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Knowledge Sharing in Industry 4.0

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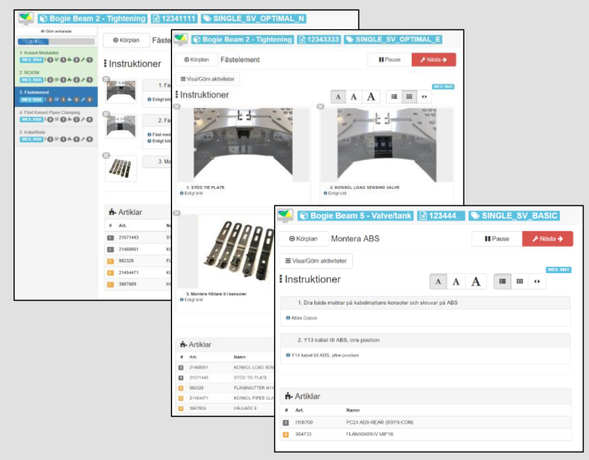
INTRODUCTION

Industry 4.0, the technology-driven paradigm shift of the manufacturing industry (Lasi et al, 2014), creates new interactions between actors and resources (Kagermann, Wahlster and Helbig, 2013), which increases complexity but if properly managed will improve performance and contribute to a competitive advantage (ElMaraghy et al, 2012). On the factory shop-floors, these promises will be realized by human operators (Brettel et al, 2014). These operators should be supported by automation (Romero et al, 2016).

COGNITIVE AUTOMATION

While physical automation relieves manual labour, cognitive automation alleviates mental work of shop-floor operators (Fast-Berglund and Mattsson, 2017). Operator 4.0, operators that work in an Industry 4.0 environment, will be assisted by cognitive automation in order to manage complexity (Romero et al, 2016). Cognitive automation that facilitates knowledge sharing for Operator 4.0 is benefitted by Industry 4.0 enabling technologies (Inkinen, 2016). However, to introduce the cognitive automation, a purposeful strategy is necessary (Mattsson et al, 2018) and subsequent organizational considerations need to be made, emphasizing an Organization 4.0 (Li et al, 2018).

This poster proposes experiments to be conducted with an Organization 4.0 approach in a learning factory environment as a means for exploring the possibilities of Industry 4.0 enabling technologies for Operator 4.0.



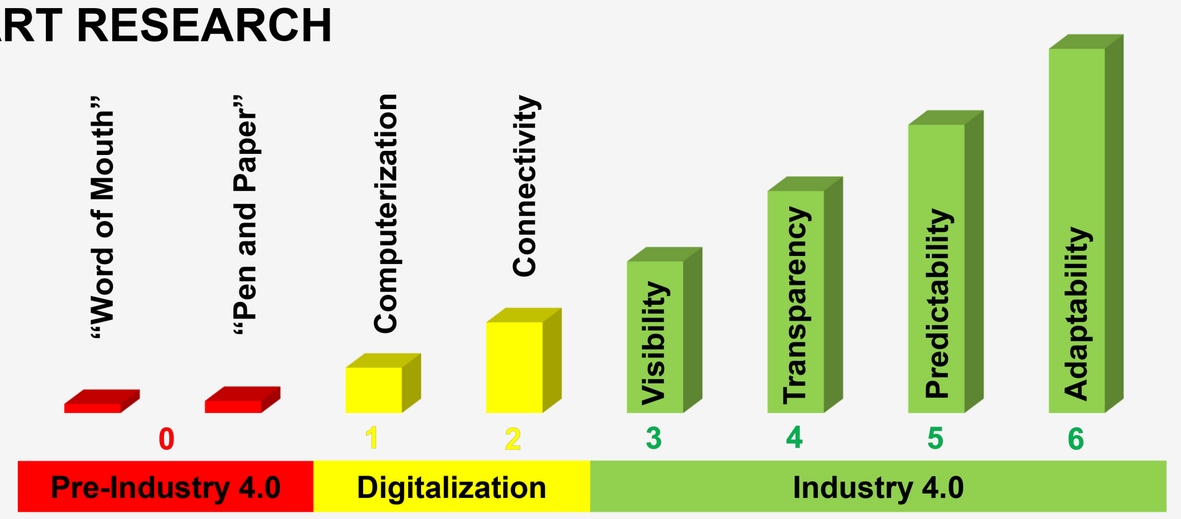
STATE OF THE ART RESEARCH

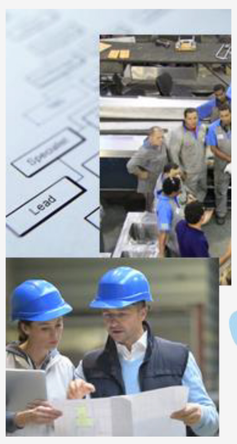
KNOWLEDGE SHARING

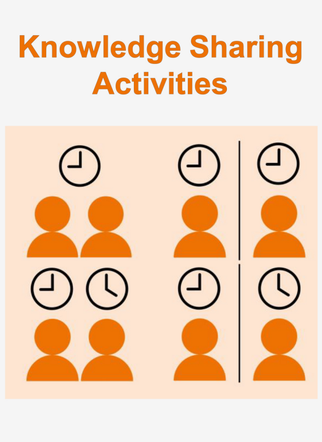
The MEET model is introduced here as an Organization 4.0 approach to support the implementation of Industry 4.0 enabling technologies as cognitive automation for Operator 4.0. The MEET model analyses ten areas within the Organization System and the Information System with the aim of identifying development focus for improving the effectiveness of sharing data, information, and knowledge that are useful and supports humans at work (Gullander et al, 2014; Li et al, 2018). This sharing of knowledge may occur during the same or different time or place relative to the participants of the knowledge sharing activities. To support the implementation of Industry 4.0 enabling technologies as cognitive automation, the MEET model explores the connections between the ten areas for a specific knowledge sharing activity, for example:

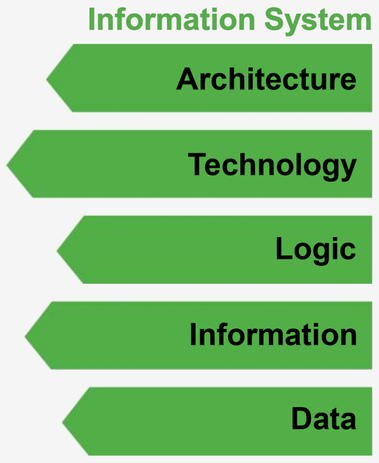
- Who (*people*) participates in *activities*?
- How do *people* perceive *technology*?
- How is *data* and *information* stored in the IT *architecture*?

The use of the MEET model stresses that there needs to be a balance between the Organization System and Information System when designing knowledge sharing activities.









INDUSTRY 4.0

Industry 4.0 enabling technologies have the possibility to integrate knowledge dissemination in production networks (Kagermann, Wahlster and Helbig, 2013). Assessment of the stages of Industry 4.0 maturity supports companies' development by identifying paths for improvements of their manufacturing agility (Schuh et al, 2017). This approach is applicable for Organization 4.0 and knowledge sharing activities that wish to transgress from pre-digitalization and setting up realistic goals along the development stages (Schuh et al, 2017; Li, Fast-Berglund and Paulin, 2019).

CONCLUSIONS

The State of the Art research forms a basis to approach the needs for knowledge sharing by Operator 4.0 in Industry 4.0. Based on the Organization 4.0 approach using the MEET model for knowledge sharing, two areas for future research is proposed for the Stena Industry Innovation Laboratory with the purpose of evaluating the stage progression of Industry 4.0 maturity.

INDIVIDUAL NEEDS

People are different and have different needs, the same is for Operator 4.0 and need for knowledge. In assembly experiments, knowledge content in cognitive automation will vary for different operators, ranging from sharing detailed knowledge to simple reminders with a coaching approach. With new sensors, the shared knowledge can self-adapt based on the progress of the assembly work and the operators' individual experience, proficiency, or preferences. This approach is affected by the operators' trust in the organization.

KNOWLEDGE CARRIERS

Transgressing from traditional word of mouth interaction and paper-based documentation, the use of new Industry 4.0 enabling technologies as knowledge carriers, e.g., Augmented Reality, Virtual Reality, or softbots, are to be assessed by their potential in various assembly situations, whether it is in training for new operators or in live production. This approach is affected by the operators' trust in the automation.

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