

Report

CODATA Symposium on

Risk Models and Applications

Kiev, Ukraine, Oct. 5, 2008

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Symposium Co-Chairs: Horst Kremers, Berlin, Germany
Juliusz Kulikowski, Warsaw, Poland; Yuri Gorokhovich, New York, U.S.A.
Wenling Xuan, Beijing, P.R. China; Alberto Susini, Geneva, Switzerland

This international symposium was held at Kiev National Technical University, organized by CODATA in connection with the 21st International CODATA Conference following the symposium and in cooperation with GI TC 4.6 WG on Risk Management. The symposium homepage is http://www.codata-germany.org/RMA_2008

This Symposium was dedicated to the data science and information system aspects of Risk Model Structure, Implementation, and Application on a very interdisciplinary level. It gave a very good overview of risk models and application from lots of different perspectives.

The following contributions have been presented and discussed:

Ludovic **Blay**: From Training Tools to Helping Tools in Crises Treatment.

Yuri **Gorokhovich**, Anthony Leiserowitz: Vulnerability and Risk Modeling of Climate Change on Northwestern Coastal Communities of Alaska Using Physical and Social Indicators,

Pascal **Mallet**: A RIS for Overall Management of the Major Risks of the Seine Estuary

Alberto **Susini**: Use of the IAEA industrial risk prioritization method for the assessment of aircraft accident probability on industrial facilities by means of GIS Risk-Register, the examples of Geneva, "Geneva Risk".

Nikolay **Chorniy**, Andriy Buryak: Information – analytical system "Credit Scoring"

Michel **Nabaa**, Cyrille Bertelle, Damien Olivier, Pascal Mallet: A Dynamic Vulnerability Map to Assess The Risk of Road Network Traffic Utilization

Falk **Huettmann**: A Risk Model to Assess and Minimize Biodiversity and Ecological Service Loss in the Circumpolar Arctic Using Strategic Conservation Planning With MARXAN

B. **Iakovlev**, V. Grudova, O. Slyvynska: Using Loss Distribution Approach for Operational Risk and Stock Markets

A.O. **Khvastunov**: Estimating bank stability with the help of probit and logit models

Horst **Kremers**: Risk Variability in Crisis Information Systems Structure

Milan Konecny, Horst **Kremers**: RISK as a Specific CartoGraphic Model

Stefanie **Betz**, Andreas Oberweis: A Process-Oriented Approach for Risk Management in Global Software Engineering Projects

The presentations showed different starting points but the problems as well as the solutions showed consensus. The detailed discussion following each presentation was very much appreciated by all symposium participants. Among the discussion items the following had been considered for further technical, methodological and strategic aspects:

- Reliable Risk information is of very high importance to individual members of information society.
- National and regional programs of research and development in this area are mainly created Homeland Security (e.g. Germany, France, U.S.) and also from the viewpoints of prevention of major hazards, emergency response and land use planning (France, Switzerland). These programs should be integrated and coordinated at least at European level.
- Risk information models typically comprise a large amount of variables and complex dependencies of functional, analytical and operational boundary conditions.
- Simplification and generalization of risk models, coupled with the use of different public databases and regional cartographic servers, made the risk mapping process possible at interesting financial budgets for regions.
- There is a methodological deficit in the separation of facts from risk models (e.g. separating the disaster information (facts) from the risk models applicable).
- Of special concern are threshold occurrences. Firstly there is the question at which point (when, where, at what value etc.) the variable (or combination) turns in to a risk? Secondly, there is the problem of the underlying distribution. In most presentations, the underlying algebra of the problems described assumes probabilistic behavior (cases of stochastic behavior have to be investigated more thoroughly and compared to solutions of the various assumptions made).
- Another important point is the generalization of findings of the risk models. Most of the findings are based on a specific data set used, so they show only one part of the possible developments rather situations supposed to happen. And if there is no generalization possible it is at least essential to bring together the different models to draw one big picture of the whole situation.
- While all elements of the situation (facts) model as well as the actors and their boundary conditions are supposed to be dynamic in space and time, so is (as a consequence) goal definition (e.g. efficient shelter, avoidance of certain types of damage and losses, etc.) of separate dynamics. This means that decision-making and action as the essential part of Risk information availability and use (pragmatics, in contrast to mere semantic "statical" description models) has to be modeled as a (dynamic) mapping of strategies onto the complex situation description and risk models.
- Risk models have to be communicated. The whole risk communication process, concerning the high variety of actors and actor groups involved in a complex situation needs much further investigation for gaining reliability, and efficiency with respect to the overall goal of better understanding and essentially better decision making and action in all exceptional cases of Risk.
- There is a need for further investigation high-dimensional parameter space dynamic visualization at the HCI. Aggregates of certain parameters would have to be visualized in a more or less standard way (agreement on visual style / cartographic models by the actors and communities involved in a certain situation type) to prevent misunderstanding / misinterpretation in a multicultural way.

- The risk perception, the community and social behavior should be further investigated. An integrated approach considering planning, decision-making and communicative strategies and tools is highly relevant. Social behavior, interaction and communication between the involved actors and their influence on decision making needs to be taken in to account.
- The International Center of Training of Local Authorities (Le Havre, France) is extending its competence in simulation of situations and training of actors for better preparedness and management of crisis situations in the urban sphere.
- Risk modeling is a part of a holistic approach to process management. Risk needs to be discussed in the context of processes and an integrated approach to for risk-aware process modeling to integrate stakeholders, activities and objects will be developed.

Publication of contributions to this workshop is planned in a separate topic issue of the CODATA Data Science Journal http://www.jstage.jst.go.jp/browse/dsj/_vols in 2009.

Recommended treatment in next-step studies:

- technical, chemical risks at regional and transboundary level,
- risk and multi-risk cartographic issues,
- risk modeling issues for infrastructure (e.g. factories, railways, highways, pipelines, maritime traffic etc.),
- health and biological risks issues for humans and the environment,
- aircraft crash risks on infrastructure,
- user-group specific risk management issues,
- generalization of the results,
- integrated strategies considering planning, decision-making and communication instruments
- disaster management and emergency preparedness, prevention, alert, response and mitigation,
- data processing related to risk management issues with special regard to information system structural aspects and risk Model Methodology and implementation,
- risk communication: from techniques to behavioral sciences and HCI,
- frameworks for technological integration
- risk-aware process modeling techniques.

There is a topic-related eNewslist available: RISK_List to exchange any suitable information in this study domain. Contact Horst Kremers for joining this eNewslist. 25 new members joined from the Kiev Symposium. To join this eNewslist, see http://www.codata-germany.org/RISK_2009

The symposium chairs greatly appreciated the support of the Kiev system Analysis and Risk Management Group and it is expected that such cooperation continues in further symposia on similar topics.

A report on the symposium was given at the main CODATA Conference and a future publication of the different presentations will be addressed.

Continuing work on that topic is expected at the Intl. Workshop on RISK Management within the scope of ENVIROINFO conference, Berlin, Germany, Sept. 10/11, 2009. Workshop Chair: Alberto Susini, Co-Chair: Horst Kremers http://www.codata-germany.org/RISK_2009

There is an overall goal of these activities from the computer science point of view: We aim at elaborating a general methodology of risk modeling and find recommendations for adequate information system components

Stefanie Betz, Horst Kremers, Alberto Susini
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