

Experience from a Modelling & Simulation Perspective in Smart Transport Information Service Design

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This paper presents experience obtained in modelling and simulation of stakeholder-driven interactions for improved transport service design. The presented results describe value-aware, service model driven design artefacts supporting smart transport service development. The Socio-Technical System Engineering process is used in order to generate modelling and simulation artefacts, based on an executable representation of requirements.

The STSE process is defined as a Modelling and Simulation Based Systems Engineering (M&SBSE) process used to guide improved design aiming to capture value co-creation service interactions embedding customer experience in service design and delivery activities. The STSE process defines the required steps to generate modelling and simulation artefacts to formally visualize service entities interactions, as UML and agent based executable models, using a socio-technical description in service systems.

Section 2 of the paper presents related work in service modelling and aligns the steps in the STSE process with modelling and design activities in IBM Rational Rhapsody, a system development platform in which models can be directly interpreted and executed. The role of the development platform in transposing the above mentioned aspects in practice is emphasized and integration guidelines of the STSE process steps with the IBM Rational Rhapsody development platform are described. This visual development environment for embedded, real time or technical application software development based on the UML and SysML modelling standards offers support for high-level modelling.

The case study presented in Section 3 approaches the development of a real time service able to provide integrated information on planning a trip by bus or alternatively by taxi. The working solution proposed here raised different questions regarding real world implementation of such services. Smart decisions involve evaluation of new public transport routes availability, extension of available routes, improvement of working shifts, acquisition of supplementary vehicles and improvement of existing business plans. Through their interaction with registered service customers, service providers may gather information about utilization degrees of travel routes in the city, utilization degrees of transport vehicles, evaluation of peak hours, or seasonal trends. This attempt to integrate agent-based modelling and simulation experience into the development of smart transport services emphasises the role of the development platform that provide tools for model analysis, validation, simulation, and real-time animation. As a consequence, the developed models can be defined consistently with user needs.