



DSO Risk Management Strategies for Reducing Risk Caused by Actions in Future Flexibility Markets #365

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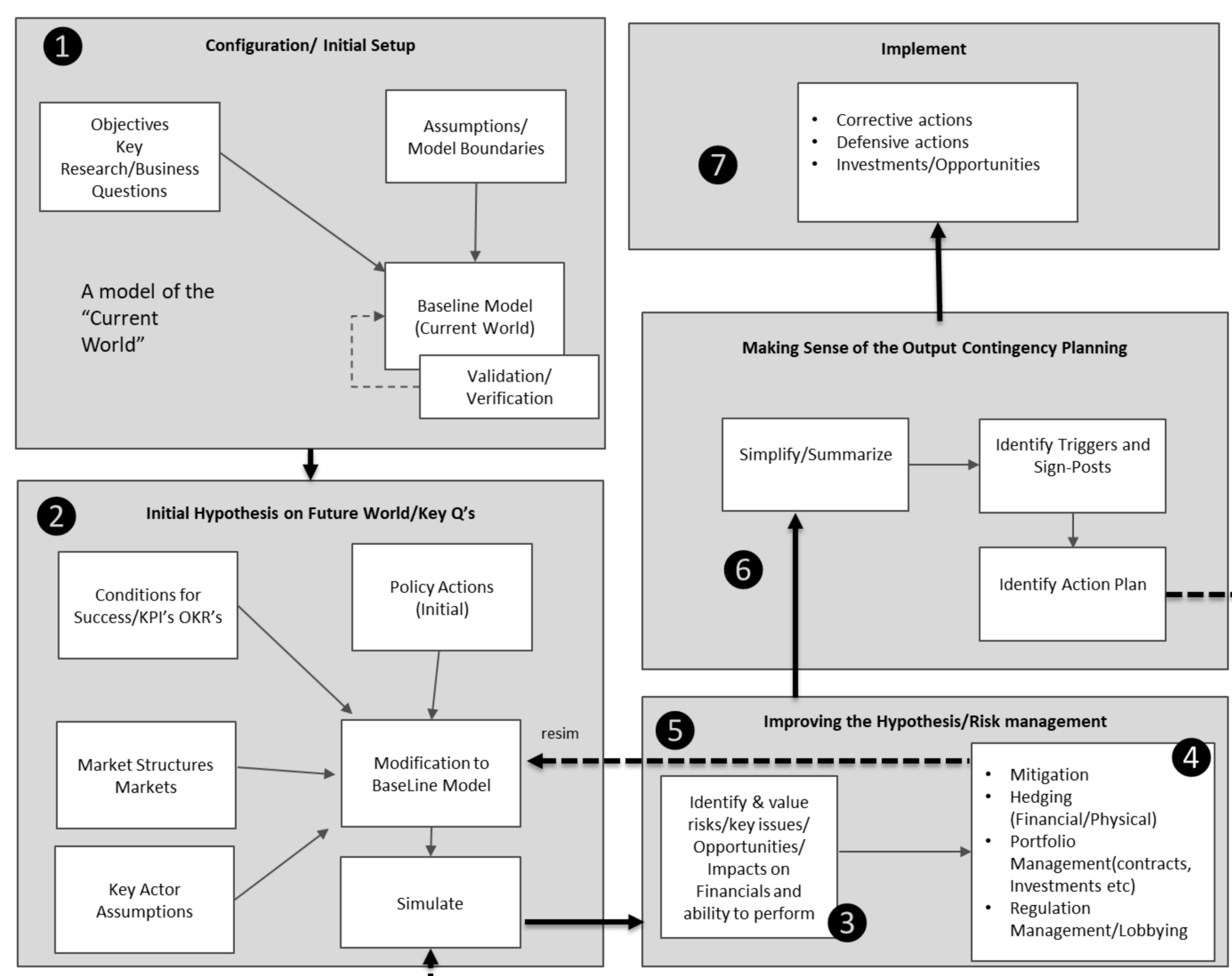
Introduction

- ❖ The lack of visibility of new actors such as aggregators and customers providing demand side response and other ancillary services presents new risks to Distribution System Operators (DSOs) in both their planning of new investments and in the day to day running of the system.
- ❖ The paper presents a methodology for assessing and quantifying these risks, using an Agent Based Modelling tool to model the interactions of key agents such as aggregators, generators, independent system/market place operators, and domestic/industrial customers.

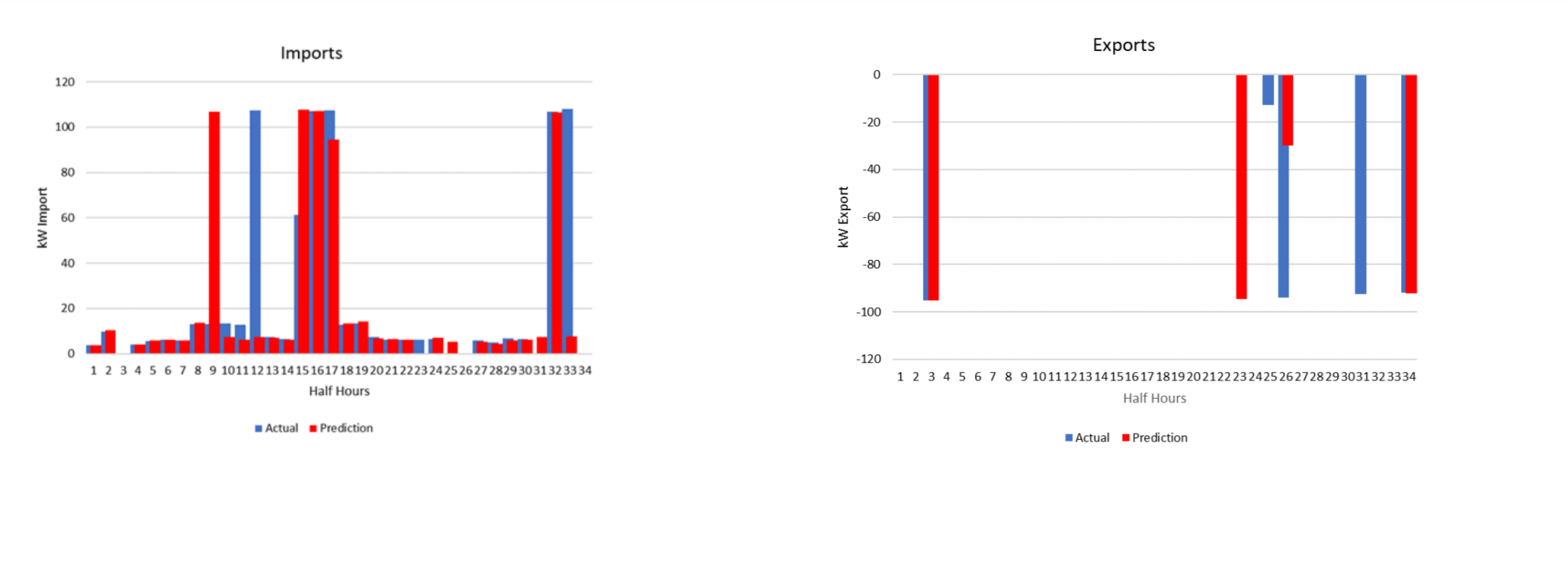
Risk State of the Art

- ❖ Typically standard approaches in the risk management field - the risk matrix approach i.e. Impact vs Probability of occurrence
- ❖ The risk management industry sees three areas for further development in its methodologies: integration of risk management into the business, depth of methods used to analyze risks, and inclusion of behaviours into risk management.
- ❖ Increased complexity of the system: The evolving distribution sector, with active involvement of domestic and industrial customers, the growth of electric vehicles, and the introduction of new actors, adds complexity to the system. This complexity makes it difficult to understand and forecast risk using traditional techniques
- ❖ ABM is a useful method to incorporate many of these aspects.

Risk Framework Methodology



Example Output: Predictions Vs Actual



Conclusions

- ❖ Using ABM simulations, the paper shows that aggregators can have a significant impact on the distribution system, posing risks to the DSO. The simulations also allow for the formulation and assessment of mitigation strategies such as curtailment, additional flexibility reserves, active network management, and novel contract structures.
- ❖ We have developed a framework based on references [1,2] to identify and manage those risks, taking account of complex interactions between actors.
- ❖ It is important to note that the specific risks and their magnitude may vary depending on the specific context and characteristics of the distribution eco-system.

References

- [1] B. Ritchie and D. Marshall, Business Risk Management. Chapman & Hall, 1993.
- [2] W. E. Walker, V. A. Marchau, and J. H. Kwakkel, "Dynamic Adaptive Planning (DAP)," Decision making under deep uncertainty: from theory to practice, pp. 53-69, 2019.