Numerous dynamic influences affect producing companies and require a continuous adaptation of the production. At present, modeling these influences and their interdependencies is mainly limited to quantitative factors. In this paper, an approach is proposed that allows to model the missing qualitative influences and their interdependencies via recurrent fuzzy systems (RFS), where the transitions between the state variables are additionally weighted (transition adaptation). This allows an easy adaption of a production environment's behavior while maintaining the interpretability of the model and the model-based analysis results.

To handle the complexity of the resulting models, a structured way to simplify a large fuzzy rule base, to reduce the number of required weighting coefficients, and to merge the state variable onto a single production effectiveness value is shown. All of this is directly illustrated by exemplarily modeling the influence of some relevant qualitative factors onto a production environment.