

# DEVELOPING EXPERTISE AND LEARNING AROUND LEARNING ALGORITHMS

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- **Introduction**
- **Paper-based discussion**
- **Cross—paper discussion**
- **Your inspirations / aspirations?**
- **My aspiration!**



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# MOHAMMAD H. REZAZADE MEHRIZI

- Associate Professor of **work and organizational (un)learning**
- Vrije Universiteit Amsterdam; KIN Center for Digital Innovation
  - PhD in Science and Technology Policy, Sharif University of Technology, Tehran, Iran
  - PhD in Management Science, ESADE Business School, Barcelona, Spain
- Researching (16 years): How do professionals and organizations develop new capabilities and (un)learn around digital innovation
- Working experiences: serving as management consultant and advisor to a range of public and private as well as small and large organizations in different countries (Iran, Spain, Netherlands, UK, Germany, ...)



<https://www.rezazadem.com>

# Applications of artificial intelligence (AI) in diagnostic radiology: a technography study

Mohammad Hosein Rezazade Mehrizi , Peter van Ooijen & Milou Homan

*European Radiology* (2020) | [Cite this article](#)

- Technography of 300+ AI applications for radiology
- Examining development processes and the roles of radiologists

**Technological developments**

**How does digital innovation impact radiology work?**

**AI implementation at work**

**Professionals and careers**

- Community discourse
- Professional career



European Journal of Radiology  
Volume 136, March 2021, 109566



How does the radiology community discuss the benefits and limitations of artificial intelligence for their work? A systematic discourse analysis

Bomi Kim , Isabel Koopmanschap , Mohammad H. Rezazade Mehrizi , Marleen Huysman , Erik Ranschaert 

- Implementation process 10 cases
- Post-implementation (active studies)



# WHAT ABOUT YOU?

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- Personal
- Professional
- Career-related
- AI-related
- Anything...



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## PLAYING WITH THE **AUGMENTED SHOES**

- Analyzing the situation
- Accurate positioning of your feet
- Detecting the best position for the next move
- Orienting your feet towards the best move
- Augmenting the hit (5-10 times)
- Beeping when you are not aligned
- Seamless integration with your feet!

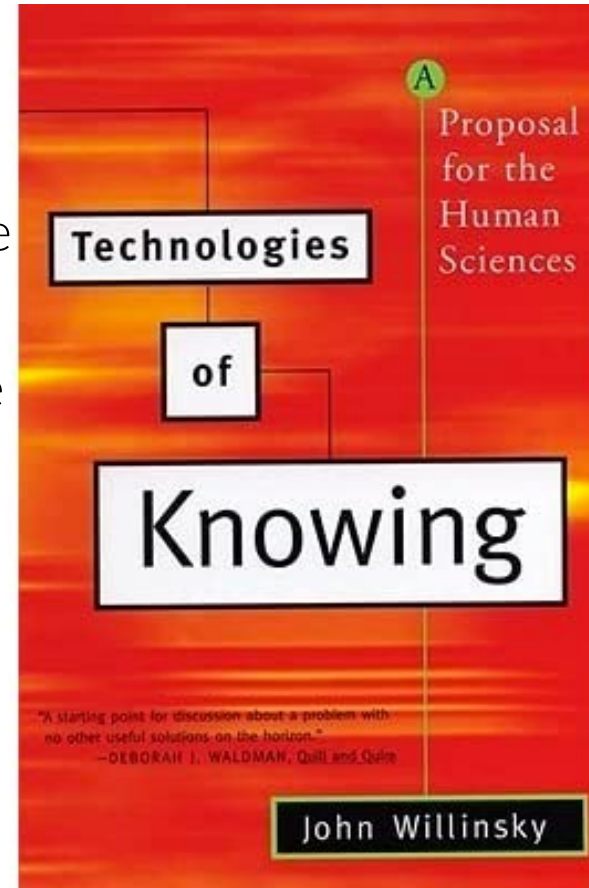
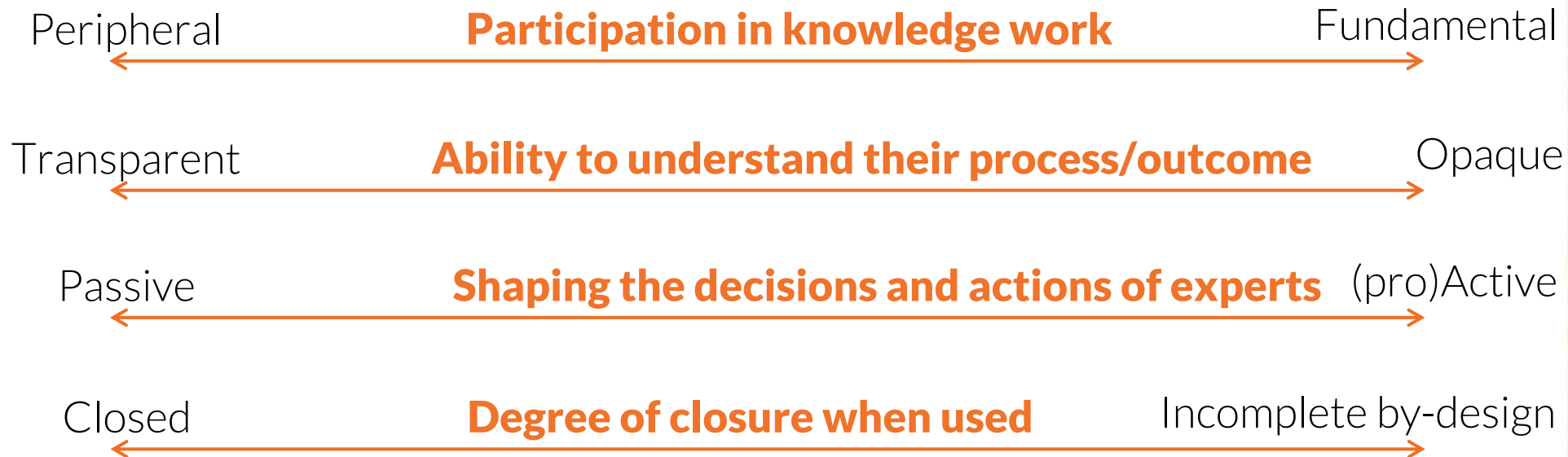


What happens to your playing skills?



# WHAT IS SPECIAL ABOUT AI WHEN IT COMES TO KNOWLEDGE WORK?

**Technologies of knowing:** Technologies that actively shape the ways in which practical knowledge is produced and worked with among professionals



# EXPERTISE AND LEARNING IN THE MEDICAL SYSTEM?

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**Expertise:** “the capability of performing (complex) tasks at a high level of quality.”

**Learning:** “the process of expanding expertise”

## Levels of expertise/learning

- **Work-practice (micro):** Individuals working with specific technologies to perform specific practices
- **Organizational (meso):** formal structures, roles, responsibilities for integrating and institutionalizing various practices, technologies and expertise
- **Ecosystem (macro):** the interactions between diverse range of organizations (formal) and institutions (informal as well) for delivering medical services at the regional, national, and international levels

# GUIDING FRAMEWORK FOR DISCUSSING EACH PAPER

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- **Core question:** What does the paper seek to understand?
- **Core concepts:** What are the core concepts and how are they defined?
- **Claim of gap/contribution:** What do they claim that we lack and they want to contribute to it?
- **Theoretical lens:** from which theoretical perspective does the paper examine the question and tries to explain it?
- **Design / method:** How do the authors try to answer their RQ?
- **Core/cool findings:** what are the interesting, novel findings of the paper
- **Implications:** So what, once we know their findings?
- **What else?** What are the boundary conditions, limitations, criticisms, ...

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- What else?



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## When Knowledge Work and Analytical Technologies Collide: The Practices and Consequences of Black Boxing Algorithmic Technologies

Callen Anthony<sup>1</sup> 

Administrative Science Quarterly  
1–40

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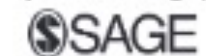


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## Shadow Learning: Building Robotic Surgical Skill When Approved Means Fail

Matthew Beane 

Administrative Science Quarterly  
2019, Vol. 64(1)87–123  
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Academy of Management Review, In-Press |

## Substituting Human Decision-Making with Machine Learning: Implications for Organizational Learning

Natarajan Balasubramanian , Yang Ye and Mingtao Xu

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# CROSS-PAPER DISCUSSIONS

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- **Concepts:** differences in their definitions? Terminology?
- **Contexts:** when/where the phenomenon happens: e.g., context of learning, legitimacy, timing, nature of tasks, ...
- **Technology:** specific tools, configurations, material conditions
- **Levels of analysis:** at which level of analysis do they study learning/expertise?
- **Methods:** how are they different in the ways in which they try to answer their questions? What is left?
- **Other similarities / differences?**



# EXPERTISE AND LEARNING IN THE MEDICAL SYSTEM?

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# AI AND EXPERTISE AT **WORK-PRACTICE** LEVEL

## Some common dynamics (to watch out)

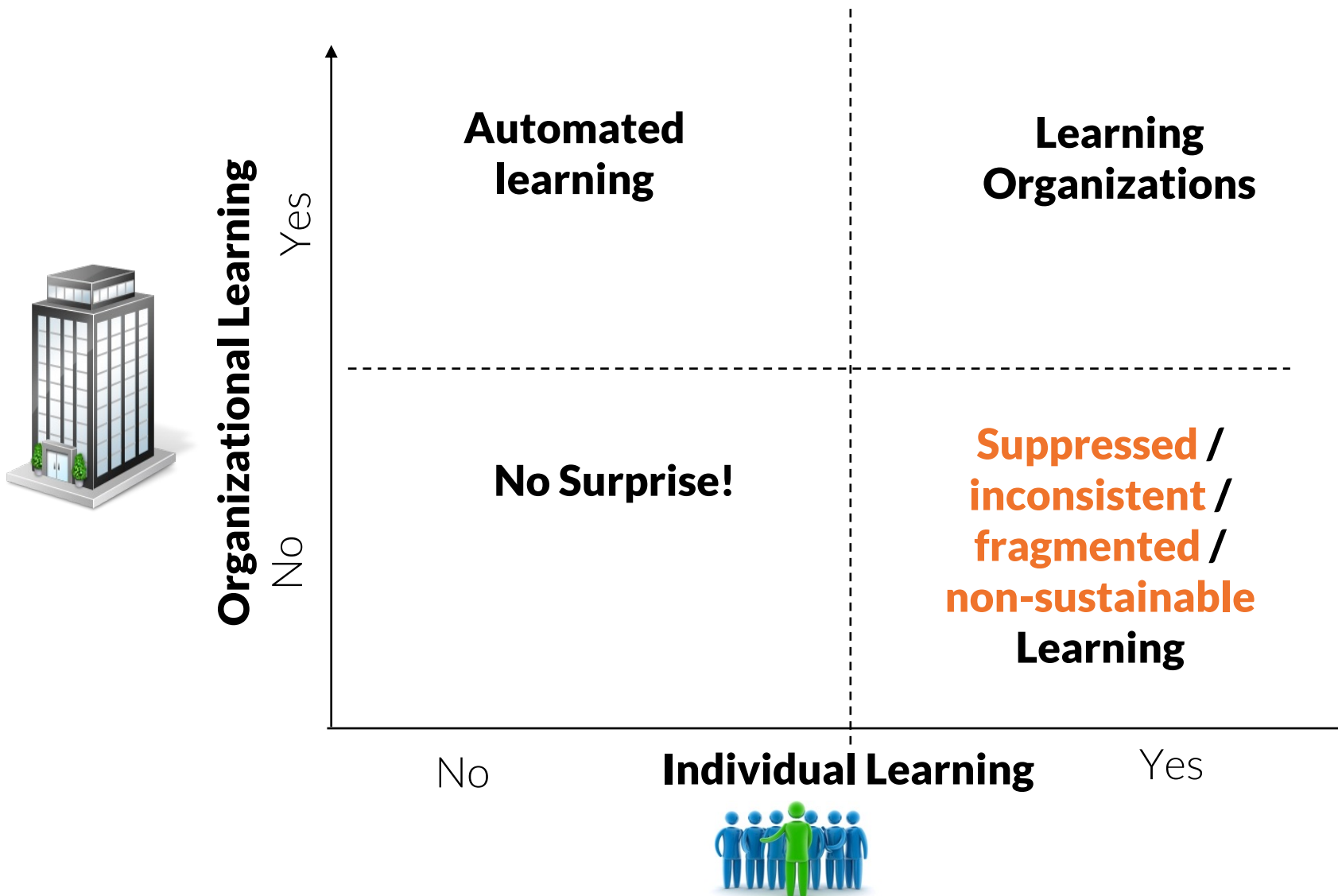
- Skill **distortion** (breakdown)
- Partitioning **expertise** (e.g., separating measurement and staging of tumor)
- Skill **delegation** (e.g., RECIST analysis)
- Expertise **expansion** (learning new skills; e.g., how to adjust the sensitivity of the algorithm)
- Reconfiguration of expertise (e.g., for a specific task, for a specific person)
- Expertise **conflicts** (e.g., morphological vs. quantitative reasoning)
- Skill **obsolescence**
- Mismatch between **learning** and **working**

## The clinical condition of the patient regarding Atrial Fibrillation (AF)

### How algorithm is introduced to the diagnosis session

	41 years old without symptom (low-risk)	41 years old with symptom (medium-risk)	75 years old (high-risk)
No algorithmic evidence (only indication of AF by the algorithm)	<u>Scenario #1</u> 	<u>Scenario #2</u> 	<u>Scenario #3</u> 
Noisy ECG produced by algorithm next to the indication of AF by the algorithm	<u>Scenario #4</u> 	<u>Scenario #5</u> 	<u>Scenario #6</u> 
ECG produced by algorithm clearly showing AF next to the indication of AF by the algorithm	<u>Scenario #7</u> 	<u>Scenario #8</u> 	<u>Scenario #9</u> 

# AI AND EXPERTISE AT ORGANIZATIONAL LEVEL



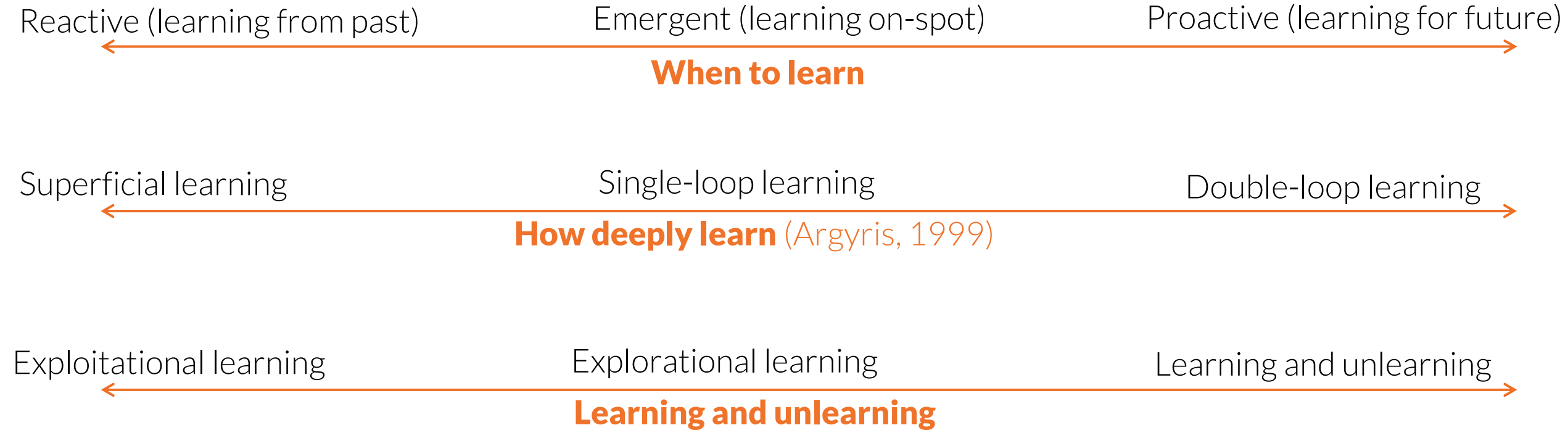
# AI AND EXPERTISE AT ORGANIZATIONAL LEVEL

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## Some common dynamics (to watch out)

- Learning how to **reallocate the skills** (e.g., between senior and juniors, between professionals and paraprofessionals, between adjacent professionals)
- Learning how to **assess and evaluate** work and AI (before implementation)
- Learning how to **prepare** for the implementation
- Learning how to **implement** AI and integrate it into the work
- Learning how to **adjust and institutionalize** effective use of AI at work
- Learning how to **work out/ around** issues and challenges when using AI
- Learning how to **stop using** ineffective AI applications

# AI AND EXPERTISE AT ORGANIZATIONAL LEVEL



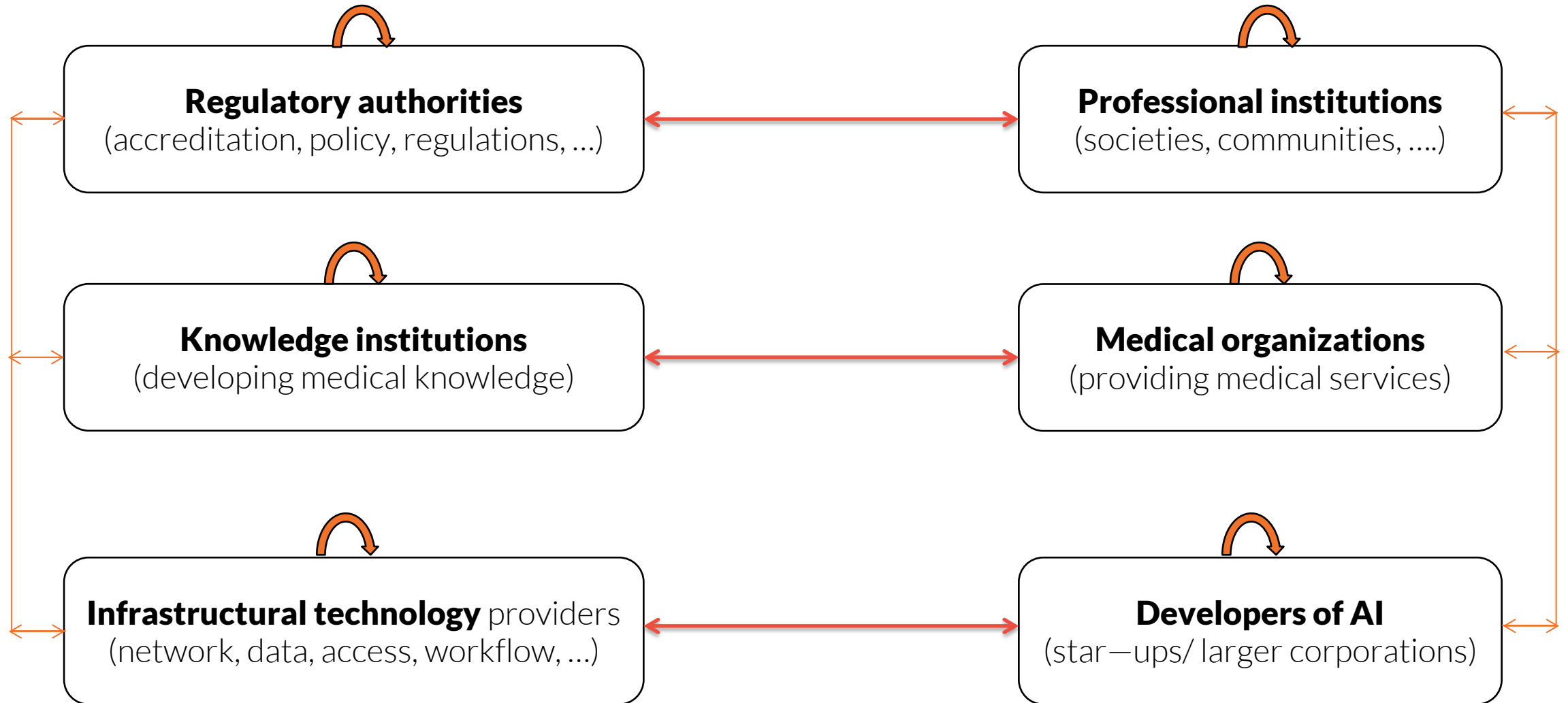
“How to develop the *capacity* to *systematically* learn and sustain it over time?”

# AI AND EXPERTISE AT ORGANIZATIONAL LEVEL

## Examples of learning strategies

- Convening an AI (advisory/management) **board** with clear responsibilities: creating shared understanding and legitimizing the work
- Defining **roles/responsibilities** with **dedicated time and responsibilities**; advisor, manager, controller, ...
- Promote and support **AI champions**; a few key actors who push for the ideas and actions
- **Formalize** the AI practices into your organizational structure: e.g., a specific team, a formal group, ...
- Experiment, but **hit the core** soon: do not let the energy and enthusiasm dries up in many little pilots
- Create an effective **organizational memory**: to document the experience, share lessons, and do not reinvent the wheel

# AI AND EXPERTISE AT ECOSYSTEM LEVEL





# AI AND EXPERTISE AT ECOSYSTEM LEVEL

## Some common dynamics (to watch out)

- Learning **dominance**: a few actors determine what/how other actors learn
- Learning **trap**: the specific way of learning creates a success trap (e.g., micro-injection)
- Learning **failure**: incapability of some actors to learn effectively
- Learning **conflict**: learning of one actor is inconsistent with the interests of other actor
- **Unbalanced** learning: the learning pace of different actors are not balanced (e.g., FDA learns slowly on how to adjust its approval procedure when a new training mechanism such as federated learning comes)

# AI AND EXPERTISE AT ECOSYSTEM LEVEL

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## Examples of learning strategies

- Public-private partnerships
- Industrial knowledge sharing systems
- Open policy movement
- Governance systems at regional and national levels
- Learning institutions (mediators between the actors, e.g., research institutions, consultancy and advisory companies, ...)

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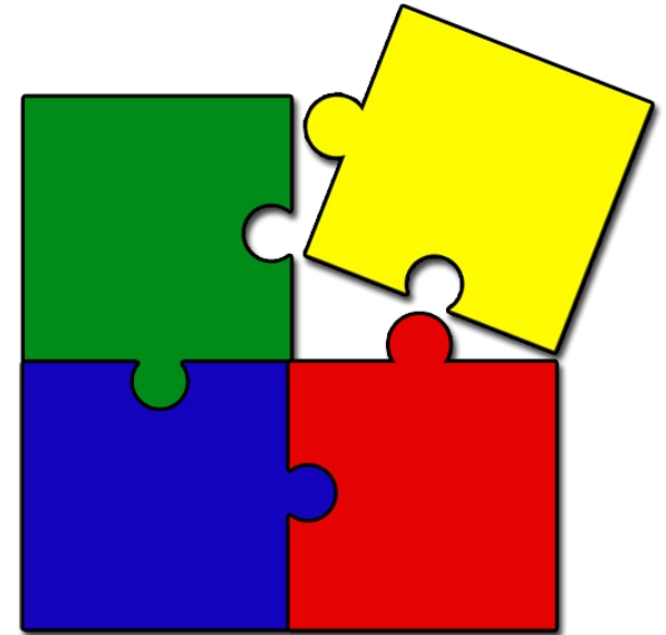
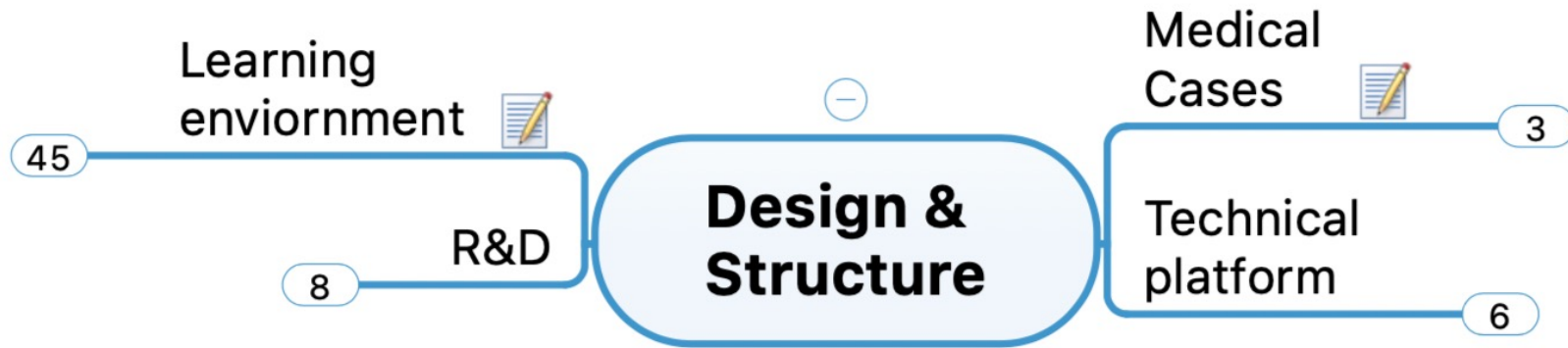


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# Learning Lab