Knowledge Sharing in Industry 4.0

Dan Li¹, Åsa Fast-Berglund¹, Dan Paulin²
¹Department of Industrial and Materials Science, ²Department of Technology Management and Economics
dan.li@chalmers.se, asa.fast@chalmers.se, dan.paulin@chalmers.se

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 (ElMaraghly et al., 2012). On the factory shopfloors, 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 labor, 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 benefited by Industry 4.0 enabling technologies (Irnikhen, 2016). However, to introduce the cognitive automation, a purposeful strategy is necessary (Mattson 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.

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:

- How (people) participates in activities?
- How do perceptions technologies change?
- 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.

STATE OF THE ART RESEARCH

"Word of Mouth" *Pen and Paper" Computationization Connectivity Visibility Transparency Producibility Adaptability Pre-Industry 4.0 Digitalization 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

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).

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 Sobots, 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 organization.

REFERENCES


Keywords: Industry 4.0, Knowledge Sharing, Knowledge Management, Organizational Learning, Sweden, SMEs.