

Ergonomics and Human Factors as a Requirement in Collaborative Robotic Systems: a review



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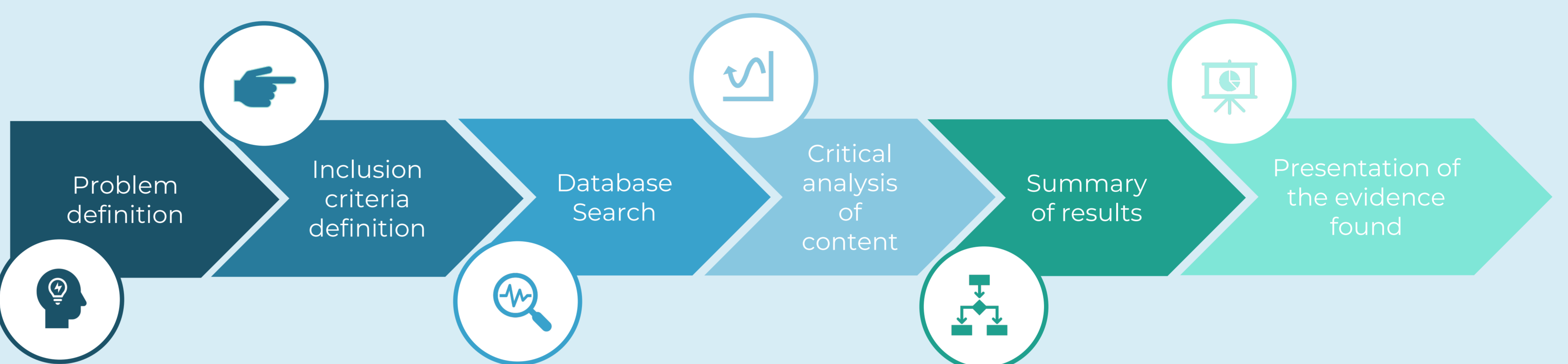
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MIT Portugal

2022 Annual Conference

RESEARCH STREAM



BACKGROUND

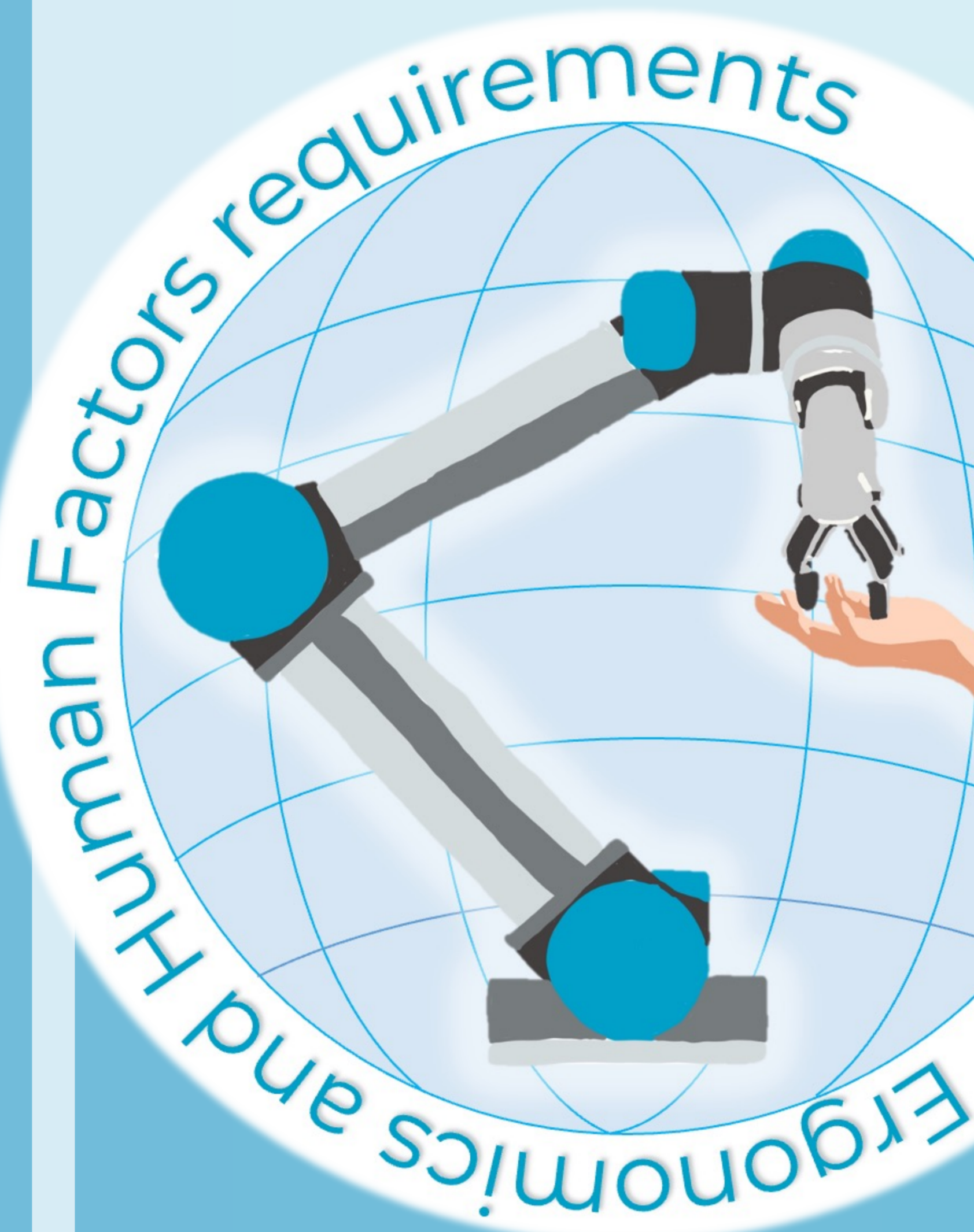
- Ergonomics and Human Factors (E&HF) focuses on **eliminating harmful and unsafe work practices** in an industrial environment [1,2].
- Collaborative Robots (COBOTS) are advertised as potential solution to **reduce occupational risk/ demands** [3].
- Benefits** on the working conditions as **outcomes**. Rather than **consider the ergonomic requirements as inputs** during the design phase.[3]
- The inclusion of **ergonomic criteria** in the development and implementation **COBOTS** technologies is **far from being well-known** [4].
- The role of E&HF in Human Robot Collaboration research seems to be addressed in **two major ways**:
 - **Offline**.
 - **Online**.

OBJECTIVE

Sum up studies that considered E&HF as a requirement to implement safer collaborative workplaces and thus improve the well-being of workers.

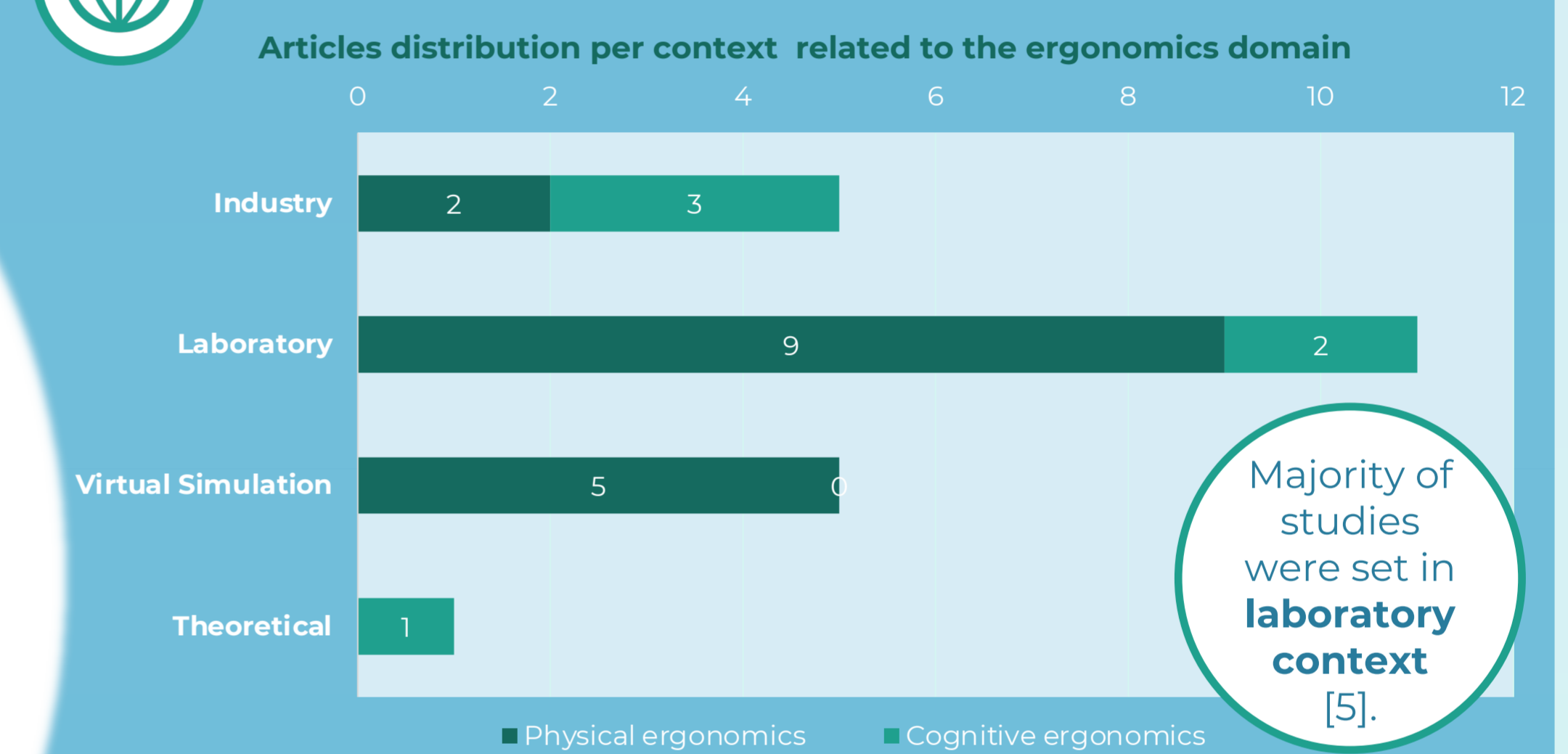
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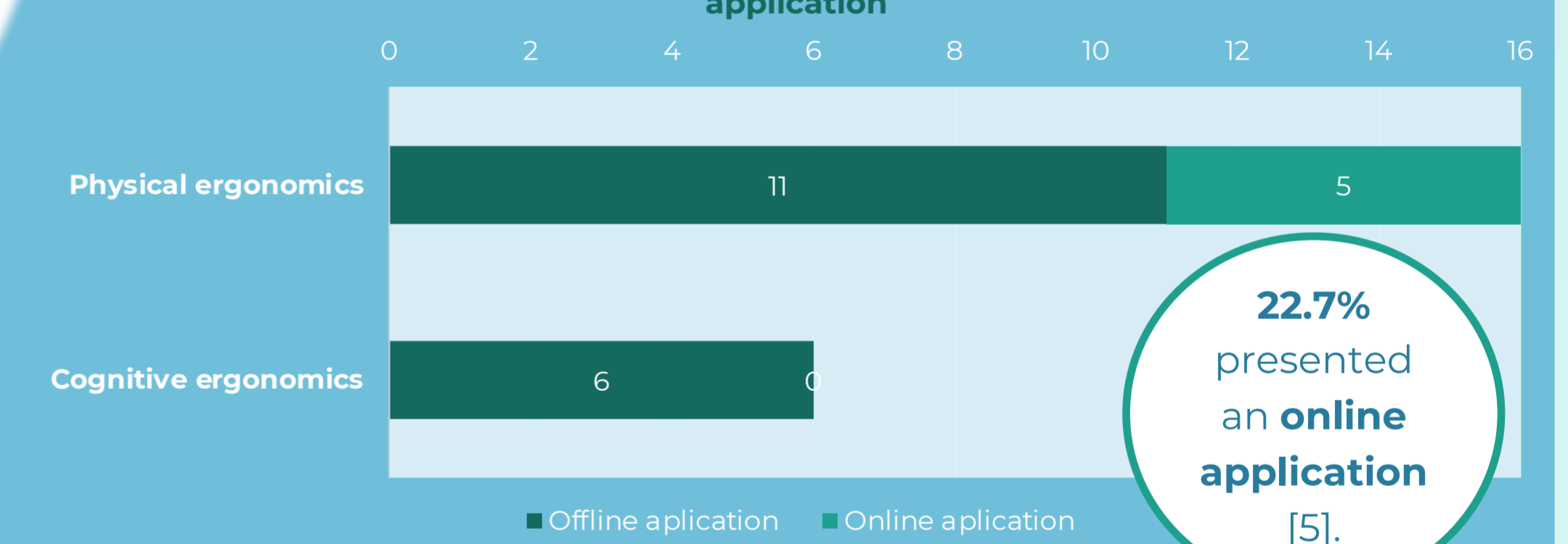


RESULTS

Overall distribution of the studies found



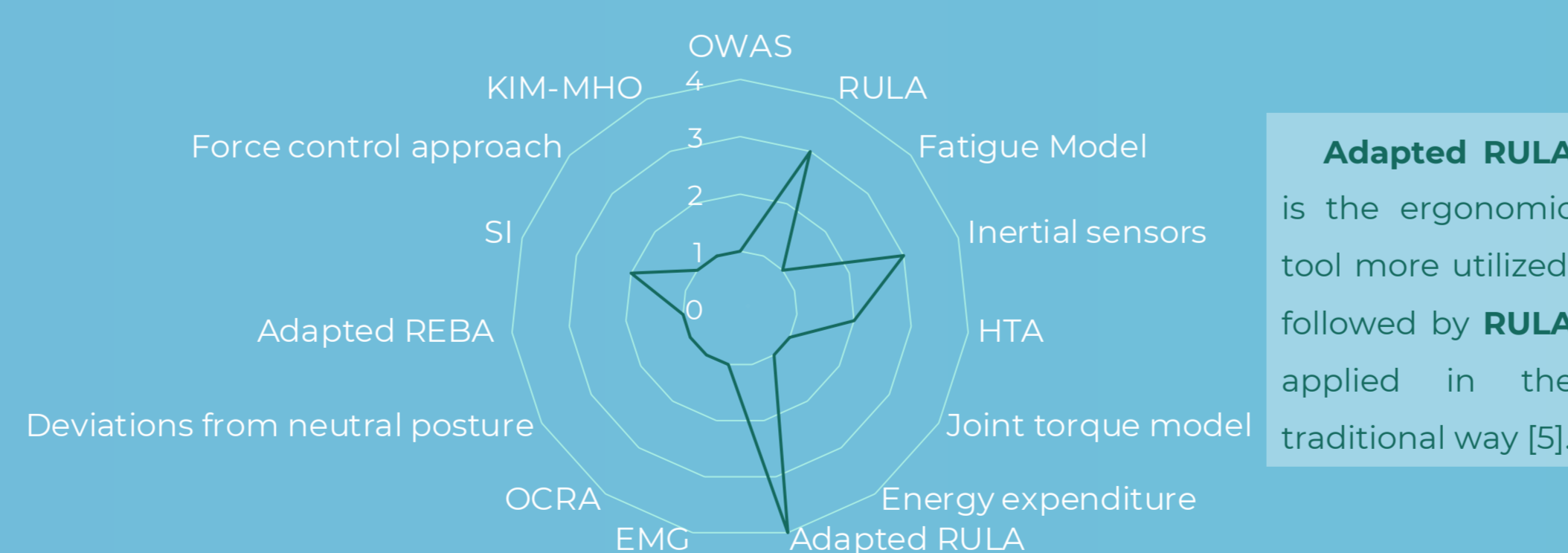
Articles distribution per type of ergonomics related to its ergonomic application



Physical ergonomic studies

- Offline studies**
 - Digital transformation of a manual workstation into a collaborative one [5].
 - Approach for allocating tasks either to the human worker or the COBOT [5].
- Online studies**
 - Improvement of worker posture in real-time [5].

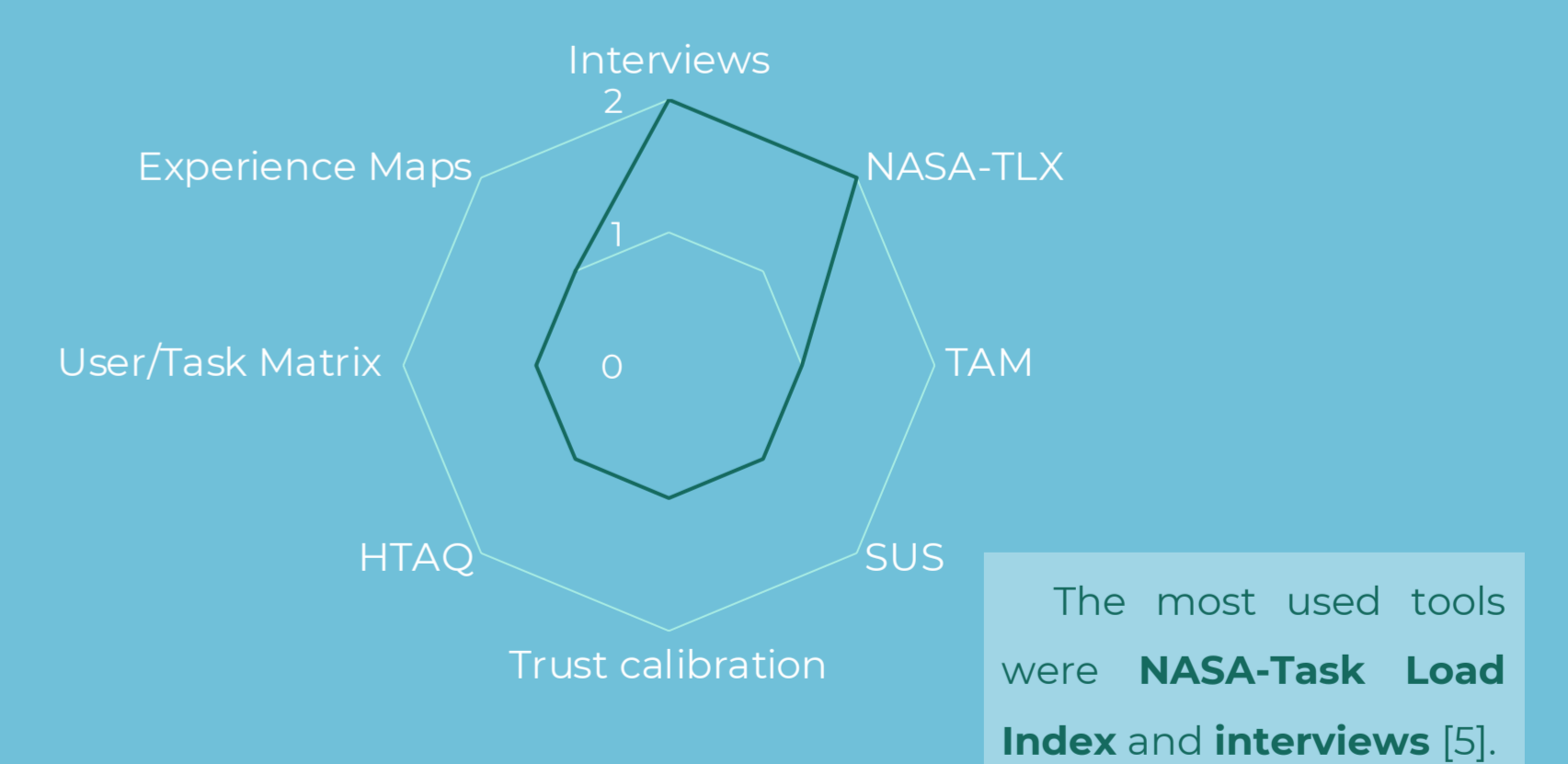
Physical ergonomics assessment tools applied



Cognitive ergonomic studies

- Offline studies**
 - Assessment of the impact of a collaborative workstation on the well-being of workers [5].
 - Development of a framework for a trust-based integrated Scheme for HRC [5].

Cognitive ergonomics assessment tools applied



CONCLUSIONS

- This research review provides **key information** for further investigations on the topic.
- The results show that this field is an **emergent research topic**.
- The role of E&HF** as a requirement in HRC systems' is extremely important for the well-being of workers.

FUTURE WORK

Development of a Framework for Real-time Ergonomic Assessment in Collaborative Robotic Systems.