

The background of the slide is a photograph of a CNC machine in operation, with a metal part being machined. The scene is overlaid with a semi-transparent blue grid and binary code (0s and 1s). In the top right corner, the Siemens logo is displayed in a white box. The main title is in a large, white, sans-serif font on a teal background. At the bottom, there is a white bar with the authors' names and the Siemens website URL.

SIEMENS
Ingenuity for life

TRIZ – Develop or Die in a World Driven by Volatility, Uncertainty, Complexity and Ambiguity

Martin Kiesel, Jens Hammer

www.siemens.com

Changing Environment – VUCA World

Volatile

expressing unclear, unforeseeable and fast changing market conditions

Uncertain

addressing user acceptance of implemented features or user acceptance of new business model

Complex

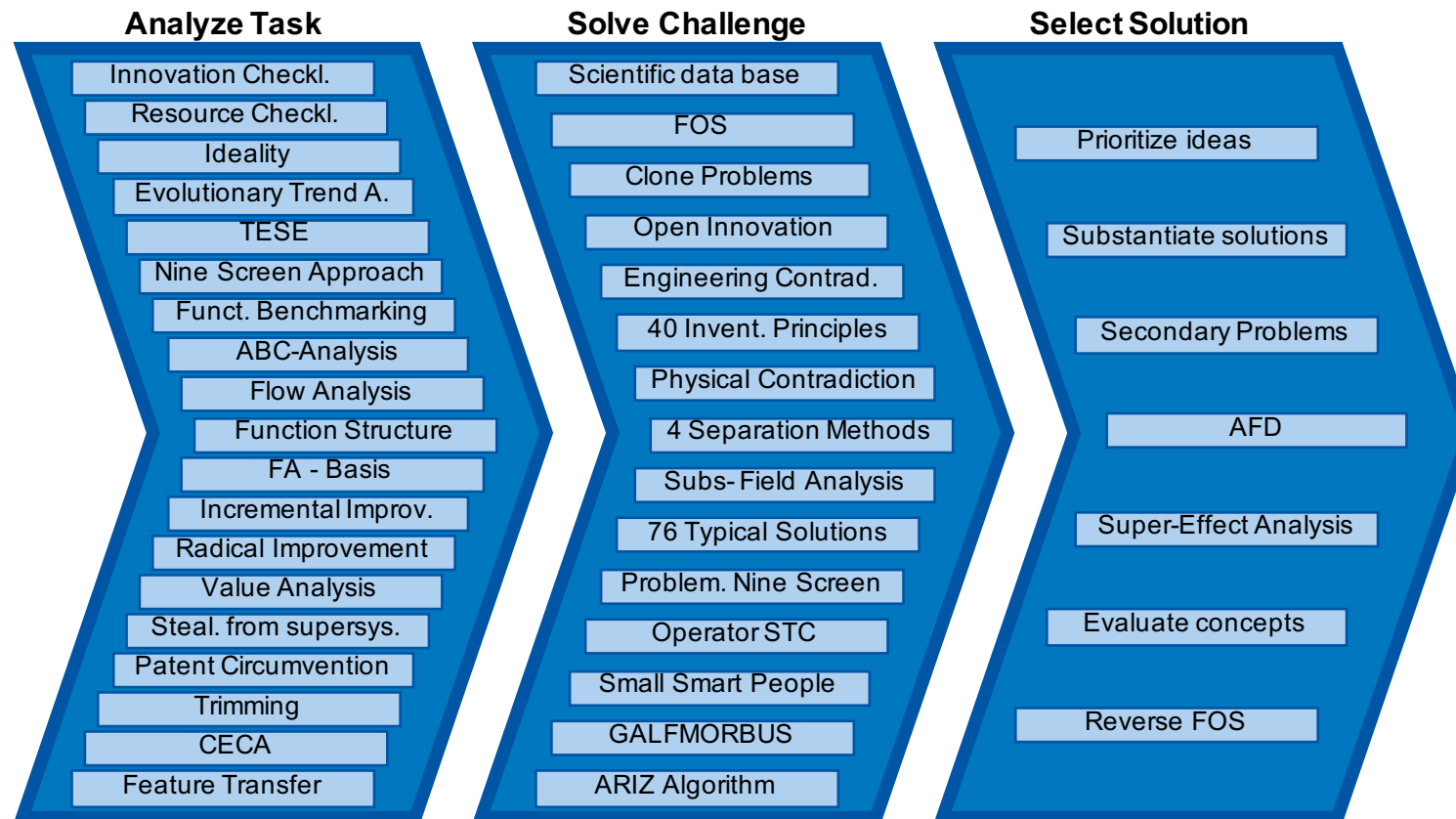
addressing to the complex development condition (teams worldwide, new technologies)

Ambiguous

focusing on unclear directions, no stable forecasting and unclear cause effect chains

[3] Prahalad, C. K., & Ramaswamy, V. (2003). The new frontier of experience innovation. MIT Sloan management review, 44(4), 12-18.

Evolution of TRIZ – Current TRIZ Tools



Evolution of TRIZ – recent approaches (1)

From technical systems to business system

- Voice of the product
- Voice of the market
- Voice of the business

Tools:

Value-Conflict Mapping (VCM / VCM+)

Increased addressing of human Senses

- near field senses (e.g.)
- Sensing
- Tasting
- Smelling

Tools:

New Trend: Trend of Increased Addressing of Human Senses

Social Media as a resource

- „data crawler“ as a proxy to social media (Facebook & Google)

[11] Boka et. al
Applications of TRIZ in Business Systems.

[14,15] Mayer. "Increased Addressing of Human Senses as a Trend"

[11] Boka et. al
Applications of TRIZ in Business Systems.

Evolution of TRIZ – recent approaches (2)

Main Parameters of Value (MPV) in Product / Process Innovation

Conclusion:

- Focus on Functions not components
- Address key problems
- Innovate against right target
- Build MPV Hypotheses

Tools:

Main Parameters of Value (MPV)
Discovery and Analysis

[18] Litvin S. Main Parameters of Value: TRIZ-based Tool Connecting Business Challenges to Technical Problems in Product/Process Innovation

TRIZ and scaled agile development (SAFe)

Conclusion:

- TRIZ applied on different Levels of the framework
- Portfolio, Program, Team
- MPV-thinking and –usage is deeply integrated in lean development

[24] Halas, M. Lessons for TRIZ from Design Thinking & Lean 3P. TRIZ Future conference 2016. Wroclaw, Poland

TRIZ and Design Thinking (DT)

Conclusion:

- TRIZ supplements Design Thinking
- TRIZ especially for ideation phase
- DT for human interaction, empathy, experimentation, fast feedback

[19] Halas, M. Lessons for TRIZ from Design Thinking & Lean 3P. TRIZ Future conference 2016. Wroclaw, Poland

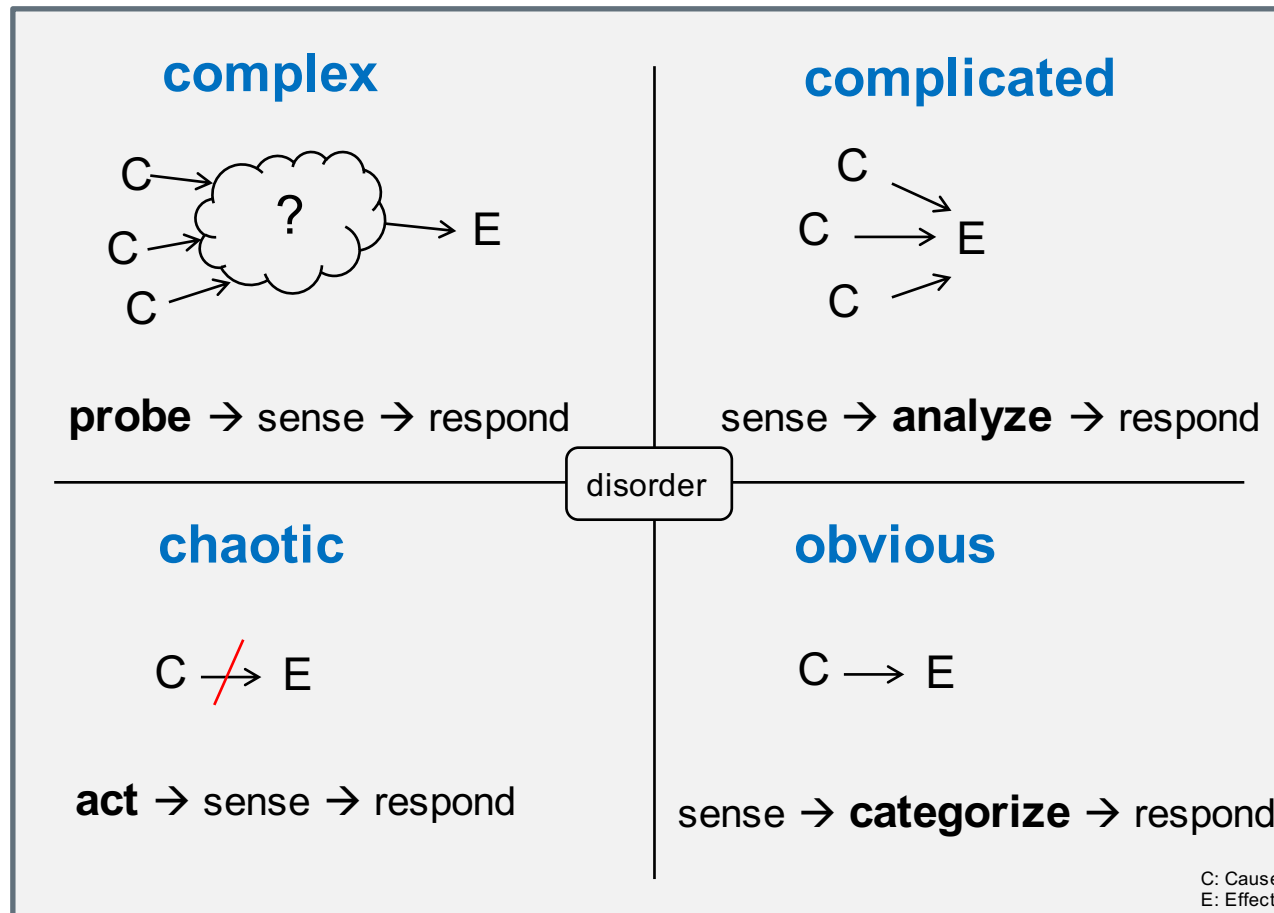
Methodology

Structured discussion concerning TRIZ Status and necessary extensions based on the Cynfin Framework (model for systems/problems) and the Three-Layer Product Architecture (model of softwareintensive product)

Approach:

- 1. Introduction Cynefin Framework**
- 2. Introduction Three-Layer Product Architecture**
- 3. Results and discussion:**
 - TRIZ in the context of the Cynefin Framework
 - TRIZ in the context of the Three-Layer Product Architecture
 - Key topics to develop TRIZ in a VUCA World
- 4. Conclusion**

Cynefin Framework as a model for systems & problems

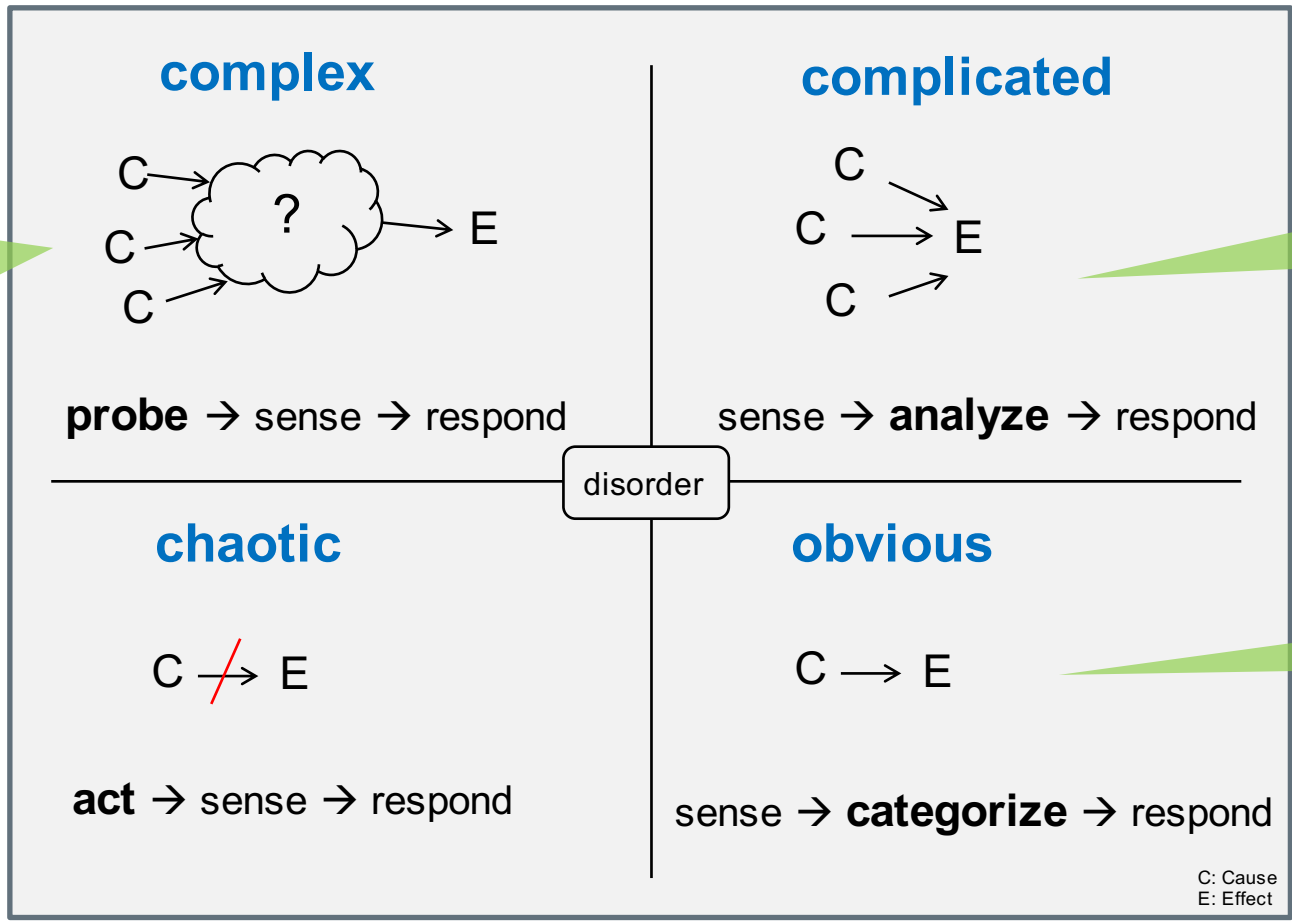


[20] Snowden, D. The Cynefin Framework.
<http://www.cognitive-edge.com>

TRIZ in the context of the Cynefin Framework

Experiments based on Hypotheses

Ideality
9-Screen Approach
TESE
MPV Hypotheses



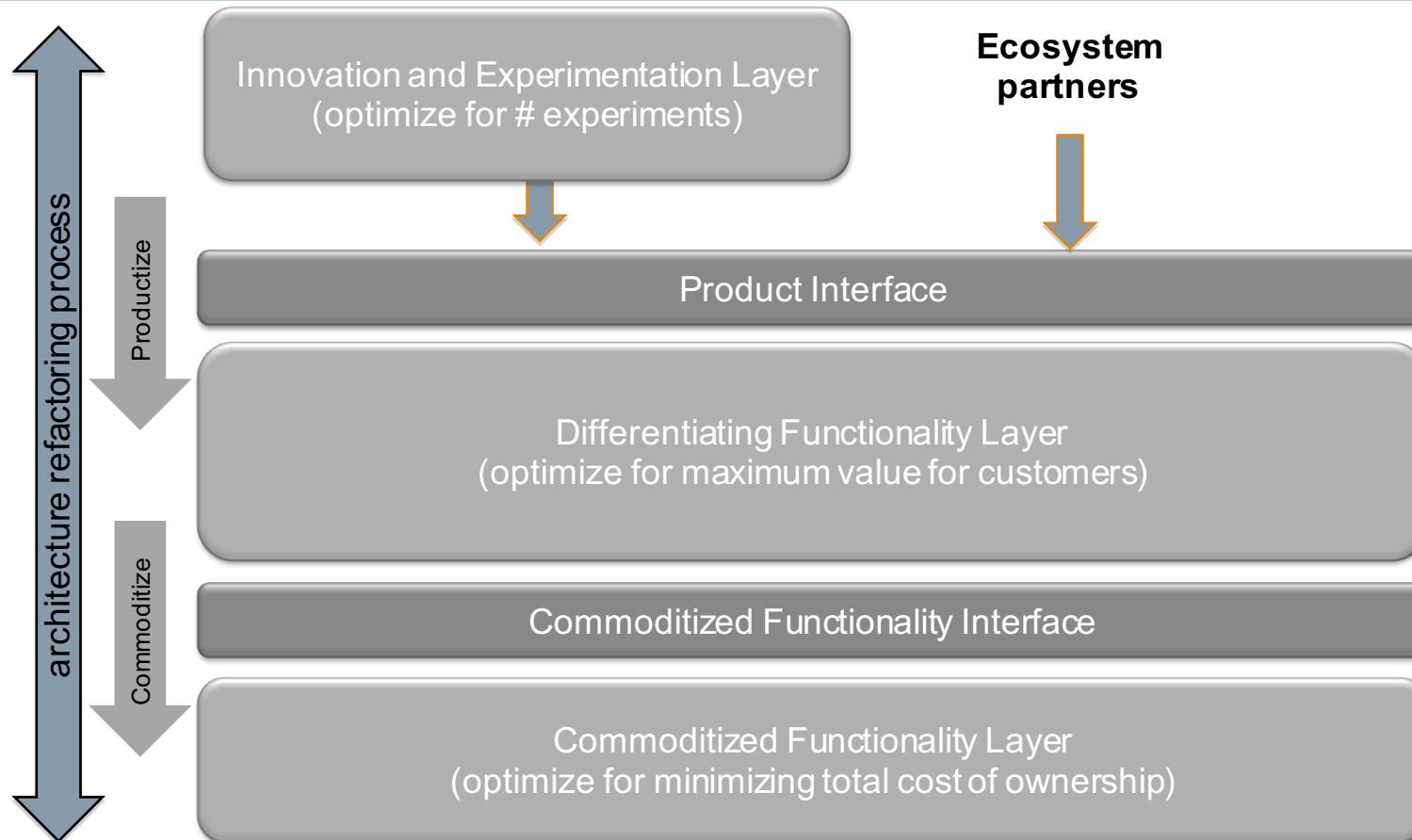
Analyze & solve

Root Cause Analysis (RCA)
Other classical tools

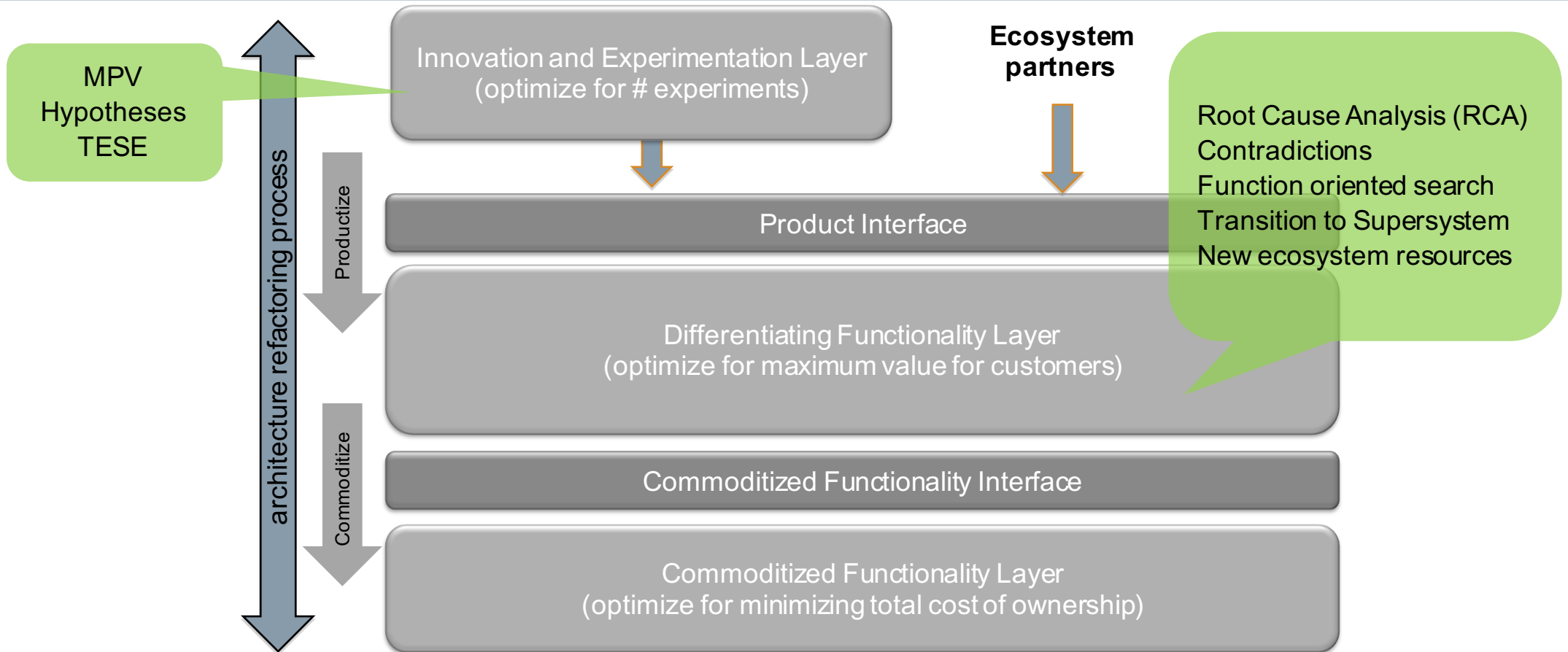
40IP
other classical Tools

based on
[20] Snowden, D. The Cynefin Framework.
<http://www.cognitive-edge.com>

Three-Layer Product Architecture as a model for softwareintensive products



Three-Layer Product Architecture as a model for softwareintensive products



Results & Discussion - Extended Application Fields

From pure **technical systems and technical processes**

to

- **technical systems with increasing Software, human interaction and IT-related aspects and technologies** (e.g. cloud computing, blockchain,...)
- **business systems & business models**
- **service oriented business models** (covering the Trend from products to services)
- **User Experience driven products and services**

Results & Discussion - Technical and Ecosystem Resources

From pure **MATCHEMIB** Resources

to

- **New sensors**
- **Data** (Data Analytics)
- Artificial Intelligence (**AI**)
- **Deep Learning**
- **Cloud Computing**
- **Ecosystems** (e.g. digital platforms from Microsoft Azure and Amazon AWS)
- **Open source** assets

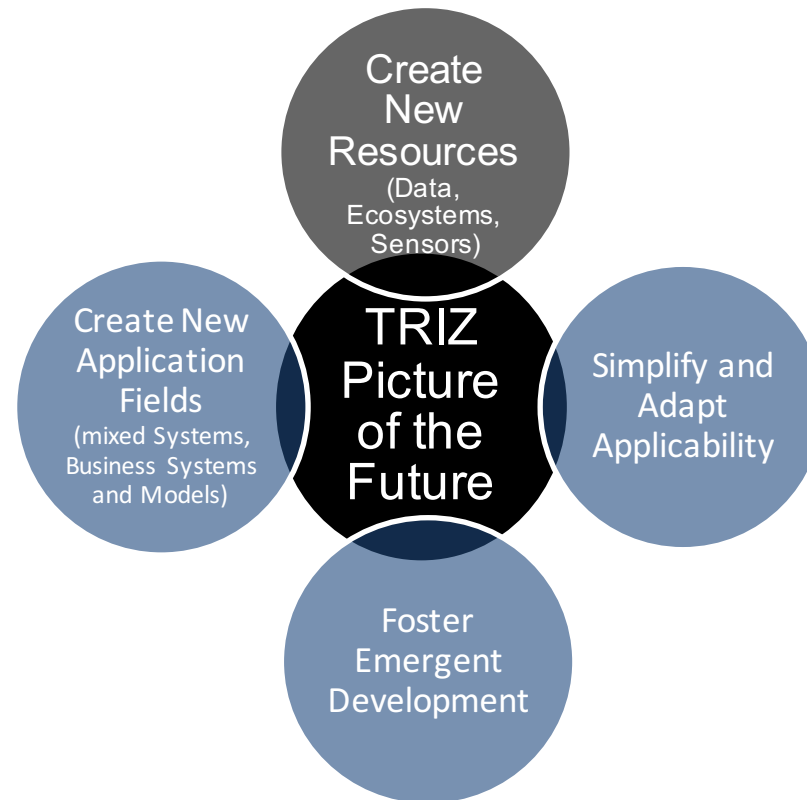
Results & Discussion - TRIZ in a Lean & Agile working environment

From heavyweight TRIZ Toolbox including complex solution algorithms

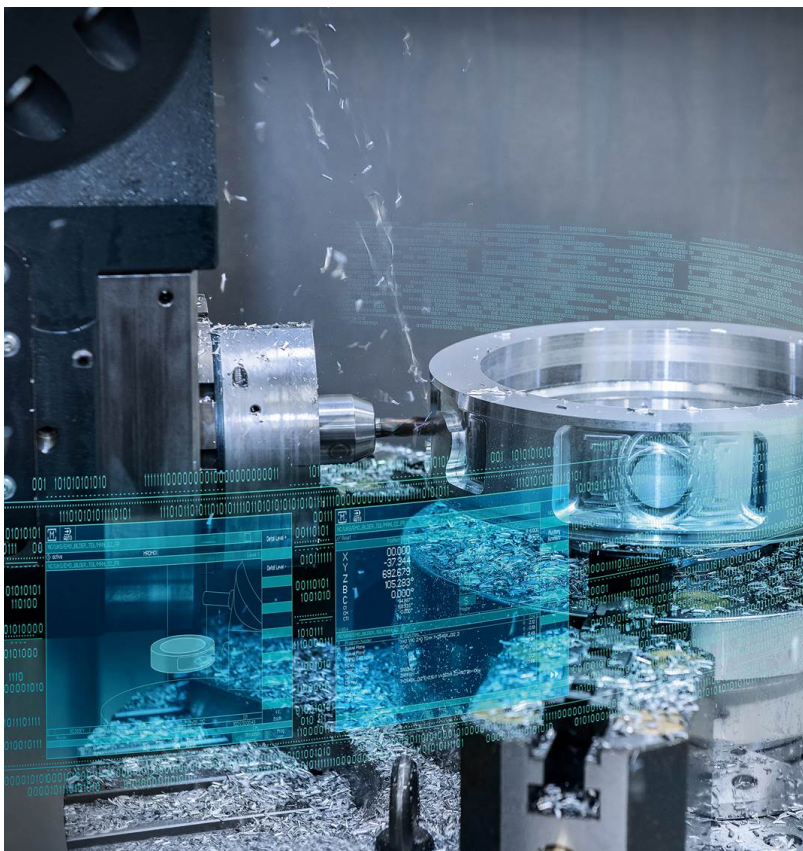
to

- a **lightweight modular approach** which can be applied in a lean / agile working cadence
- Iterative feedback (**retrospectives**) and **constantly optimizing the usage** of the methods
- Intensively leverage the **MPV-Thinking, -Discovery and -Analysis**
- Using **MPVs for unfolding product MPVs to Epics and User Stories**
- Driving **innovation on different levels** (Portfolio, Program, Teams)
- Applying TRIZ for **products, services and processes**
- deriving **“disruptive” approaches** derived from TESE or radical trimming
- Using TRIZ as a **learning & thinking tool** for accelerated learning

Conclusion



Thank you for your attention!



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Literature

Reference	Source
3	Prahalad, C. K., & Ramaswamy, V. (2003). The new frontier of experience innovation. MIT Sloan management review, 44(4), 12-18.
10	Adunka R. MATRIZ Level 1 Training: Script; 2015; triz-online.de. (2014). TRIZ online. Retrieved 05/30, 2014, from http://www.triz-online.de/
11	Boka, Siarhei, Kuryan Andrei, Ogievich Dmitry, Applications of TRIZ in Business Systems. TRIZfest 2017. Krakow, Poland.
14	Mayer, O. Trend of Increased Addressing of Human Senses – Focus on Near Senses”. TRIZ Etria Conference 2016. Wroclaw, Poland.
15	Mayer, O. “Increased Adressing of Human Senses as a Trend”. TRIZfest 2017, Krakow, Poland.
19	Halas, M. Lessons for TRIZ from Design Thinking & Lean 3P. TRIZ Future conference 2016. Wroclaw, Poland.
20	Snowden, D. The Cynefin Framework. http://www.cognitive-edge.com
21	Bosch, J. https://www.researchgate.net/publication/260584542_Achieving_Simplici-ty_with_the_Three-Layer_Product_Model
24	Opportunities for integrating TRIZ and systematic innovation tools into large scale Agile software development. TRIZ Future conference 2016. Wroclaw, Poland.