T-Shaped

... Na?, not in Germany

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Deep disciplinary knowledge

Ability to communicate across boundaries

The T-shaped professional

Source: http://tsummit.org/t
The „STEM“ of the T-shaped professional

- The essential disciplinary part of every program (education)
- Deep knowledge in a “marked off” area
- Intensive study over a long time
- Focused
- The individual is seen as an authority in the field
Michael Crichton coined the term “thintelligent” to describe engineers who “think narrowly and . . . call it ‘being focused.’ They don’t see the surround. They don’t see the consequences.”

Jurassic Park (1990: p. 284)

We call them „nerds“ or discipline idiots
The T-shaped professional

The „bar“ of the T

- Possession of boundary crossing competencies
- Deep interest in areas beyond the “marked off” own discipline
- Communication skills
  - Empathy
  - Understanding
- A (more) rounded individual
Changing Innovation Processes

- **Start of the Project**
- **Extension of period of development**
- **Extension of period of amortization**
- **Payback period**
- **Product substitution**
- **Shortening of the product life cycle**

Translated from German
original source: https://www.tcw.de/

- All firms
- Risks too high (generally)
- Costs too high
- Lack of internal money
- Lack of external money
- Internal resistance
- Organizational problems
- Lack of skilled employees
- Lack of technical information
- Lack of market information
- Lack of customer acceptance

- Multiple answers possible
- in % of firms participating in the survey
The Rogers Factors

- **Relative Advantage**: degree to which an innovation is perceived by (potential) **customers** to be better than established products or ideas.

- **Compatibility**: degree to which an innovation is perceived by (potential) **users** to be consistent with existing values, experiences or processes.

- **Complexity/Simplicity**: Is the innovation easy to use by the **adopter**?

- **Trialability**: degree to which the innovation can be experienced by the (potential) **user**.

- **Observability**: Degree to which the benefits of an innovation are visible.

E. Rogers: Diffusion of Innovation, 1985
The T-shaped professional

I- shaped or T- shaped?

❖ Interesting regional differences
  • USA – English speaking countries
    ➢ “Spohrer’s List”
    ➢ ASEE Annual Conferences
  • Germany – German speaking countries
    ➢ ???

The T-shaped professional

shaped or T-shaped?

Number of References

- Phase 4
- Phase 3
- Phase 2
- Phase 1

Spohrer's List from Oct. 2014  ASEE Conference Papers

2010 (2)
2011 (1)
2014 (2)
2015 (2)
2016 (2)
2017 (4)

Why do we see so little change in the way we teach in Germany?

- Dipl.-Ing. – Made in Germany?
- “A ‘Dipl.-Ing.’ in front of your name is like a star on the engine hood: A trademark of highest quality.”

(Quote translated from German: https://www.grandprix247.com/2018/01/18/zetsche-we-are-100-aligned-with-ferrari/)
“Ceterum censeo Carthaginem esse delendam!”

“… These courses should be removed from the engineering curricula”
“You know, Prof. Steffensen, we are able to calculate but we don’t (like to) communicate!”

The perspective of the engineering professors is often not very different.

Some of the innovation flops or failures to anticipate new challenges might highlight the need to listen more to the customers or stakeholders and less to brilliant engineering traditions.