PROPOSAL OF A RELEVANCE MATRIX BETWEEN NEW TECHNOLOGIES AND DECISION-MAKING STEPS

Congrès de la SAGIP

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Lyon, France

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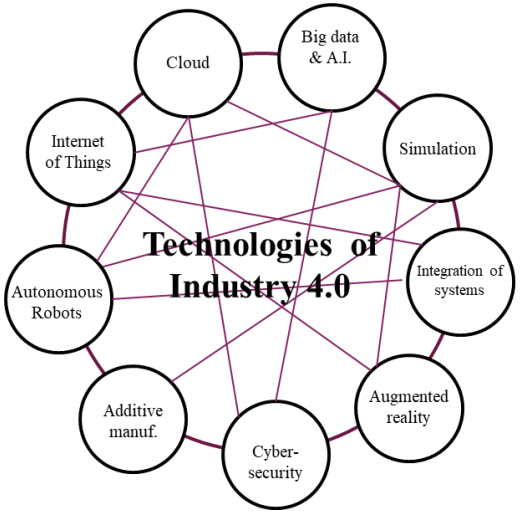
Agenda

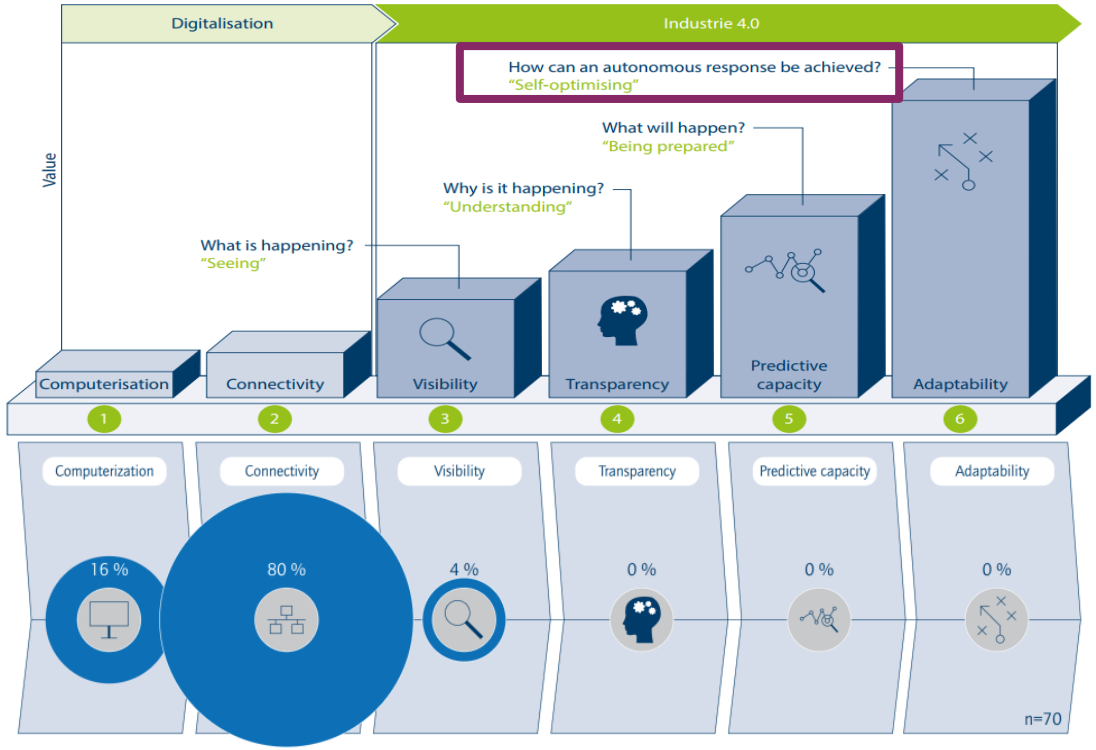
1. Context
2. Theorical Framework
3. Objectives
4. Methodology
5. First results

Context - Deployment of Industry 4.0



Ruessmann et al. (2015), CEFRIO (2018)

Companies by average overall maturity stage ?



Schuh et l.. (2020). Using the industrie 4.0 maturity index in industry. Current Challenges, Case Studies and Trends. Acatech COOPERATION.

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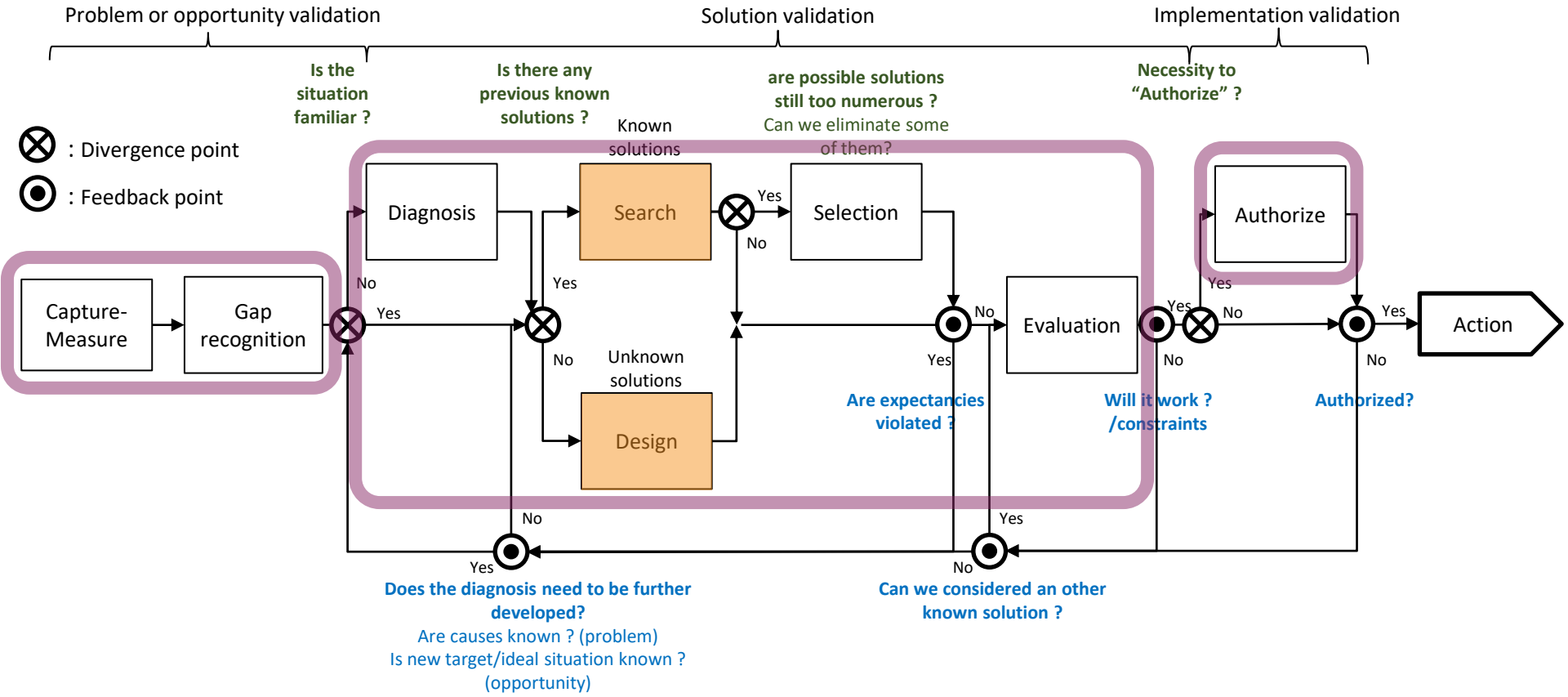
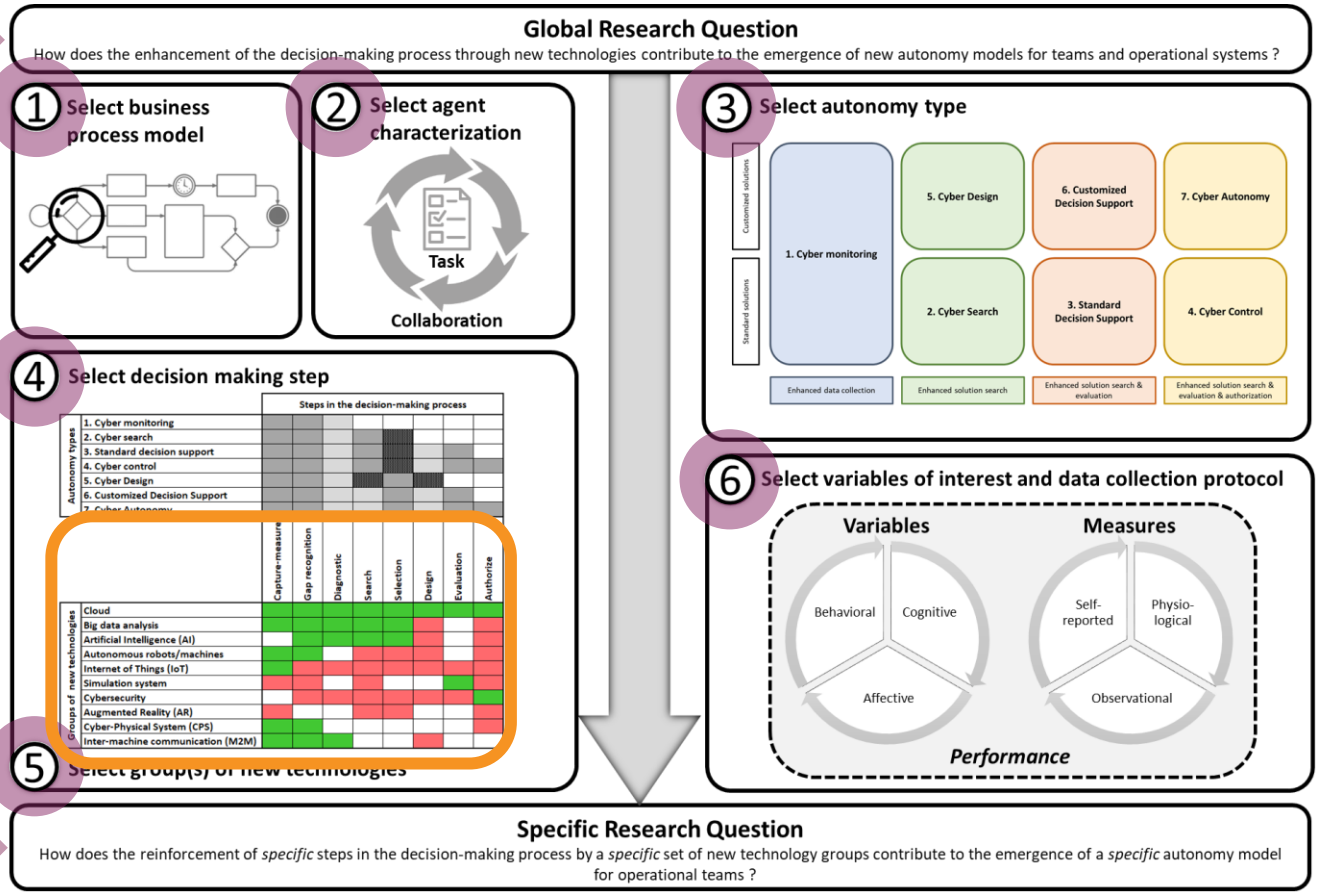
Theorical framework – Decision-making model



Theorical framework – Use cases development framework



Theorical framework – Relevance matrix of technologies

Groups of new technologies	Steps in the decision-making process							
	Capture-measure	Gap recognition	Diagnostic	Search	Selection	Design	Evaluation	Authorize
Cloud								
Big data analysis								
Artificial Intelligence (AI)								
Autonomous robots/machines								
Internet of Things (IoT)								
Simulation system								
Cybersecurity								
Augmented Reality (AR)								
Cyber-Physical System (CPS)								
Inter-machine communication (M2M)								

Blank matrix

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Matrix proposal via a Delphi-Régnier study (Rosin et al., 2021)

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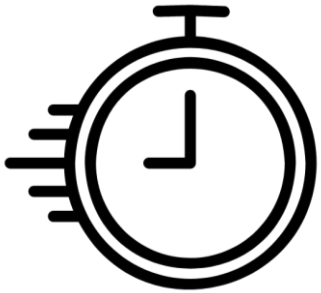
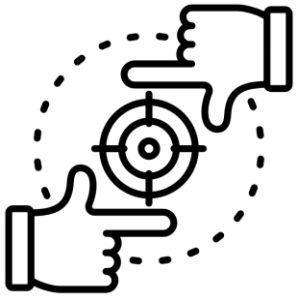
Objective – Limitations of Delphi-Régnier study

The Delphi-Régnier method is designed to organize expert consultation and highlight consensus and dissensus on a specific subject.

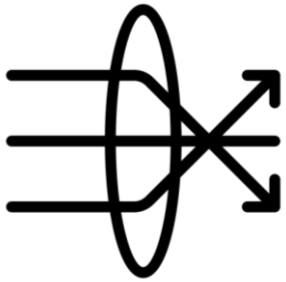
Limitations of the study :



Aging



Focused



Biased

Qualitative

Objective – New relevance matrix of technologies

Groups of new technologies	Steps in the decision-making process							
	Capture-measure	Gap recognition	Diagnostic	Search	Selection	Design	Evaluation	Authorize
Cloud								
Big data analysis								
Artificial Intelligence (AI)								
Autonomous robots/machines								
Internet of Things (IoT)								
Simulation system								
Cybersecurity								
Augmented Reality (AR)								
Cyber-Physical System (CPS)								
Inter-machine communication (M2M)								

Blank matrix

Systematic literature review

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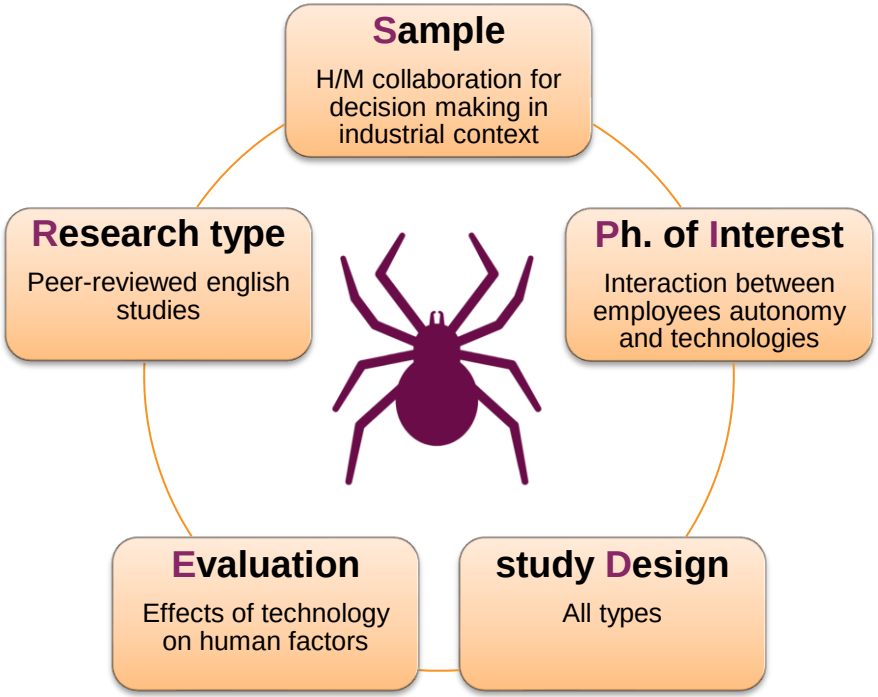
Methodology – Spider matrix and query



I4.0 / I5.0	"industr* 4.0" OR "industr* 5.0" OR "operator 4.0" OR (("smart" OR "digital" OR "connected") PRE/1 ("factor*" OR "industr*" OR "manufact*"))
	AND
Autonomy	("operator*" OR "employee*" OR "worker*" OR "human*") AND ("autonom*" OR "self-determin*" OR "self-organiz*" OR "self-regulat*" OR "freedom" OR "discretion" OR "empowerment“ OR "human-in-the-loop")
	AND
Decision	"decision*" OR "decid*" OR "measur*" OR "analys*" OR "diagnos*" OR "search*" OR "select*" OR "design*" OR "evaluat*" OR "authoriz*"

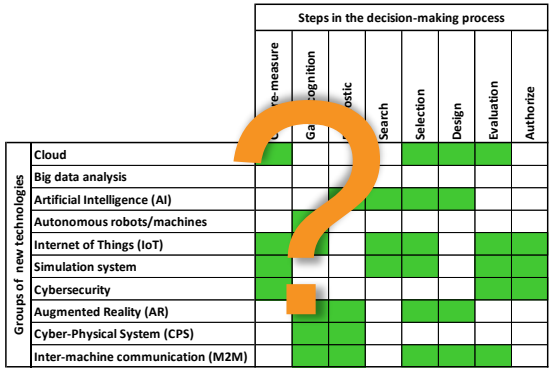
Abstract reading

Full-text reading

Methodology – Data collection protocol

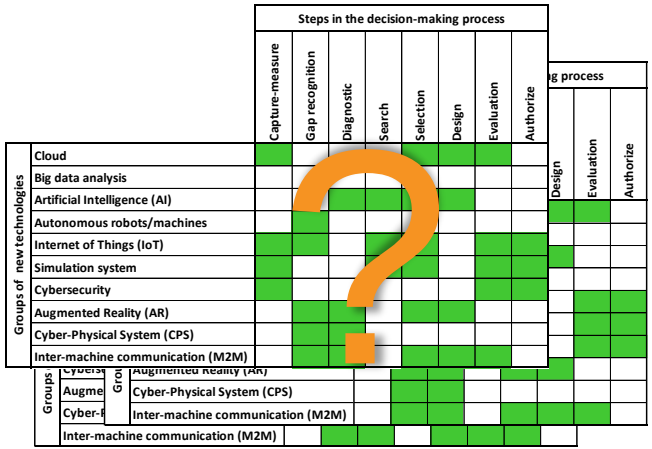
1/ Decontextualized study

- → Technology(ies) studied
- → Autonomy type identified
- → Decision-making step(s) targeted



2/ Contextualized study

- → Main, secondary and implicit technologies
- → Case concretization level
- → Decision description
- → Clarity of the link according to the authors



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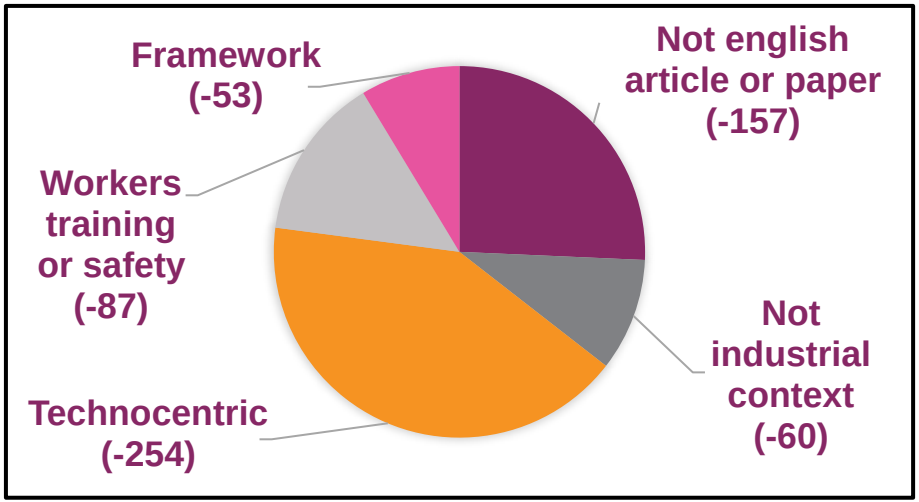
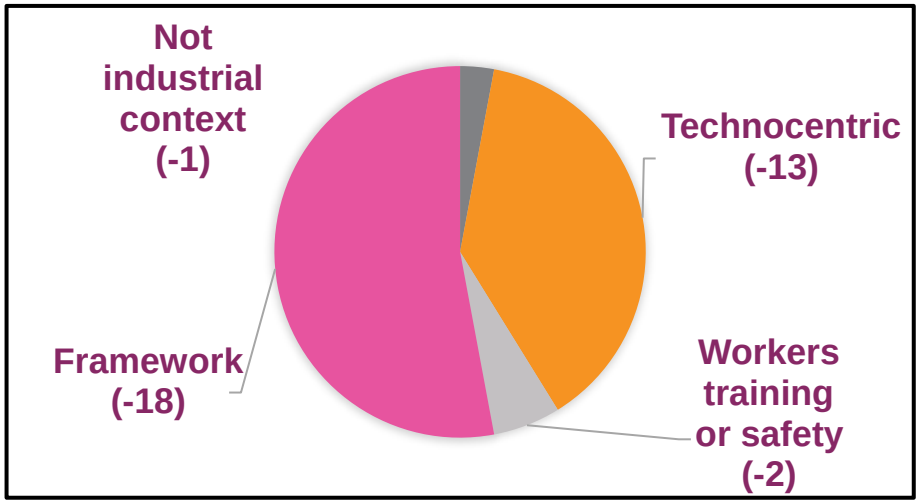
First results – Documents filters

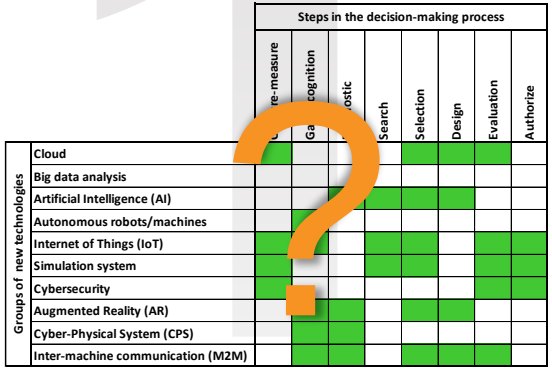
693 records → 82 records → 48 records



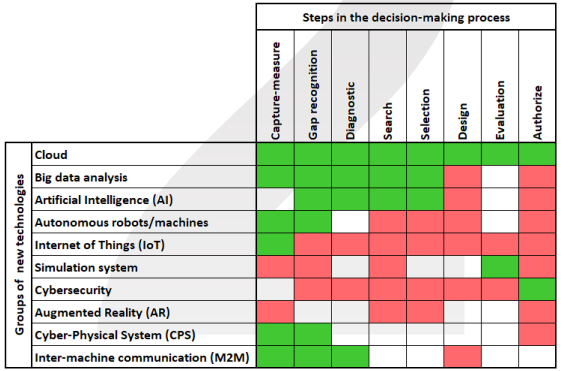


First results – Remaining to be done

1 Build the relevance matrix(es)



2 Propose a global relevance matrix by comparing all matrices



3 Validate the global relevance matrix

→ Delphi-Régnier study ?

→ Experiment ?

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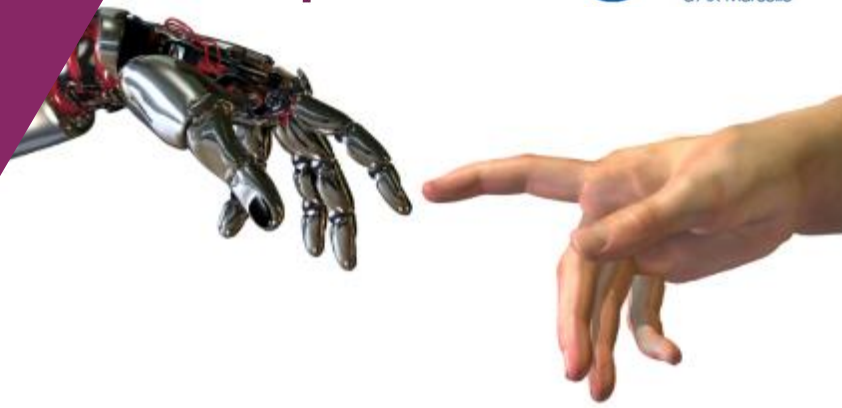

Thank you for your attention