

## INTEGRATED WORLD MODEL (IWM) (REGIONAL WORLD IV)

### Frederick Kile

*Microtrend, Appleton, Wisconsin, USA*

**Keywords:** Population, nutrition level, values, socioeconomic activity, modes, value measures, recalibrated models, free-running models, simulation, disaggregation, global economy, decision context, problem of the commons, political boundaries, difference equations, embedded coefficients, satisfaction

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### Summary

Reliable modeling of the interaction between psychological/attitudinal variables and sociopolitical/economic variables may elude researchers for generations. History flows from diverse, overlapping events, trends, and actors, and is nonrepeatable. There is no “control group” against which to measure research results.

Models provide insight into the benefits and potential costs of trends, though underlying social theory may not be clear for several decades. Validatable theories will follow continued study.

During the intervening years, decisionmakers could examine decisions using simulations to help them reduce future dislocations caused by uninformed decisions.

For example, a hybrid socioeconomic and political simulation could provide a rich analytical context for a decision on arms reduction. Recent studies in conflict prediction have incorporated additional factors into the modeling process, leading toward understanding the precursors to conflict before the parties involved have become too agitated to resolve differences peacefully.

However, even in a model-enriched rich decision context, decisionmakers will continue to be in situations resembling the well-known “prisoner’s dilemma.”

The techniques of global modeling as an analytical tool have sometimes been overemphasized to the exclusion of studies of more basic human problems such as the prisoner’s dilemma and the problem of the commons.

Through their rich experience global modelers can offer insight to governments and bodies such as the UN, in particular by stressing the value of lengthened spans of accountability and the need to study the problem of the commons. To help solve long-term problems, the time horizon of our social and political reward structures must be more closely fitted to the curve describing society’s response to perturbations. Global modelers understand this necessity but have not communicated their insight to the larger society. Sharing this insight should be pursued with as much vigor as developing modeling expertise.

### **1. Problem Statement**

The growing scope of global change challenges include:

- Our ability to manage existing political structures
- The capacity of the environment to support global society
- The ability of existing organizations to maintain international stability

### **2. Purposes of Project**

The purposes of the IWM project are:

- To use computer modeling to analyze likely social and economic change
- To introduce explicit value representations into computer models—instead of allowing implicit assumptions to drive model results

The time horizon of the project is the period 1970 to 2010.

### **3. Project Assumptions**

The assumptions of the IWM project are:

- Models will be accepted by decisionmakers only when there is general understanding of modeling as a decisionmaking aid.
- Poorly understood models will not supplant existing methods of managing socioeconomic activity.

#### 4. Model Assumptions

The assumptions in the IWM Model are the following:

- Regional disaggregation in a model of the global social system is required to design a dependable model capable of providing early warning of emerging problems. The underlying assumption is that instabilities associated with the “problem of the commons” will surface in regional disturbances well before corresponding global disturbances become evident.
- Political boundaries are important delineators of forces driving subsystems of the world social system. This is particularly true with regard to early warnings of emerging tensions because the potential for political instability to trigger war is one of the most threatening social forces in the global system. Any regional war has the potential to widen into large-scale or global conflict in an unpredictable fashion.

It is important to note the significance of political boundaries in this model, since some alternative modeling schemes are based on other parameters, notably watersheds and trade regions.

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#### Bibliography

Bremer S.A. (1977). *Simulated Worlds: A Computer Model of National Decision-Making*, Princeton, NJ: Princeton University Press. [This book reflects work done on the GLOBUS Project, an early global modeling effort in affiliation with the Free University of Berlin.]

Kile F.O. (1990). Global Modeling—Questions and Challenges for the 1990s. *Cybernetics and Systems '90. (Proceedings, 10th European Meeting on Cybernetics and Systems Research (EMCSR90)*, Vienna, Austria, April 17–20, 1990, pp. 683–690.) [This paper examined the issues confronting global modeling in the 1990s. Most of those issues remain open in the early twenty-first century.]

Kile F.O. (1990). Quantifying Social Values in a Global Model. (*Proceedings, 11th World Congress on Automatic Control*, Tallinn, Estonia, (former USSR), August 13–17, 1990, **Vol. 12**, pp. 263–266.) [This paper discusses quantification of social values. Examples can include deemphasis of arms production in conjunction with raised emphasis on production of goods for household use as part of a broad effort to

reduce military tension and improve people's standard of living.]

Kile F.O. (1985). Testing Policy Options with a Global Model. (*Proceedings, 1985 IEEE Conference on Systems, Man and Cybernetics*, Tucson, AZ, Nov. 12–15, 1985, pp. 490–493. [The paper describes results from IWM as well as the model which immediately preceded IWM.]

Kile F.O. (1984). Cultural Factors and Values as Influences on International Decisionmaking. (*Proceedings, IX World Congress, International Federation of Automatic Control (IFAC)*, Budapest, Hungary, July 2–6, 1984 **Vol. IV**, pp. 50–55.) [This paper illustrates how cultural values interact in the context of global socioeconomic dynamics.]

Kile F.O. (1983). Rebirth of Adaptation. *Environment and Population: Problems of Adaptation*, pp. 131–134. New York: Praeger. [The author's contribution to this book describes individual human interactions with the larger social sphere.]

Kile F.O. (1979). A Regionalized World Model to Disclose the Nature of Implicit and Explicit Socioethical Presuppositions, pp. 305–315. *Communication and Control in Society*. New York: Gordon and Breach. [A model-based discussion of how social values are represented in global models. No model is value free. It is important to disclose modeling presuppositions.]

Kile F.O. (1979). The Agenda of the Modeler. *ASC Cybernetics Forum* **Vol. IX**, Nos. 1 and 2, Spring/Summer 1979, 18-24. [This article describes what a modeler is achieving through the design approach which is utilized.]

Kile F.O. (1977). Evolution of An Integrated Modeling Approach. *IEEE Transactions on Systems, Man, and Cybernetics* **Vol. SMC-7**, No. 12, December 1977, 859–863. [This paper discusses the development of a predecessor model to IWM, describing how the model was developed and what it does.]

Kile F.O. and Rabehl A.J. (1980). Structure and Use of the Integrated World Model. *Technological Forecasting and Social Change* **17**, 1980, 73–87. [This paper describes the workings of the Integrated World Model in broad outlines and gives examples of model output.]

### **Biographical Sketch**

Frederick O. Kile is Chairman of Microtrend in Appleton, Wisconsin. As a consultant, he offered guidance for innovation and studies of social change and the effects on business. From 1973–1996, he was as a consultant to the AID Association for Lutherans in Appleton, Wisconsin. He led a team studying corporate marketing strategy; conducted a multiyear study involving 7000 people using a health-risk appraisal procedure in cooperation with the Carter Center of Emory University; and was a member of project teams: corporate marketing strategy, technology strategy, universal life insurance. He was Manager of a Marketing Strategies Division and member of team which developed mutual funds and a cashless credit union. He conducted quantitative and qualitative corporate market research and developed plans for a multibillion dollar family of mutual funds and a national credit union. As Director of Futures Research, he studied inflation and family spending and saving patterns. He also studied technology and social change and conducted a national research project on the Hispanic market. As a Research Consultant for Social Modeling, he designed and developed a 20-region global computer model and a more advanced 26-region global model, simulating population, food and industrial production, energy, trade, and international payments. Issues relating to social values are incorporated directly into the models. The project emphasized strengths and problems of using computer models in social decisionmaking, with special focus on the changing nature of social systems under the impact of computerization, and on societal development under the stress of accelerated decision processes. As a Systems Engineer, he worked on Project Apollo.

Mr. Kile's degrees include a BS in Mathematics and MS in Electrical Engineering from the University of Wisconsin, Madison, a BD from Luther Theological Seminary, St. Paul, MN, and a ThD from the University of Marburg, Germany (Dissertation: *Die theologischen Grundlagen von Schellings Philosophie der Freiheit*).

Mr. Kile served as Vice Chairman, IFAC Technical Committee on Supplemental Ways to Improve International Stability. He has more than 40 papers, publications, and conference presentations. He has been an instructor and lecturer on Western Thought, Management, and World Religions/International Business/Ethics. He has been a member of the International Program Committees for IFAC/IIASA SWISS

Workshop on International Stability, Laxenburg, Austria; IFAC/SWIIS Workshop on International Stability, Bolton (Toronto); and Chairman, IFAC SWIIS Conference, Bucharest Romania. Mr. Kile is a Life Member of the Institute of Electrical and Electronics Engineers (IEEE).

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