

Abstracts

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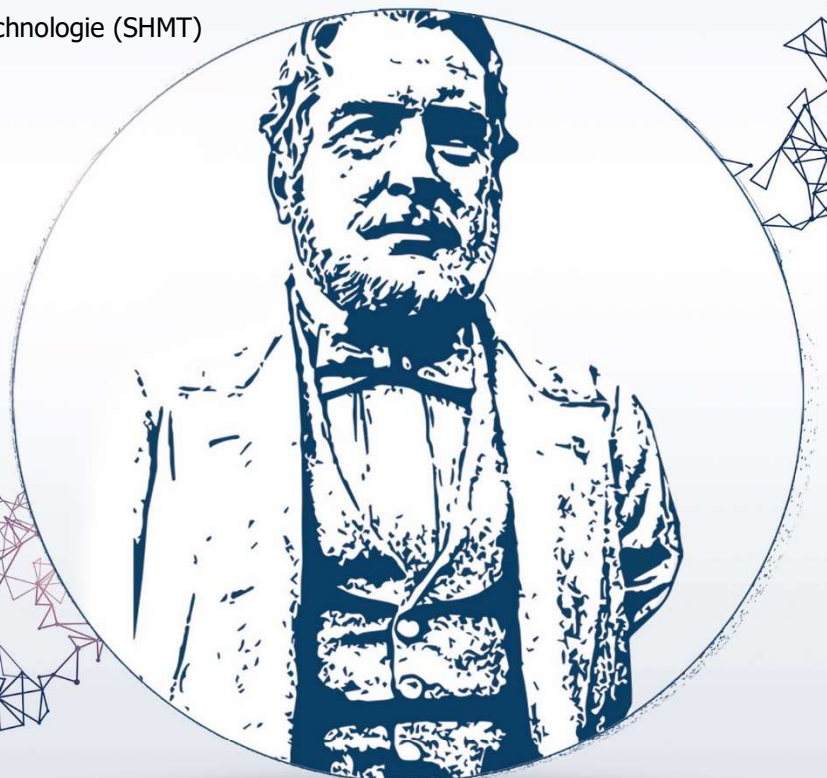
50 years "Limits to Growth" - Scientific Perspectives on the future of Innovation, Modeling and Digitalization

50-Jahre „Die Grenzen des Wachstums“ – Rückblick, Status und Ausblick

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Günter Haag

Limits to growth in modelling – implications, impacts and challenges

The turbulent development of computer science 50 years ago made it possible for the first time to simulate dynamic social systems, such as a "world model" (limits to growth in a finite world) of the Club of Rome, in their temporal development. At the time, it was clear to all scientists involved that the published results only roughly reflect the basic behaviour of the individual Economic sectors, but not when, for example, resources are running out or environmental pollution is becoming unbearable for mankind. The aim of the lecture is to show the limits of modelling and simulation of complex systems and to present the resulting implications. As an example the migratory system of Germany, consisting of 402 German districts and 11.418 communes will be analysed on the base of a dynamic decision model using the master equation approach (Weidlich-Haag model). The attractiveness indicators for each district and commune as well as indicators describing regional interdependencies are shown. For the City of Heilbronn the spatial interrelations with other communes are shown and discussed.

Denise Pumain

Confidence in the future of cities and regions

For the ambitious project that brings together this conference, I would like to present an optimistic vision of the means available to face the challenges posed to territorial planning at the beginning of the 21st century. I will revisit the path we have taken over the past forty years to better understand spatial dynamics, using the principles of physics, the theories of social sciences and the capabilities of computer science. We have consolidated a geographic theory of the evolution of cities. This theory inspires great confidence in the sustainability of these complex systems that demonstrate an extraordinary capacity to adapt at all scales. Our reflection on this subject makes the metaphor of territorial intelligence very concrete. Interdisciplinary collaborations have allowed the development of simulation models of spatial dynamics and geosimulation methods that make them important tools for the accompaniment of more precise policies whose effects will be better controllable. These new means reinforce confidence in our ability to face the challenges of ecological, demographic and technological transitions thanks to the attention paid to the territorial modalities of transformations.

Andreas Pyka

Economic Growth, Structural Change and Transformation: What's important now?

Economics today is under severe critique because of the limited abilities to provide answers concerning long term economic development. Because of the prevailing quantitative orientation and the focus on substitution, mainstream economic theory is not capable to include qualitative developments like structural change and transformation. Modern evolutionary innovation economics offers an alternative and places central qualitative change triggered in complex innovation systems. However, also modern evolutionary innovation economics falls short when it comes to transformative change encompassing the whole economic systems including the interaction between supply and demand sides. The current developments in the knowledge-based bioeconomy are an example par excellence for a comprehensive transformation which has the power not only to overcome the lock-in into fossil-based technologies but to contribute substantially to new patterns of production and consumption and to achieve higher degrees of sustainability. In order to understand better this crucial transformation processes and to derive adequate policy recommendations, innovation economics needs to address the ability of innovation systems to pass tipping points in order to fundamentally change the patterns of production and consumption, before the Earth climate system reaches its tipping point which would go hand in hand with devastating and irreversible effects.

Aura Reggiani

Network vulnerability, complexity and resilience: The role of connectivity

The issue of network complexity has received a great deal of scientific attention in recent decades, given its relevance in several fields (economics, geography, transport, environment, etc.). In parallel, the concepts of vulnerability and resilience have come to the fore, also for their links to sustainability issues and related policy (e.g. the terrorist attack in NY in 2001, the economic shock in 2007-08, the COVID-19 pandemic, the disruptions of nodes in transport/communication, etc.). The methodological question is: What is the role of network connectivity in vulnerability/resilience analysis and modelling? And, consequently: Can network connectivity be considered as a useful framework for understanding and interpreting resilience and vulnerability in complex (spatial-) economic systems?