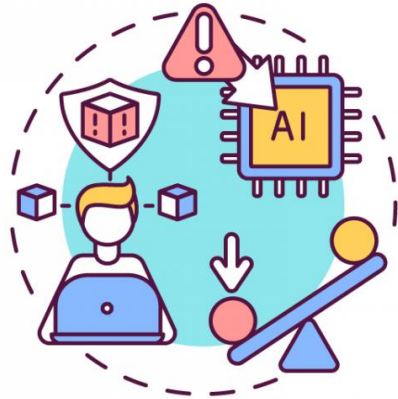


# AI Standardisation: STAR project trusted AI in manufacturing



 **STAR** [STAR-AI.EU](https://STAR-AI.EU)

Safe and trusted human-centric AI for manufacturing



Dr Christos Emmanouilidis

netcompany  
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UBITECH  
ubiquitous solutions

R2M  
RESEARCH TO MARKET  
SOLUTION

UNPARALLEL

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Linked third party

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 groningen



# STAR: AI in manufacturing use cases



Human-Robot Collaboration  
(PHILIPS)



Safety Zone Detection  
(DFKI)

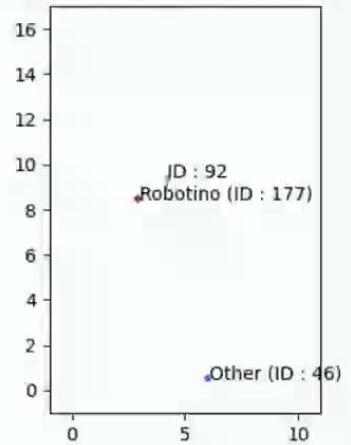


AI for Agile Manufacturing  
(IBER)

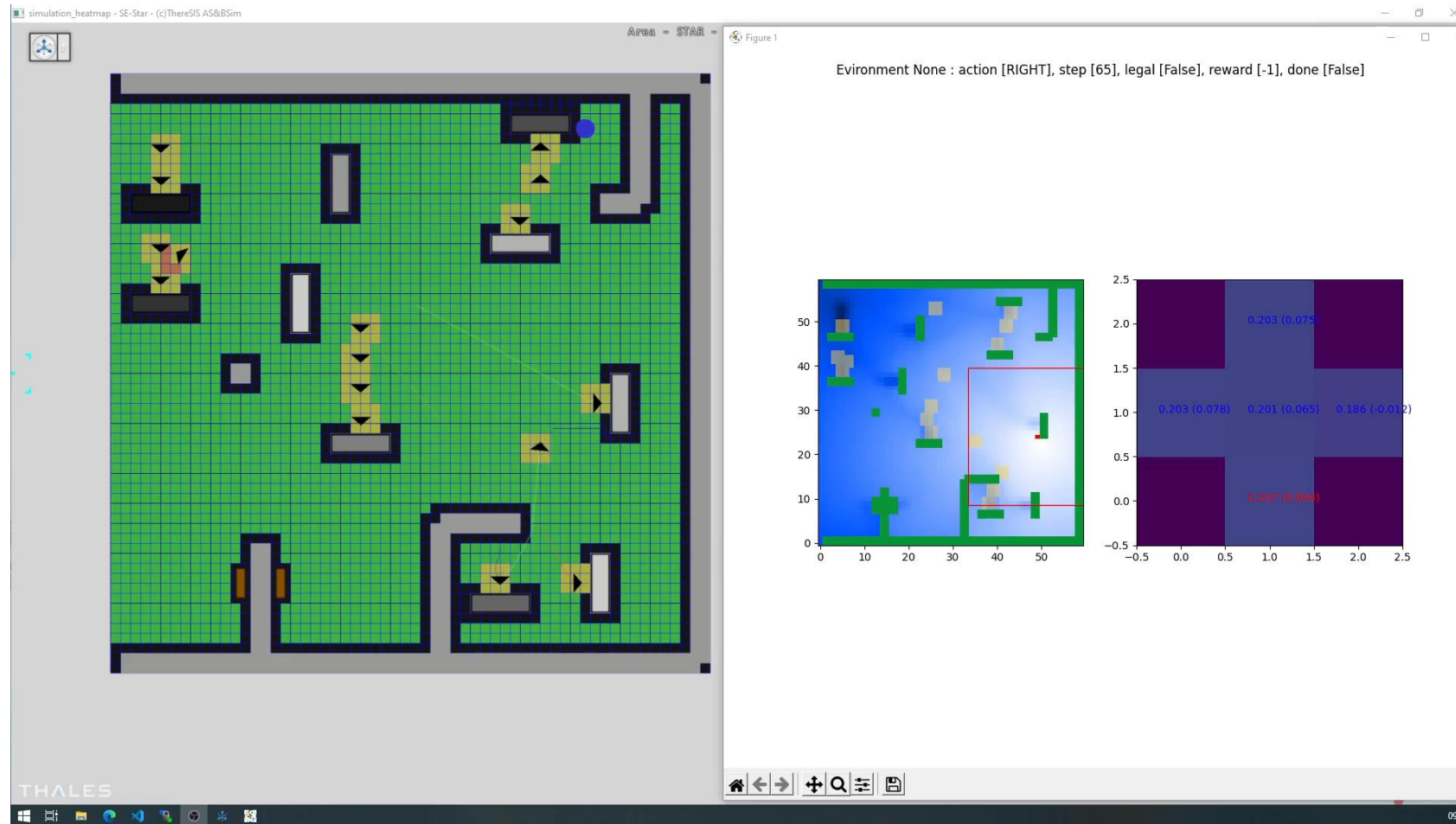
Each one of the three pilots above has multiple sub-cases for AI in manufacturing



Number of person in the area : 1



# Human – robot co-existence in shared industrial spaces



VisualStation

Net bevelgd | 192.168.10.10/3c3plchmiweb/port\_851/visu/webvisu.htm

Demo Mode

### States

**START**

Sequence	Camera
<input type="text" value="seq_001"/>	<input type="text" value="1"/>
PicCounter	ProdCounter
<input type="text" value="1"/>	<input type="text" value="1"/>

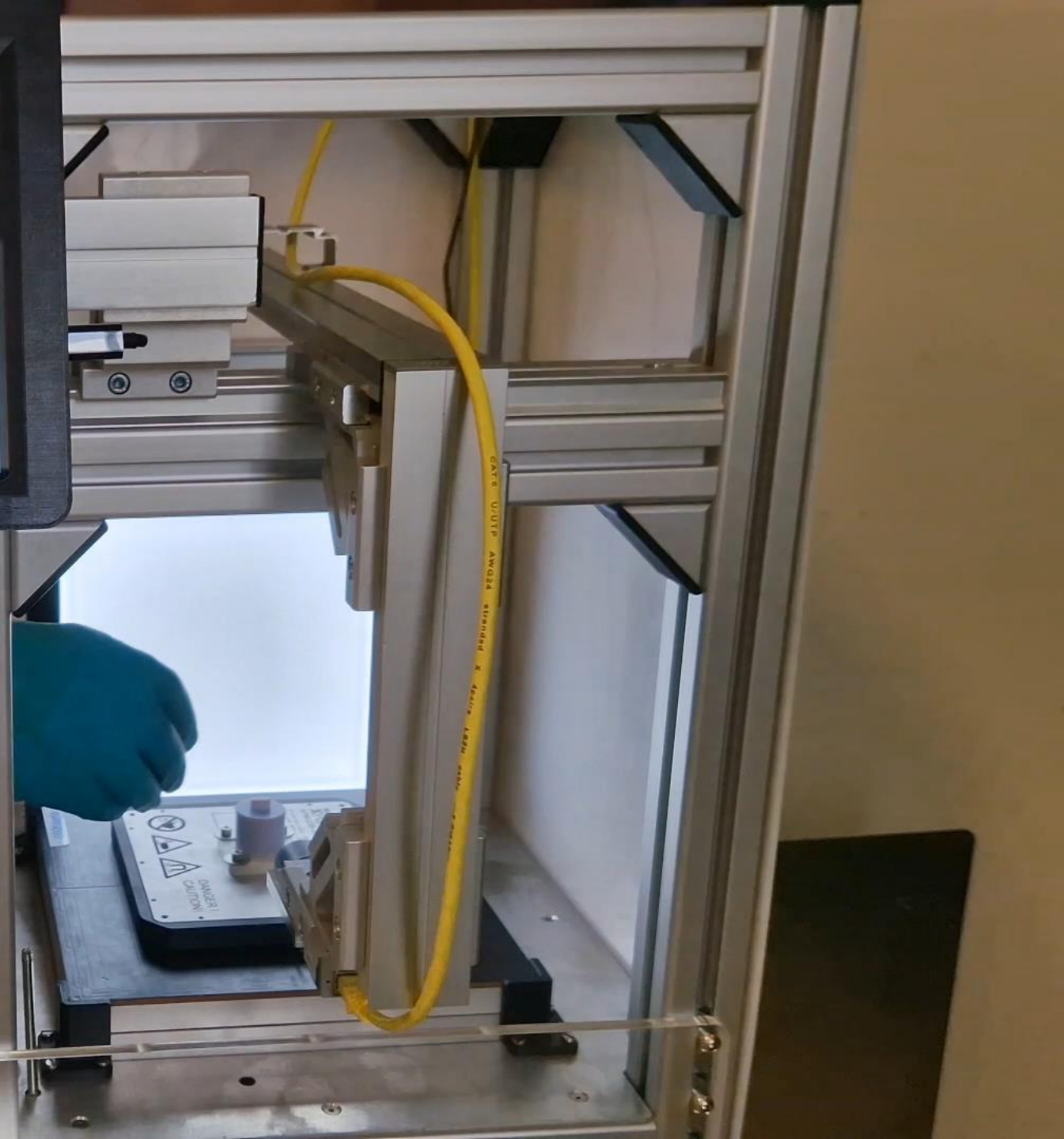
### Results

Good parts	Bad parts
<input type="text" value="1"/>	<input type="text" value="1"/>

### Mode




### Files

### Error



# Human – AI teaming in quality control

Does the current piece have any kind of defect?

Good sample	Current piece	Known similar image
		
		Label: good

NO DEFECT    DOUBLE PRINT    INTERRUPTED PRINT    UNABLE TO TELL    OTHER DEFECT

# AI Act and Applying the FRAIA Framework

## Ethics & legal analysis questionnaire (Fundamental Rights & Algorithms Impact Assessment)

- I. WHY? Intended effects of the system
- II. WHAT? [Data (input)]; Algorithm (throughput)]
- III. HOW? Implementation and use of algorithm (output)
- IV. Fundamental Rights impact assessment

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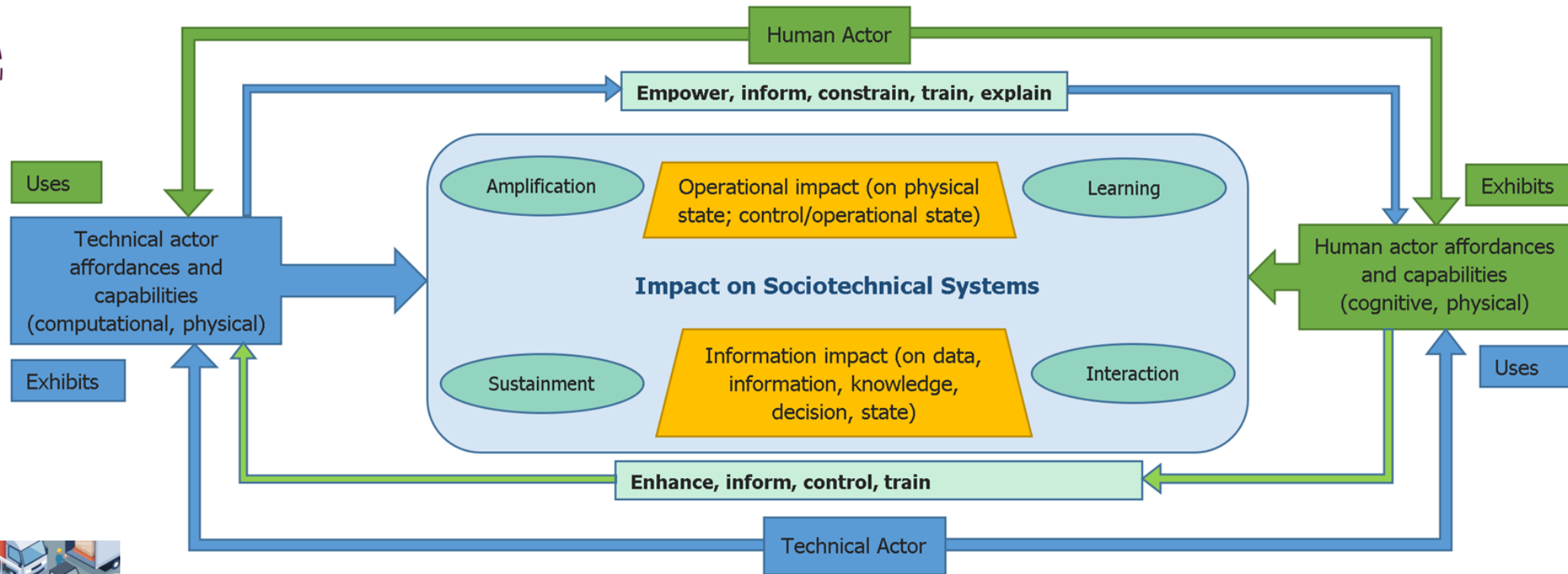
RPM  
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# Human – AI teaming: best of both



- Linked Data and Knowledge
- Natural Interfaces Interaction
- Active Trust Management
- Human in the AI Loop
- XR
- Context Management
- FAIR AI & Bias Management

Shared spaces – context – affordances - values – targets – understanding – actions

C. Emmanouilidis, S. Waschull, J. A. C. Bokhorst, and J. C. Wortmann, 'Human in the AI Loop in Production Environments', in IFIP Advances in Information and Communication Technology, 2021, vol. 633 IFIP, pp. 331–342, doi: 10.1007/978-3-030-85910-7\_35.



# AI Solution Spaces in Industry Use Cases

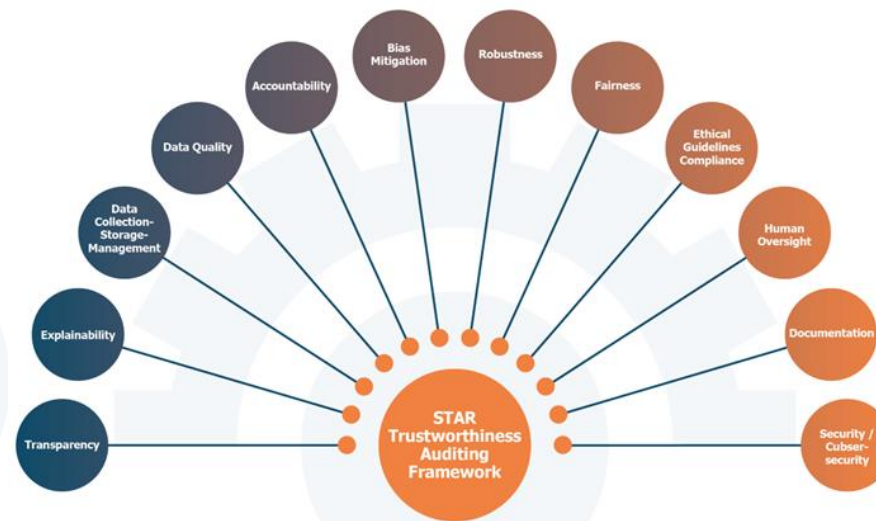
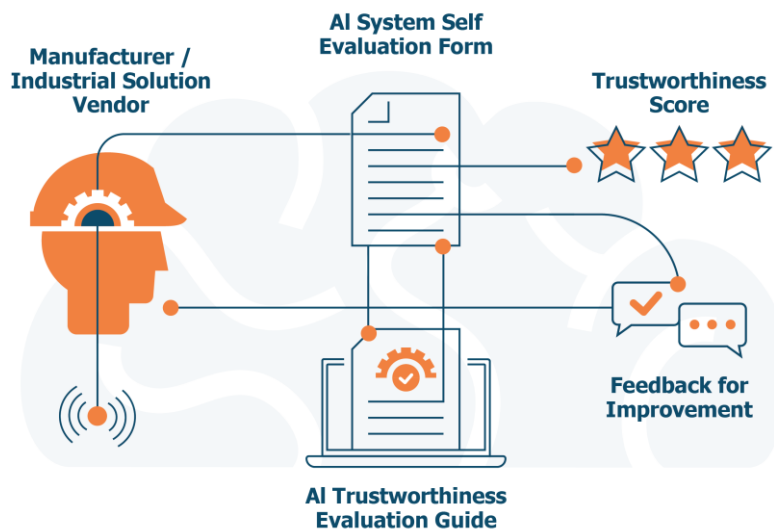
AI replaces humans

AI helps humans

Human + AI

Humans help AI

AI + Humans



ELSA dimension



Operational dimension



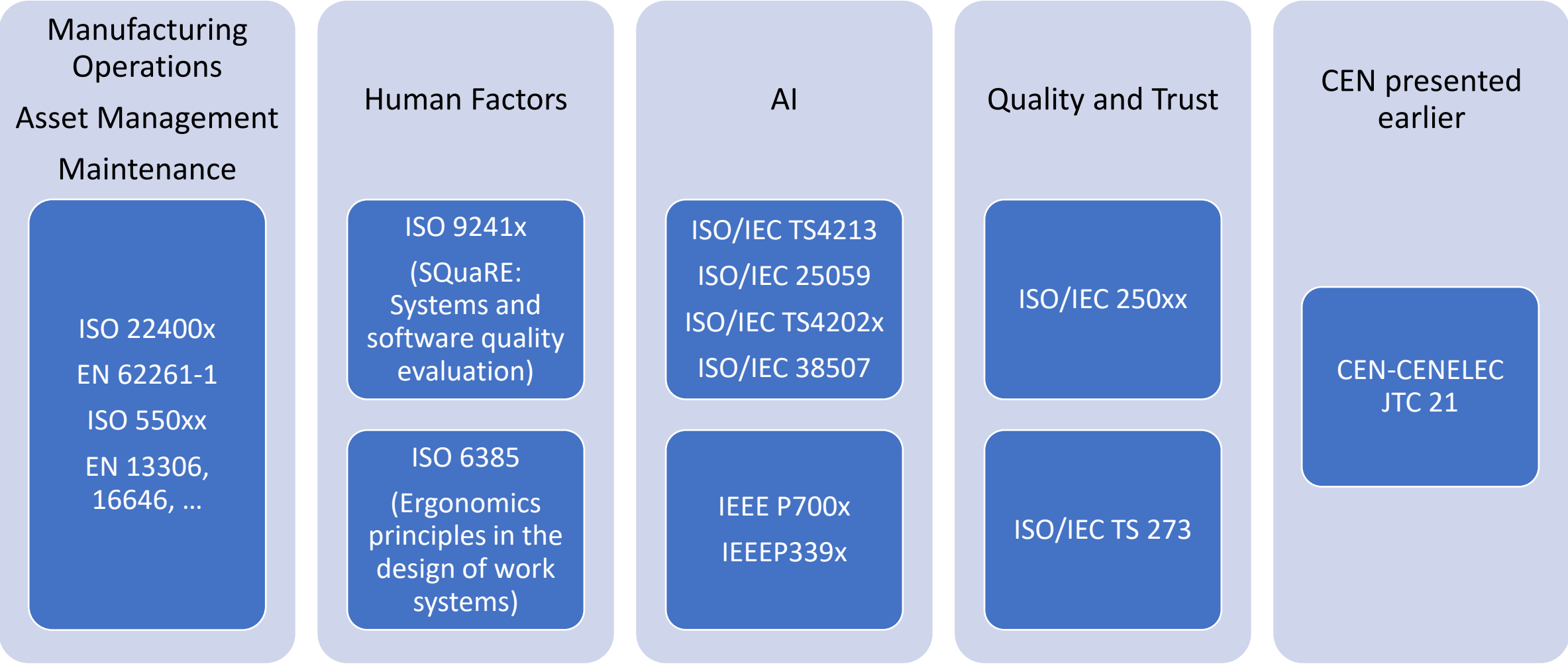
Technical dimension



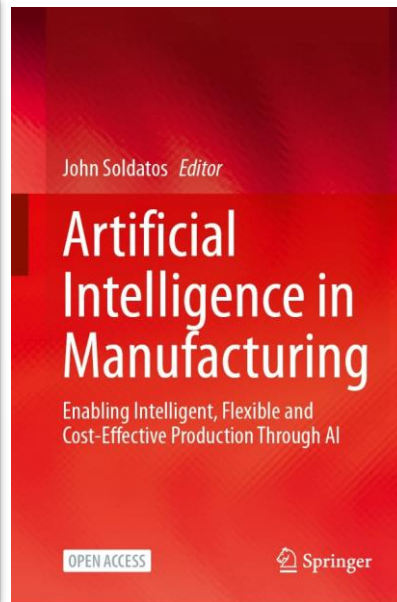
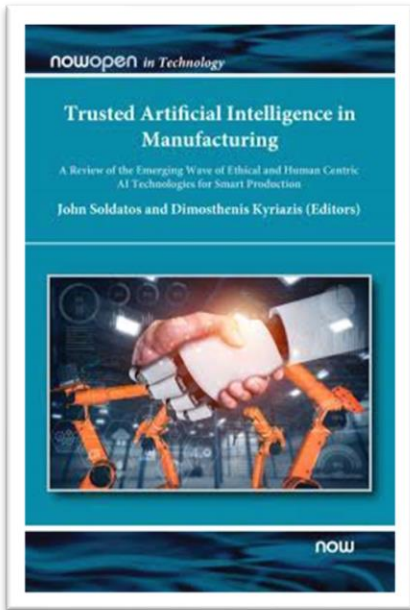
<https://star-ai.eu/star-auditing-framework-trustworthy-ai>

Source: <https://doi.org/10.1016/j.ifacol.2023.10.1891>

# STAR project: examples of AI and domain-specific standards

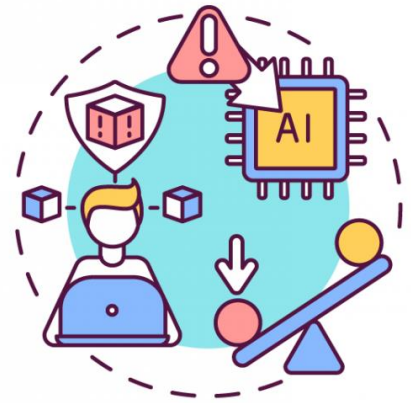


# STAR: to probe further



- <https://star-ai.eu/deliverables>
- [Review of applicable standards and regulations](#)
- The STAR Auditing Framework for Trustworthy AI - <https://star-ai.eu/star-auditing-framework-trustworthy-ai>
- AI Norms and Standardisation: <https://star-ai.eu/ai-norms-and-standardisation-road-ahead>
- Human in the AI Loop: how organisations can assess human-centric AI systems in Manufacturing? <https://star-ai.eu/human-ai-loop-and-how-organisations-can-assess-human-centric-ai-systems-manufacturing>
- Bias Management for AI consistent with Human Values: <https://star-ai.eu/bias-management-ai-consistent-human-values>
- Humans and AI: Meeting the challenge of creating effective synergies in Manufacturing - <https://star-ai.eu/humans-and-ai-meeting-challenge-creating-effective-synergies-manufacturing>

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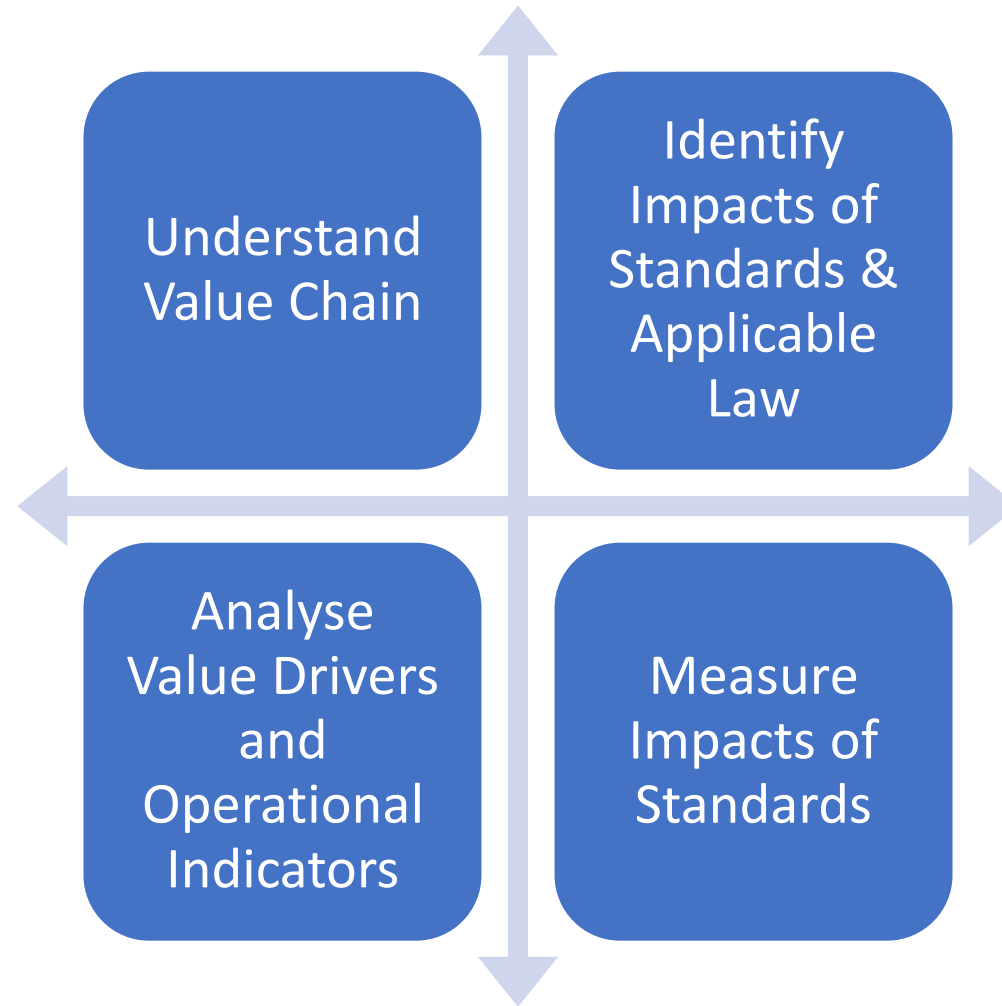
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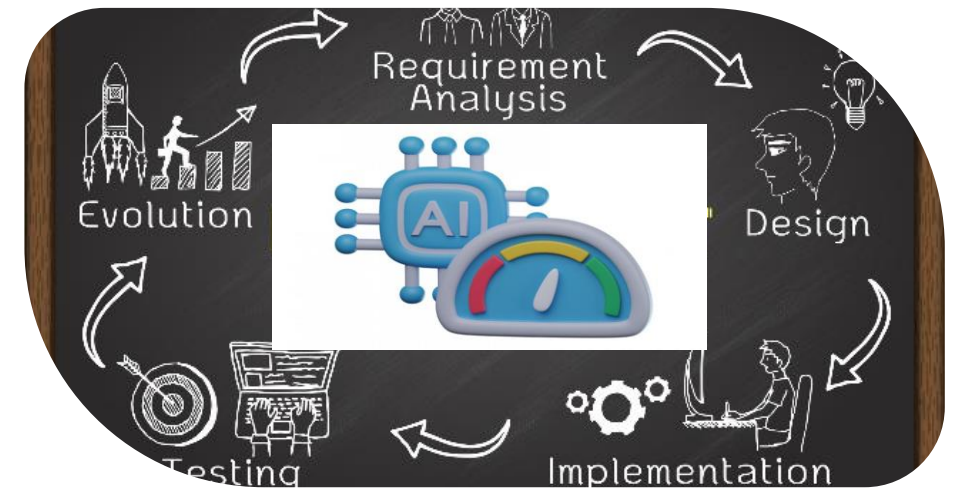
# STAR: Lessons Learned from Human-Centric AI Use Cases in Manufacturing



# STAR Evaluation Methodology for Human-Centric AI in Manufacturing

1. Define the unit of analysis and identify use cases
2. Establish a multidisciplinary team of relevant stakeholders
3. Identify and validate relevant 'performance categories' based on goals & requirements
4. Conduct evaluation and feed outcomes to relevant teams

Can inform and steer all different life-cycle phases!



Source: Waschull, S., & Emmanouilidis, C. (2023). Assessing human-centricity in AI enabled manufacturing systems a socio-technical evaluation methodology. 22nd International Federation of Automatic Control World Congress (IFAC WC 2023), 56(2), 1791–1796.

# STAR Co-creation Methodology applied in practice

1. Define the unit of analysis and identify use cases
2. Establish a multidisciplinary team of relevant stakeholders
3. Identify and validate relevant evaluation criteria

## INPUTS

Process Workflow As Is and Draft Scenarios

Draft User Stories

SURVEY concepts

## DURING WORKSHOP

Seeding co-creation workshop with initial

[User Stories] [Components / Actors / Partners] [AI-Human Interaction] [Success Criteria]

Link/Add/Delete/Update/ Prioritise [User Stories][Components/Actors/Partners][AI-Human Int][Success Criteria]

## OUTPUT

[Updated User Stories] [Workflows as ToBe – Processed Scenarios] [Validated Success Criteria]

