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## Applied Evolutionary Economics and Social Simulation

*Journal of Artificial Societies and Social Simulation* vol. 7, no. 2

<<https://www.jasss.org/7/2/6.html>>

To cite articles published in the *Journal of Artificial Societies and Social Simulation*, reference the above information and include paragraph numbers if necessary

Received: 10-Mar-2004 Accepted: 15-Mar-2004 Published: 31-Mar-2004

### Abstract

At the third European Meeting on Applied Evolutionary Economics in Augsburg almost 120 participants from all over Europe, North and South America, and South Africa discussed the latest developments in applied Evolutionary Economics. In addition to the nine keynote lectures covering a wide range of topics addressed to the conference theme, 72 papers were presented in the parallel sessions. Due to the general high quality of papers and also an increasing share of simulation work we decided to have this time not only our conference proceedings ([Pyka and Hanusch 2004](#)) but also a special issue in a well recognized journal. And of course, no other journal than [JASSS](#) would fit better to our EMAEE initiative. Finally, out of the 72 papers eight jointly suggested by the EMAEE scientific committee were chosen to be included in the regular referee process of [JASSS](#). In the end, five dealing innovatively with simulation models were chosen for this special issue.

### Keywords:

EMAEE, Evolutionary Economics, Conference Proceedings

### Introduction

#### 1.1

Organised around the general topic of "The Knowledge-based Economy: New Challenges in Methodology, Theory and Policy", the Third European Meeting on Applied Evolutionary Economics (EMAEE) took place at the University of Augsburg from April 10-12, 2003. Although originally conceptualised as an informal initiative only for younger scientists, the [EMAEE](#) idea has become a widely recognised label within the scientific community, and this was demonstrated once again at the Augsburg conference.

#### 1.2

Let us start this introduction of a special issue of EMAEE papers dealing with simulation with a short historical outline of the EMAEE. The idea of a conference on applied Evolutionary Economics was born in 1998 at Grenoble when a small group around Paolo Saviotti (INRA-SERD) thought it was time for a meeting addressing, in particular, applied issues within the broad field of Evolutionary Economics. Over the last few years, the European PhD-programmes, such as [ETIC](#), and summer schools, such as [ESSID](#), have triggered the development of new and more creative research programmes, ranging from the exploitation of new data sources, and the application of methods from complexity theory to simulation analysis addressing empirical questions. Due to these developments, Evolutionary Economics today is able to analyse dynamic processes of change and transformation in

their multi-faceted empirical dimensions in new and interesting ways. Following these ideas, the 1st European Meeting on Applied Evolutionary Economics finally took place in 1999 at Grenoble. A collection of conference papers, including a brilliant introductory chapter by Paolo Saviotti (2003), was released by Edward Elgar last summer.

### 1.3

The second EMAEE then took place in Vienna organised by Werner Hoelzl. Although the conference - taking place from Sept. 13 to 15 - was overshadowed by the horrifying terror attacks of September 11, the intensive and creative mood already experienced in Grenoble was revived at the Vienna meeting. Werner Hoelzl and his colleagues successfully managed this second meeting in a somewhat difficult and turbulent environment, and a further volume, edited by John Foster and Werner Hoelzl (2004), and again published by Edward Elgar - to come out soon - will document the high scientific quality of the event.

### 1.4

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### 1.5

Let us now go on with some remarks on the relationship between Evolutionary Economics and Social Simulation: Evolutionary Economics suggests a close proximity to agent-based simulation techniques as a tool for investigation. "While neoclassical theory describes with precision and rigour a simple world that apparently does not exist" (Dopfer 2004), evolutionary economics tries to analyse a complex reality of economic phenomena deeply intertwined with cognitive, institutional, organisational and political dimensions, i.e. a world of variety full of *complexity* and "informational fuzziness". Furthermore, the evolutionary perspective in economics focuses on the historicity or path-dependence of economic life: processes on the micro-level are characterised by their discontinuity (*mutation*), their direction and irreversibility (*selection*), their sometimes un-expected areas of stability (*retention*) and multiple non-linear interactions between heterogeneous actors, i.e. individuals or firms and other organisations, and between actors and the environment (*adaptation*). The features of micro level processes create *emergent structures* on the system level. These characteristics of evolutionary economic processes with high dynamics and uncertainty can be easily wedded to agent-based simulation techniques which are typically directed towards action/interaction and emergent structure allowing for multiple feedbacks in system creation to analyse and visualise complex processes.

### 1.6

Furthermore, deficiencies in the analysis of complex socio-economic systems require simulation techniques in order to produce data for economic research. In Evolutionary Economics, innovation and learning on the micro level is a core issue for economic development. How knowledge about technology and production is created, adapted, learned, selectively adopted, translated into routines, transferred, applied and changed is seen as crucial for either industrial dynamics as a whole and any economic operations on the firm level. However, it is extremely difficult to follow and test assumptions about effects and mechanisms of innovation and learning by empirical observations alone; simulating these processes provides data to offer further possibilities for elaborating theory formation in Evolutionary Economics.

### 1.7

The contributions selected for this special issue show these advantages of agent-based simulation for Evolutionary Economics. Thus, *J. Pajares, C. Hernández and A. López* is a programmatic paper elaborating some of the issues above. The authors even propose a cognitive science-based approach for the micro level of economic modelling. Their applied simulation analysis shows how innovative firms

learn to change their decision behaviour sensibly according to different conditions in evolutionary environments.

## 1.8

The paper of *N. Lazaric* and *A. Raybaut* deals with innovation on the firm level where different organisational co-ordination mechanisms such as "hierarchy" and "network" provide different environmental conditions for firm learning. The simulation shows that a difference in organisational settings provokes a big difference in knowledge distribution which in turn leads to an un-equal ability to learn for the organisation as a whole. The results of the simulation suggest that innovation and learning is best supported within network arrangements when a solution to the truce problem of an intra-organizational conflict can be found.

## 1.9

Attributes and capacities of learning networks in a knowledge-based economy are also the topic of *P. Morone* and *R. Taylor*. In their contribution, they present simulation results for a network analysis of agent interaction and knowledge diffusion located in geographical and economic settings looking like the metropolitan area of greater Santiago de Chile. While investigating patterns of centrality and cohesion, they find small-world dynamics on the population level due to the special features of learning and decision-making within the network.

## 1.10

In studying the adoption and use of e-commerce, *E. Darmon* and *D. Torre* state that both individual and collective learning, is important for the evolution of new economic structures. In their model, the agents are heterogeneous in their preferences and in their ability to trade on the electronic market and/or on the co-existing traditional market which both include different co-ordination costs. It is shown how different learning strategies establish different market features in the long run, i.e. generate different results for the use and adoption of electronic markets. The paper underlines the advantages of simulation techniques for data collection in a field known to be difficult for empirical research.

## 1.11

The paper of *R. Boero*, *M. Castellani* and *F. Squazzoni* summarises the importance of the micro-macro link necessary to investigate complex economic phenomena in Evolutionary Economics. Their simulation model implements micro behavioural attitudes of heterogeneous complementary firms which on the macro level lead to emergent technological adaptation in industrial districts. Simulating rational agents who follow an individual action motivation, which causes different decision behaviour and strategies, shows how context-specific interactions and feedbacks on the micro level change the shape of the overall system.

## 1.12

Finally, this introduction offers an opportunity to thank some people and institutions that contributed significantly to the success of the conference. First of all, we thank the local host, Horst Hanusch, for hospitality in Augsburg. Also we would like to express our deepest thanks to the DFG (German Research Foundation) and the State of Bavaria for financial support. In addition, Zeuna Stärker (automotive industry), PCI (chemical products), Deutsche Bank and Stadtparkasse Augsburg supported the conference. We must also gratefully acknowledge a donation by the Friends of the University of Augsburg. Finally, the Augsburger bakery Wolff, the dairy producer Zott, the juice company Burkhart, the fruit company Fruchthof Nagel, the brewery Hasenbräu, the Stadtwerke Augsburg and Saeco coffee deserve our deepest thanks. Without their generous support, we hardly could have offered the outstanding refreshment. Finally, we would like to express my thanks to Nigel Gilbert for his patient assistance in editing this special issue.

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