Legislation, Regulatory Impact Assessment and Simulation

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1. INTRODUCTION

1.1. Overview

This article gives an overview over various possible applications of simulation approaches to legislation. Simulation has been used in legislative processes for several decades, nearly from the time when simulation was first used in the social sciences, particularly in political science. Its main use so far was in assessing the impact of alternative political strategies before new legislation would be set into force. This is why Section 2. of this article first discusses the role of regulatory impact assessment. Sections 3 through 5 are then devoted to a discussion of three of the major approaches to social simulation and their use for impact assessment: static and dynamic microsimulation as well as agent-based simulation. Whereas the two former have a tradition of more than half a century, the latter made its entrance into the repertoire of computational social science only some twenty years ago, although there were several forerunners before the term “agent-based simulation” was coined which used similar techniques.

* The Author is professor emeritus at the Universität Koblenz-Landau (Germany). Section 2. extends the introduction of the earlier paper M. BICKING, K.G. TROITZSCH, M.A. WIMMER, Regulatory Impact Assessment: Modelling and Simulation to Facilitate Policy Choices, in Ernst A., Kuhn S. (eds.), "Proceedings of the 3rd World Congress on Social Simulation. Scientific Advances in Understanding Societal Processes and Dynamics - WCS2010", CD-ROM, Center for Environmental Systems Research, University of Kassel, 2010. Section 5.2. discusses first results of the OCOPOMO project (co-funded by the EU within FP7, contract No. 248128; the European Commission cannot be made liable for any content) directed by Maria Wimmer at the University of Koblenz-Landau. The Author also gratefully remembers the time when he first came into contact with regulatory impact assessment during his membership in the Hamburg state legislature from 1974 till 1978.
1.2. Approaches to Social Simulation

During the long history of applying simulation to social, economic and political phenomena, several simulation approaches have been developed. Some were used to forecast future states of a given target system, others rather had in mind that prediction and forecast should only follow a deep understanding of the system in question and a validation of models used for any kind of prediction. It is a matter of course that even the earliest attempts at forecasting via simulation set up complex models of the respective target systems, but the theory behind them was not in all cases properly validated (perhaps one of the reasons why there is often some skepticism among political decision makers about simulation models). If one follows Zeigler, one has to distinguish among three steps of validation: replicative, predictive and structural validation. While replicative validation is satisfied when a dynamic process model replicates data from the past (which can be tested at the time the model is first used), predictive validation can only be performed some time after the use of the model, as one has to wait for the predictions of the model to come true (or not). But even this predictive validation is by no means a guarantee for the structural validity of the model as different models might have predicted the same future state of the target system. We will discuss this issue with several examples of simulation models applied to processes where legislation was involved.

System dynamics and microsimulation are certainly the first among the simulation models used for supporting political decision making as they date back to the 1950s, as the System Dynamics Society and the International Microsimulation Association celebrated the 50th anniversaries of these two approaches in 2007. These two approaches both have their merits in defining and analysing political strategies, but their application areas are entirely different.