

## How does the process of Industry 4.0 change the job of a carpenter?

DI SCHWARZMANN Wolfgang;  
Supervised by Prof. Dipl. Arch. ETH Urs Meister  
University of Liechtenstein;  
Institute of Architecture and Planning  
wolfgang.schwarzmann@uni.li



### ABSTRACT

The ongoing transformation process driven by industry 4.0, will affect almost each and everything in our environment. This process may take several decades, however a continuous impact on the daily work of a carpenter can be observed already today. In central Europe, new CNC-robots are installed in many workshops of carpenters. These machines provide quality and productivity at the current state of technology. At first there is a shift in the profession of a carpenter, moving from a manually skilled handcraft to a machine supported technician (Schindler, 2009). This technological change will bring benefits to production according to speed, precision and reliability. As a second element of transition, these new solutions start a process of transformation with regard to knowledge and tradition which can be understood as the

beginning of a radical transformation. We can expect more rapid access to knowledge, a better collection of building elements in databases, however with the risk of loss of individual handicraft skills. Embedded in the theoretical foundation of the Actor-Network Theory (ANT) the profession of a carpenter has to be interpreted as being part of a constantly shifting network of relationships (Belliger, Krieger, 2006). Based on this social theory, it is possible to interpret the technological change as new driving force, which changes the perspective of this profession. Analyses of the question of 'what was before' or respectively where 'it might progress to' will help to keep track of this transition. Technology might make a carpenter faster and more cost-efficient but, without doubt, former core elements of his profession will lose relevance (Herres, U. M., 2016). The ongoing research project is investigating the technological change driven by new concepts of Industry 4.0 in the working environment of a carpenter and further on the effect to his profession and identification. The research will focus on the point of interface between digital technologies and the tradition of physical production in wood construction. An interpretation of findings according to the ANT of human and non-human actants will demonstrate a variety of new opportunities formed by technology towards a new 'profession' of a carpenter (Belliger, Krieger, 2006). Visualisation of different approaches on interpreting the handling of tradition and technology, will formulate critical aspects by adding different perceptions of involved Actants. These positions might result from Carpenters, Architects, Estate-developers or institutions like the heritage agency. An expected outcome of the ongoing research will be the identification of essential key skills the profession of a carpenter has to cover.

*Keywords: Actor-Network-Theory, Carpenter, digital transformation, tradition, handcraft, Industry 4.0*

#### References:

- Belliger, A., & Krieger, D. J. (Eds.). (2006). Science studies. Anthology: Ein einführendes Handbuch zur Akteur-Netzwerk-Theorie. Bielefeld: Transcript.
- Herres, U. M. (2016). Spuren des Handwerks: der Einfluss handwerklicher Herstellung auf die Architektur. Retrieved from: <https://doi.org/10.3929/ethz-a-010738690>
- Schindler, C. (2009) Ein architektonisches Periodisierungsmodell anhand fertigungstechnischer Kriterien, dargestellt am Beispiel des Holzbaus. (PhD. Dissertation). ETH Zürich, Department für Architektur, Zürich, Switzerland. Retrieved from: <https://doi.org/10.3929/ethz-a-005956976>

#### SHORT BIO

Wolfgang Schwarzmann is a researcher and PhD student at the University of Liechtenstein. After he finished his Architecture studies in Austria, he worked as a carpenter-trainee at a Workshop and by that developed a deep understanding of this specific field. Further on he worked in the architecture office of Prof. Hermann Kaufmann, a well-known Austrian Wood-Construction-Architect.