way the World Works
Why?? Because that’s the way we do things around here.

Nobody notices if I work or browse the web all day long.

Managers make decisions about my work without asking me.

My abilities are being severely underutilized.

I work here because of the benefits and the holidays/free time.

Nobody notices if I work or browse the web all day long.

My manager has no idea about my work or my skills.

We are not allowed to make mistakes here.

Yet another meaningless meeting / report.

Nobody can tell me the impact of my work on the bottom line.

The louder gets promoted.

I work here because of the benefits and the holidays/free time.

My manager has no idea about my work or my skills.
Our projects take much longer and cost much more than anticipated.

It’s hard to find talented, motivated employees.

My employees don’t go the extra mile. They shall stay longer, work harder, like me.

Employees are asking too many questions. Why can’t they just do it for me?

We’ve successfully delivered our new product as planned. Why nobody wants to buy it?

This project is my responsibility – so I shall make the decisions here.

Everything is priority. I just have to spend more time at work.

Our retention rate is high. And it’s always the best who leave first.

We’ve successfully delivered our new product as planned. Why nobody wants to buy it?

If we go on like this, competition will eat our market share.

It’s hard to find talented, motivated employees.

Everything is priority. I just have to spend more time at work.

Our retention rate is high. And it’s always the best who leave first.

We’ve successfully delivered our new product as planned. Why nobody wants to buy it?

If we go on like this, competition will eat our market share.

Disappointment of the manager
We spend more than half of our conscious life “working”.

- Producing results
- Planning activities no one ever executes
- Writing reports nobody ever reads or cares about
- Wasting time at work (reading news online, playing solitaire, ...)
- Social life and internal politics (chats, meetings, ...)
- Commuting
- ...

Did the child you used to be imagined an adult’s life like this?
Did the adolescent you studied so hard for this?
“The way the world works is broken.”

Jeff Sutherland, creator of Scrum
II. Modern Day Organizations
Organizing people and projects – The classical way

Hierarchical organization

Matrix organization

Phase-Gate Waterfall project management
NASA PPP, PMI, PRINCE2, HERMES, ...

Feasibility → Plan → Design → Build → Test → Production → Support

quality gate then handover
Gotthard Base Tunnel, CH
Swiss Federal Government
Swiss Federal Railways (SBB)
AlpTransit Gotthard

• ~12 GCHF cost
• 23 years
  (1993 (first drills) – 2016 (inauguration))
• ~2600 employees
• 57 km twin-track underground route
• Max. train speed: 250 km/h
• Estimated lifetime: 100 years
Virtual Case File
Science Applications International Co. for FBI

Cancelled: 2005
Budget spent: $170 M
Staff: ≈300
Lines of code: 730 k

Cancelled as found to be broken beyond repair.
**Virtual Case File**
Science Applications International Co. for FBI

Cancelled: 2005
Budget spent: $170 M
Staff: ≈300
Lines of code: 730 k

Cancelled as found to be broken beyond repair.

**Sentinel**
Lockheed Martin for FBI

Planned: 2006–2009
Stopped: 2010
Budget spent: $405 M
Staff: ≈250

Users refused to use.

Post mortem analysis:
More discipline and more rigorous planning is needed.
Virtual Case File
Science Applications International Co. for FBI

Cancelled: 2005
Budget spent: $170 M
Staff: ≈300
Lines of code: 730 k

Cancelled as found to be broken beyond repair.

Sentinel
Lockheed Martin for FBI

Planned: 2006–2009
Stopped: 2010
Budget spent: $405 M
Staff: ≈250

Post mortem analysis:
More discipline and more rigorous planning is needed.

Users refused to use.
III. The Agile Movement
\[ t_{\text{response}} \gg t_{\text{env change}} \Rightarrow \text{failure} \]

Examples of changes

External environment

- Customer interest
- Requirements
- Competition
- Regulations
- Work market
- Underlying technologies
- Unexpected opportunities
- ...

Internal environment

- People available
- Required skills
- Resources
- Team dynamics
- Collaborations
- Initiatives
- Strategy
- ...

Product R&D in a turbulent environment
Manifesto for Agile Software Development (2001)

We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

**Individuals and interactions** over processes and tools  
**Working software** over comprehensive documentation  
**Customer collaboration** over contract negotiation  
**Responding to change** over following a plan

That is, while there is value in the items on the right, we value the items on the left more.

http://agilemanifesto.org/
Agile Teams
- Commitment and Focus
- Self-Driven
- Organizes own work
- Responsibility, Ownership
- Iterative delivery

Agile Culture
- Trust
- Transparency
- Empowerment
- Flexible & Adaptable
- Minimal Bureaucracy

Agile Organization
- Grown gradually
- Self-Organized
  Adaptive Complex Network
- Dynamic
- Scale-free
IV. Status of Agile in 2018
Agile frameworks

Team-Level Frameworks
- SCRUM
- Extreme Programming
- XTPRIME MANUFACTURING
- DUBLIN SOFTWARE CRAFTSMANSHIP
- SPRINT

Scaled Frameworks
- SCRUM@SCALE
- Nexus™
- SAFe®
- DISCIPLINED AGILE
Traditional vs Agile Success Rates

**Agile Maturity of Organizations**

- **High**: 3%
- **Medium**: 27%
- **Low**: 70%

**FrAgile**
- **ScrumBut**
- **Agile in name only**

KPMG, Agile Project Delivery Report, 2017

Business Agility Institute, The Business Agility Report, 2018
Reasons why transformations fail:

- Contradicting hybrid approaches, e.g. matrix organization kept
- Deployment approach, as if Agile would be a tool or a process
- Big Bang approach, instead of organically growing
- Low priority, e.g. transformation lead role is delegated to a low power person
- Lack of understanding of what Agile is or what a transformation takes
- Executive false incentives, e.g. short-term gains, layoffs, ...
- Insufficient coaching
- Coach false incentives, typically $$$
Jan Farkas
Agile Coach

Halkeon Development GmbH
Dietikon | Switzerland

janfarkas.com
jf@janfarkas.com
+41 77 455 20 57
www.linkedin.com/in/jan-farkas/

Thank you for your attention!