Source: Condé Nast Traveler

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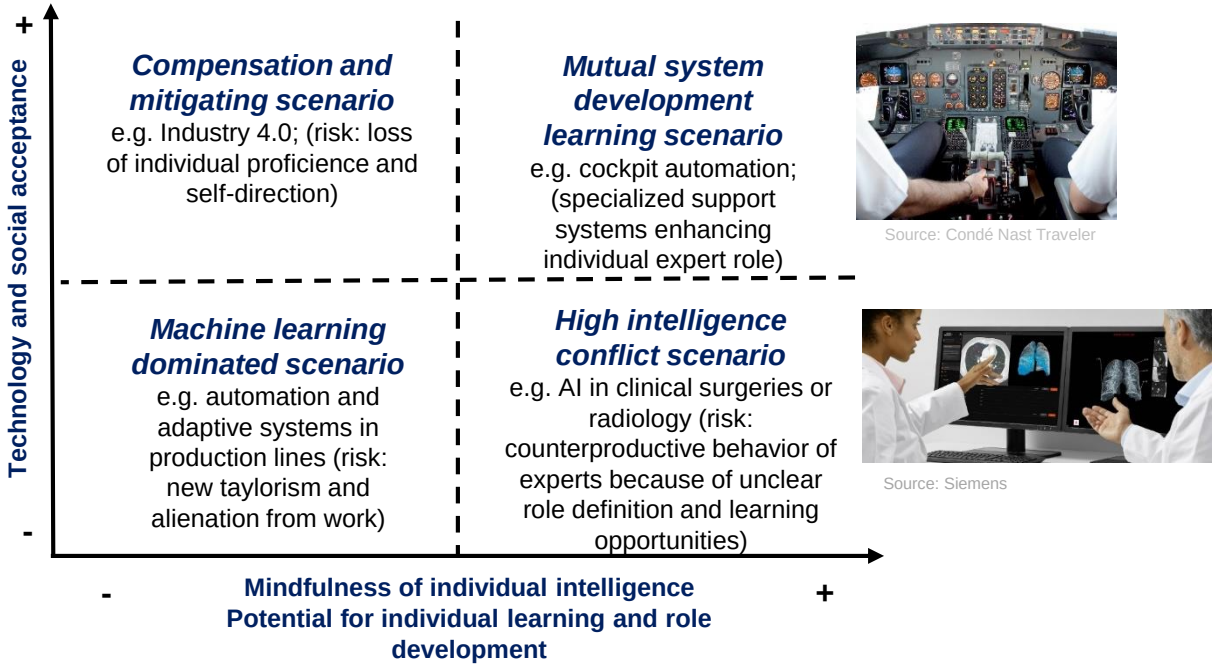
# TOWARDS AN AI LEARNING CULTURE - FACING THE SYSTEM ENTIRE LEARNING POTENTIAL OF MACHINE, INDIVIDUAL AND ORGANIZATIONAL LEARNING

ENGELTOFTA SYMPOSIUM: RETHINKING AND REINVENTING LEARNING, EDUCATION, AND COLLABORATION IN THE DIGITAL AGE — FROM CREATING TECHNOLOGIES TO TRANSFORMING CULTURES, STOCKHOLM, SEPT. 17-20, 2019

**Prof. Dr. Uta Wilkens**

# DISTRIBUTED INTELLIGENCE IN THE WORK PLACE AS CHALLANGE OF SOCIO-TECHNICAL SYSTEM DESIGN





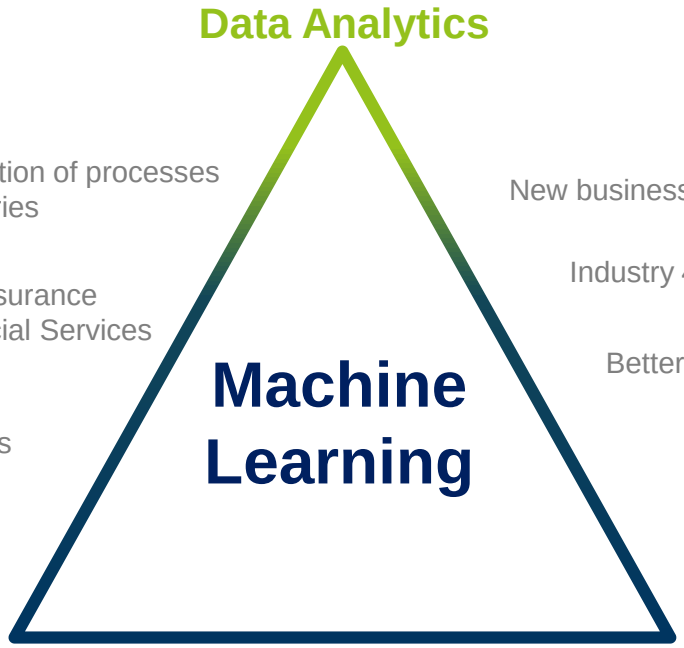

Source: Condé Nast Traveler



Source: Siemens

Wilkens & Dewey 2019

# RESEARCH PERSPECTIVES IN AI




**Rationalization and substitution of human work**

**Better life: Quality of life; Quality of work**

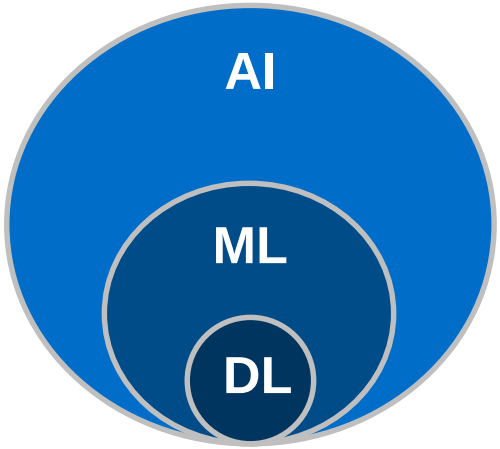
⇒ **socio-technical system design**

See Arlindo Oliveira, 2019

# MACHINE LEARNING AS PART OF AI

## Artificial Intelligence (AI)

- Smart solutions
- Voice analysis
- Process planning




## Machine Learning (ML)

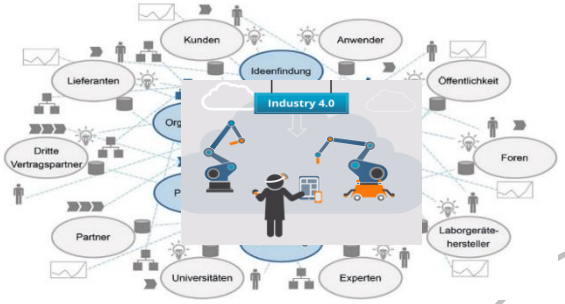
- Big data
- Statistics
- Algorithms
- hardcoding

## Deep-Learning (DL)

- Neuronal networks

see Kuhlenkötter & team members

# DIFFERENT LEARNING PERSPECTIVES …




**System learning**

**On the job**

**Learning tools**

**On the job & near the job**

**Machine learning**

**Organizational learning**

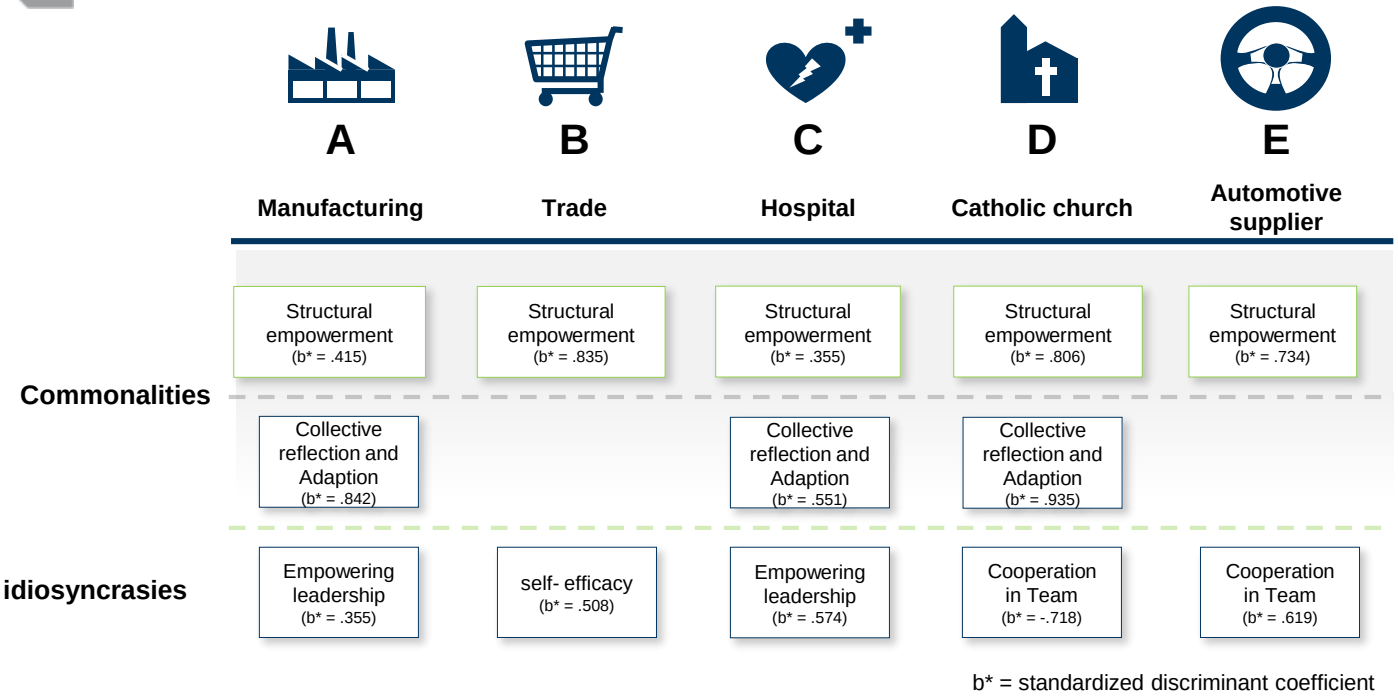
**Individual learning**

**Institutionalization; capability development**

**On the job**

# MICRO-FOUNDATION OF DYNAMIC CAPABILITIES

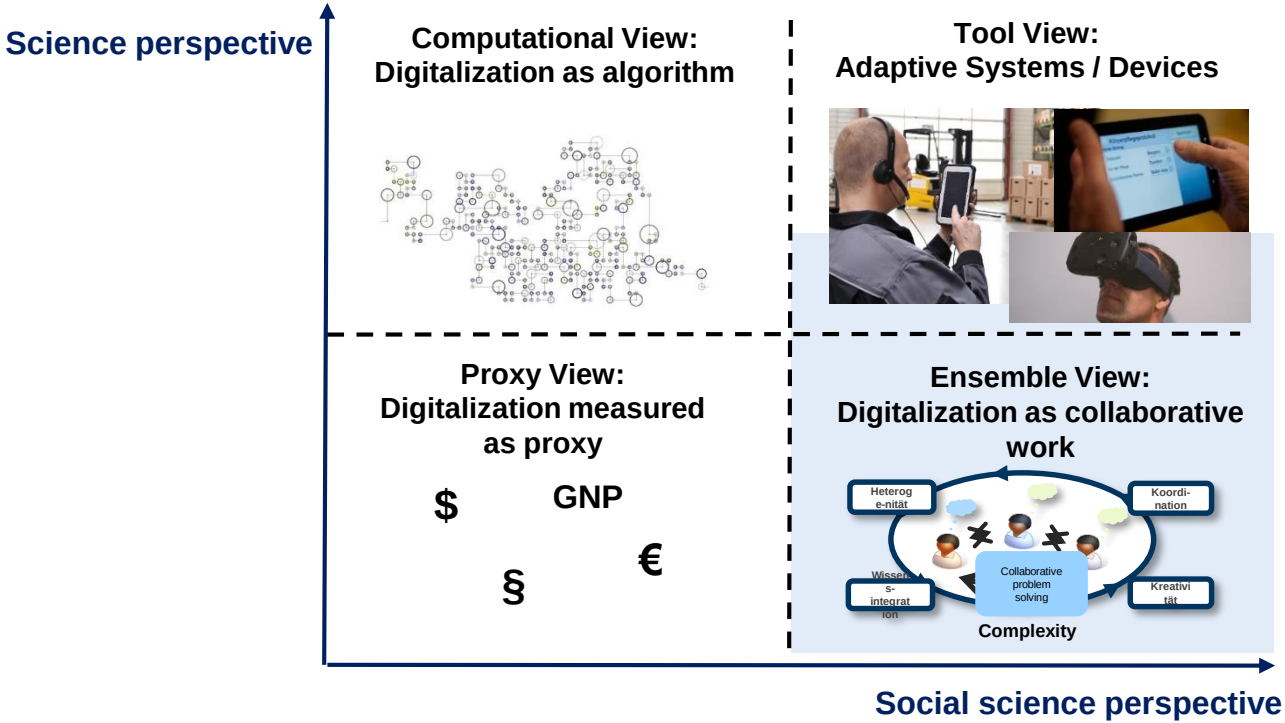
## MULTIVARIATE DISCRIMINANT ANALYSIS IN FIVE CASES




b* = standardized discriminant coefficient

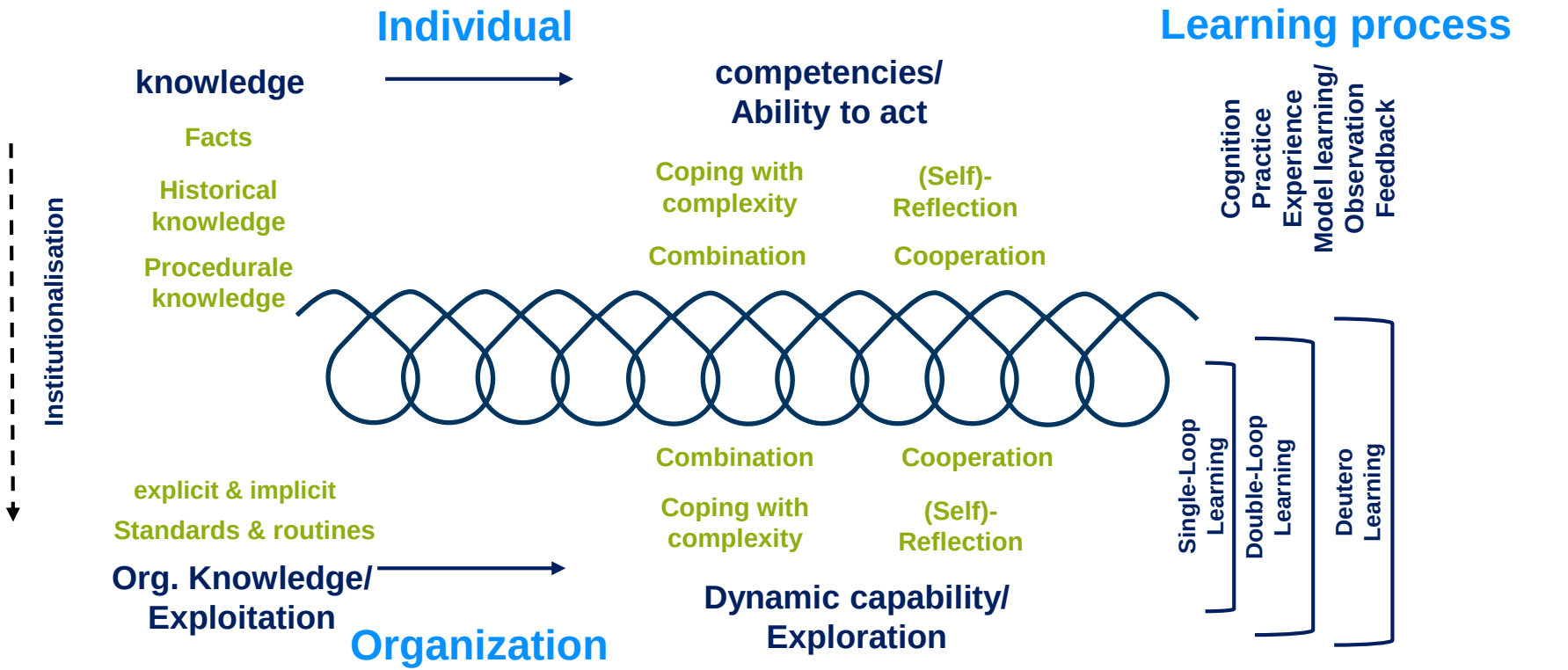
Wilkens & Sprafke 2019: WILKENS, U. & SPRAFKE, N. (2019): Micro-variables of dynamic capabilities and how they come into effect – Exploring firm-specificity and cross-firm commonalities. In: Management International. (published in August 2019)

# …INTEGRATE DIFFERENT PERSPECTIVES ON HOW TO COPE WITH THE IT ARTEFACT



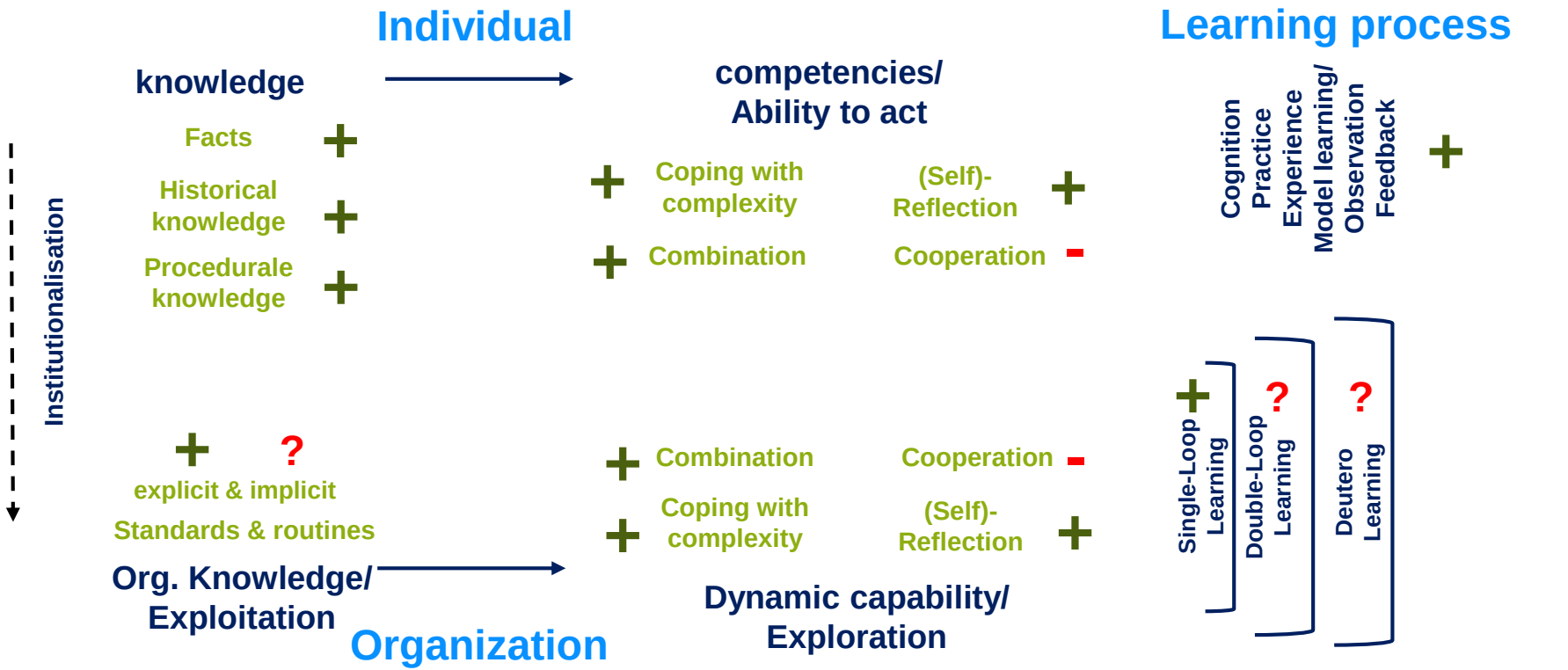

Inspired by:
Wanda J. Orlikowski & C. Suzanne Iacono (2001) In: Information Systems Research, Vol. 12, No. 2, 121–134
Saeed Akhlaghpour, Jing Wu, Liette Lapointe, Alain Pinsonneault (2013): In: Journal of Information Technology, 28, 150–166

# BASICS IN INDIVIDUAL AND ORGANIZATIONAL LEARNING THEORY




Vgl. Bandura 1986, Trautner 1992; Heideloff & Baitsch 1998; Wilkens et al. 2006; Cyert & March 1963; Argyris & Schön 1978; Crosan et al. 1999, March 1990; Eisenhardt & Martin 2000; zusammenfassend Wilkens et al. 2019

# ENHANCING INDIVIDUAL AND ORGANIZATIONAL LEARNING WITH MACHINE LEARNING




Vgl. Bandura 1986, Trautner 1992; Heideloff & Baitsch 1998; Wilkens et al. 2006; Cyert & March 1963; Argyris & Schön 1978; Crosan et al. 1999, March 1990; Eisenhardt & Martin 2000; zusammenfassend Wilkens et al. 2019

# DISCUSSION

- AI has a high potential for enhancing individual and organizational learning processes: AI enhances cognitive learning, feedback and reflection
- Other social dimensions of learning – especially cooperation – cannot be reinforced by AI
- Implicit knowledge can hardly be explored by AI (see also Vladova et al. 2019)
- The contribution of AI to organizational learning is almost reduced to single-loop learning

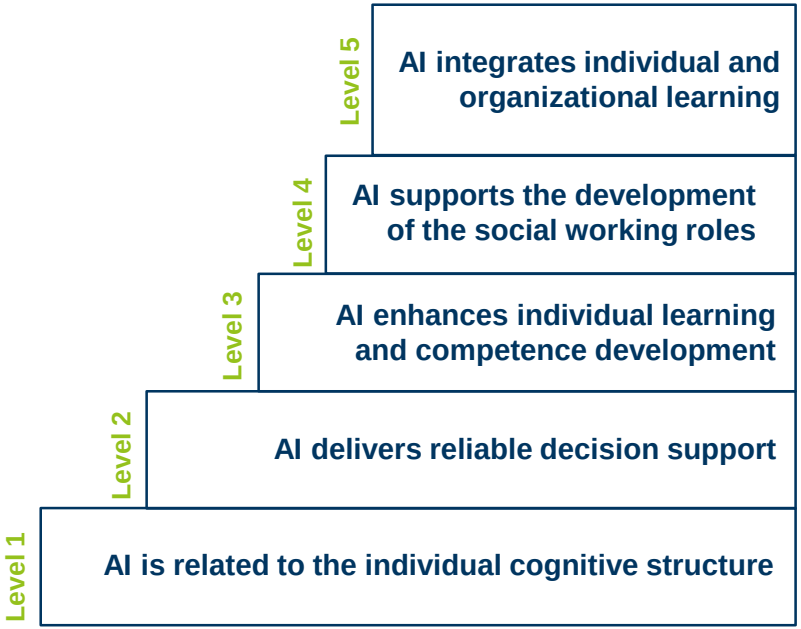
⇒ There is a need for off-the job learning scenarios for embedding and framing AI in the workplace in socio-technical system design

See Wilkens, Lins, Prinz, Kuhlenkötter 2019

# DISTINCTION BETWEEN AI AND HUMAN INTELLIGENCE

| AI | Human Intelligence |
|---|---|
| Based on data | cognitive and social dimension (incl. emotions, norms and values, intuition, …) |
| Highly specialized, context specific, no multifunctionality | Flexible, can be transfered to multiple contexts |
| Infinite capacity, no system-specific failure (but: based on man-made data of bounded rationality) | Bounded capacity, subjective perspective, biased information (risk of failure) |
| Optimization with big data | Optimization with multiple learning processes |

# TOWARDS A HUMAN-CENTERED AI-INTEGRATED LEARNING SYSTEM




## State of the art

Would require certain algorithms in parallel

Challenge for socio-technical system design – out of the technical system

Aim of adaptive systems (are adaptable systems better? Fischer 1993)

Core challenge in many use cases, e.g. radiology (Dewey & Wilkens, 2019)

Examples from pedagogical psychology, learning software

See Wilkens, Lins, Prinz, Kuhlenkötter 2019

# SOCIO-MATERIALITY OF TECHNOLOGY

| | Adaptive | Adaptable |
|---|---|---|
| **Definition** | • dynamic adaptation by the system itself to current task and current user | • user changes (with substantial system support) the functionality of the system |
| **Knowledge** | • contained in the system<br>• projected in different ways | • knowledge ist extended |
| **Strengths** | • little (or no) effort by the user<br>• no special knowledge of the user is required | • user is in control<br>• system knowledge will fit better<br>• success models exist |
| **Weaknesses** | • user has difficulty developing a coherent model of the system<br>• loss of control<br>• few (if any) success models exist (except humans) | • systems become incompatible<br>• user must do substantial work<br>• complexity is increased (users need to learn and know to interact with the adaption component) |
| **Mechanisms Required** | • models of users, tasks and dialogs<br>• knowledge base of goals and plans<br>• powerful matching capabilities<br>• incremental update of models | • layered architecture<br>• human problem-domain communication<br>• „back-talk“ from the system<br>• design rationale |
| **Application Domains** | • active help systems<br>• critiquing systems<br>• differential descriptions<br>• user interface customization | • end-user modifiability<br>• tailorability<br>• information filtering<br>• design in use |

see also Leonardi & Barley, 2010; Orlikowski, 2000, 2004

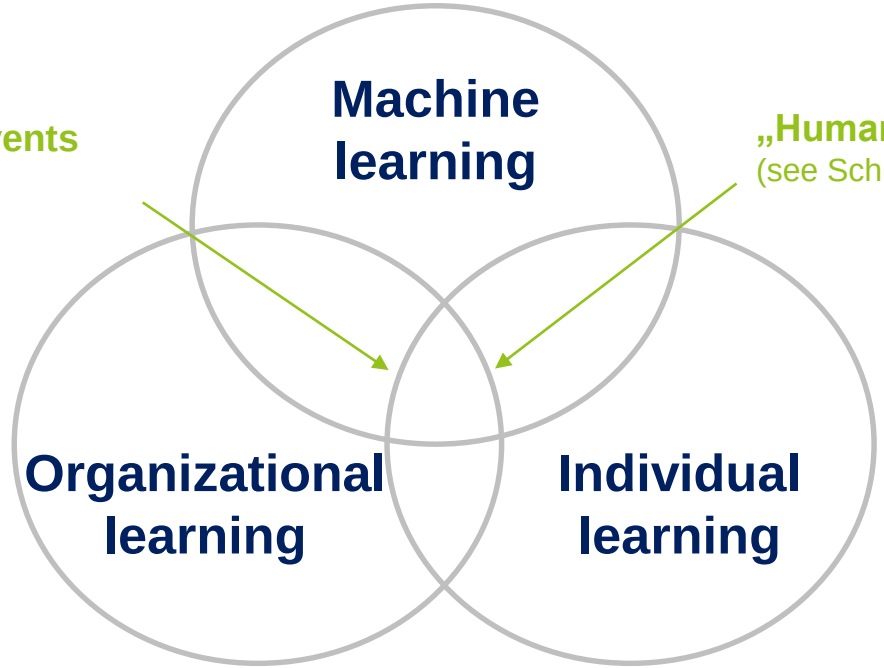
Source: Fischer, 1993, 56

# DEVELOPMENT NEEDS: BOTH DIRECTION APPROACH TOWARDS AI LEARNING CULTURE

**Social learning events**

Source: Das JetSim-Flugsimulator-Event Berlin; jetsim.de

**Near the job; Off-the job**




**„Human-in-the-loop“ practices**
(see Schuler, Hämmerle, Bauer, 2019)

Source: Condé Nast Traveler

**On the job, after action**

# CONTACT

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