

Selected Topics on Complex Systems Informatics: Editorial Introduction to Issue 12 of CSIMQ

Kurt Sandkuhl*

University of Rostock, Chair Business Information Systems,
Albert-Einstein-Str. 22, 18059 Rostock, Germany

kurt.sandkuhl@uni-rostock.de

Complex systems and their analysis, development and management are the context and the motivation of most of the articles in this issue of CSIMQ. Different views exist on what actually makes a system “complex”. In systems theory, a widely spread view is that complex systems have many components with emergent behavior [1], i.e. the large number and the dynamics of components are decisive. Other disciplines emphasize the importance of also including a more subjective view on complexity by considering “difficulty” factors in understanding and dealing with a system. This interpretation of complexity is very much in the eyes of the observer [2]. Furthermore, in informatics and business information systems, we are dealing with socio-technical systems, i.e. the human is also part of the system and affects complexity.

Modeling is an important contribution to dealing with complexity in development and engineering processes. A model is a generalized representation of a piece of reality, with only those real-world properties included which are relevant to the purpose of modelling [3]. Models don’t remove the complexity of the real world but help to understand it and to design and develop solutions. All articles in this issue are in some respect concerned with models or modelling.

The articles in this issue also reflect recent trends in industry and society, such as digitization and industry 4.0, and show that these trends will not necessarily reduce complexity in systems but rather require the combination of proven approaches, such as modelling, and new methods for managing this complexity.

The following articles were accepted by the reviewers:

- Planning human activities within business processes is the topic of van Eck, Firat, Nuijten, Sidorova and van der Aalst. The authors show how dynamic human performance may influence the scheduling process.
- The work of Nardello, Møller and Götze addresses a topic related to “Industry 4.0”. The authors implement the Reference Architecture Model Industry 4.0 (RAMI4.0) in a laboratory context and investigate its contribution to organizational learning in the

*Corresponding author

© 2017 Kurt Sandkuhl. This is an open access article licensed under the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>).

Reference: K. Sandkuhl, “Selected Topics on Complex Systems Informatics: Editorial Introduction to Issue 12 of CSIMQ,” *Complex Systems Informatics and Modeling Quarterly*, CSIMQ, no. 12, pp. I–II, 2017. Available: <https://doi.org/10.7250/csimq.2017-12.00>

Additional information. Author's ORCID iD: K. Sandkuhl – <https://orcid.org/0000-0002-7431-8412>. Article PII S225599221700067X. Article received: 27 October 2017. Available online: 31 October 2017.

laboratory by collecting and sharing up-to-date information concerning manufacturing equipment.

- Zikra, Stirna and Zdravkovic discuss information systems integration as an essential instrument for organizations to attain advantage in today's fast changing business and technology landscapes. The authors propose a quality-driven, model-driven methodology for designing and developing integration solutions. The methodology spans organizational and systems design details.
- Kaidalova, Seigerroth and Persson propose a framework for using enterprise modelling (EM) in business and IT alignment (BITA). The authors identify challenges that EM practitioners face when EM is used for BITA and propose recommendations to deal with these challenges.
- Kameni, van der Weide and de Groot address in their work challenges of supporting domain experts in model development. They propose a natural-language-based approach to modeling application domains, show how these models can be transformed systematically into computational models, and propose the tool TiC (Tool in Context) that supports the domain expert when developing a model.

The CSIMQ editorial team would like to thank the reviewers of this issue for providing valuable comments and improvement proposals for the submitted articles.

References

- [1] Y. Bar-Yam, "Dynamics of complex systems," Studies in Nonlinearity, Perseus Books, 1997.
- [2] G. J. Klir, "Complexity: some general observations," *Systems Research and Behavioral Science*, vol. 2, no. 2, pp. 131–140, Wiley, 1985. Available: <https://doi.org/10.1002/sres.3850020205>
- [3] T. Kühne, "Matters of (Meta-) modeling," *Software and Systems Modeling*, vol. 5, no. 4, pp. 369–385, Springer, 2006. Available: <https://doi.org/10.1007/s10270-006-0017-9>