HUMBOLDT-UNIVERSITÄT ZU BERLIN

VolkswagenStiftung

WINS Berlin Workshop in Institutional Analysis of Social-Ecological Systems

malik

Governing the Anthropocene: Cyber-systemic Possibilities

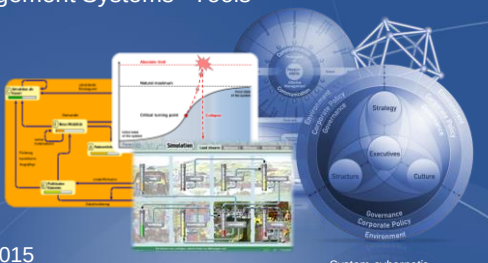
"Building cyber-systemics into policy and practice"

With the Malik Management Systems® Tools

Gabriele Harrer
gabriele.harrer@mzsg.ch

Dipl. Geologist
Head Malik Compentence Center Vester
Malik Management Zentrum St.Gallen AG

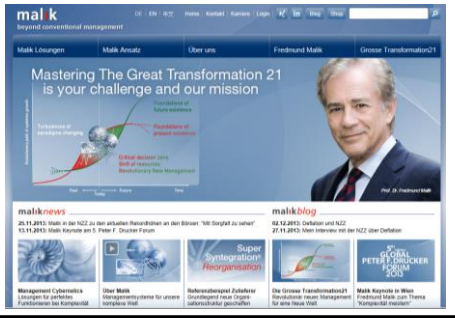
Hannover Herrenhausen Palace, July 31st 2015



System-cybernetic Malik ManagementSystems® for mastering complexity

malik management

St.Gallen · Zurich · Wien· Berlin · London · Shanghai · Toronto



The world's leading knowledge organization in Holistic General Management Systems providing holistic management solutions for mastering complexity, based on the complexity sciences, i.e. ***systemics, cybernetics & bionics****.*

- Established in 1973 as a foundation by the Society for Management Research at the University of St. Gallen, Switzerland
- Converted into a public limited company in 1984 by **Prof. Fredmund Malik**
- Using and combining approaches of important cybernetitians **(R. Asby, S. Beer, F. Vester, ...)**
- Unique in its integrated scientific systemic, cybernetic & bionic approach to management
- 200 employees with practical experience in the business & non governmental world **www.malik-management.com**

Contents

Complexity and Transformation

Application of Cyber-systemic tools in policy and practice:

- *Malik Management Systems®*
- *Sensitivity Modeling®Prof.Vester*
- *Syntegration*
- *Viable System Model*
- *Operations Room*
- *Interconnected Thinking: the cybernetic environmental game ecopolicy®*

Selection of published cases

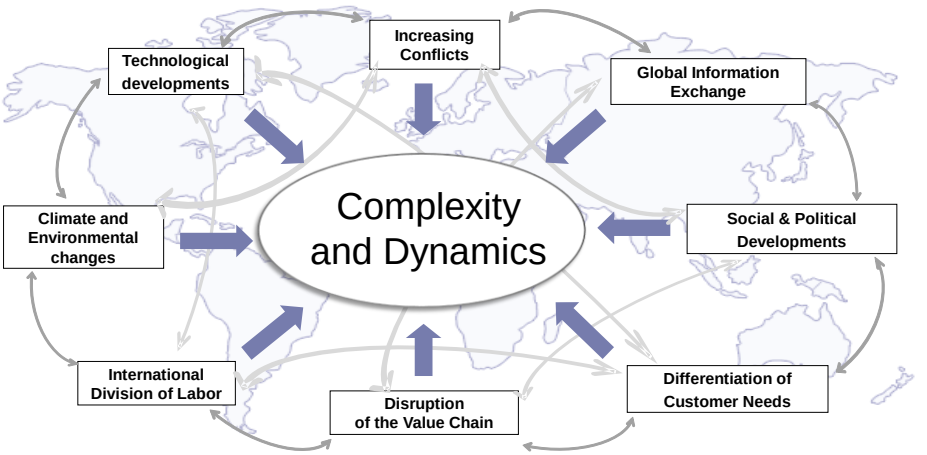
- ✓ ***European forestry & climate change*** (Sensitivity Modeling)
- ✓ ***Metropolitan Area***: Weifang, China (Syntegration & Sensitivity Modeling)
- ✓ ***Systems Thinking International***: cybernetic simulation game *ecopolicy®*

Page 3

malik

© Malik 2015

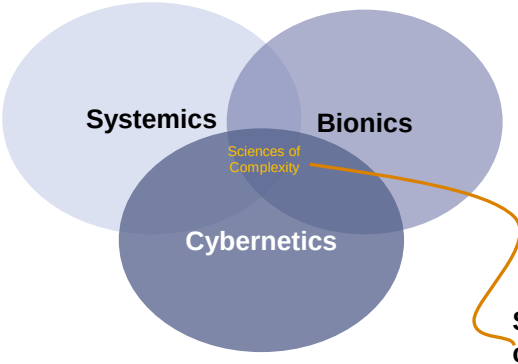
Drivers of Complexity

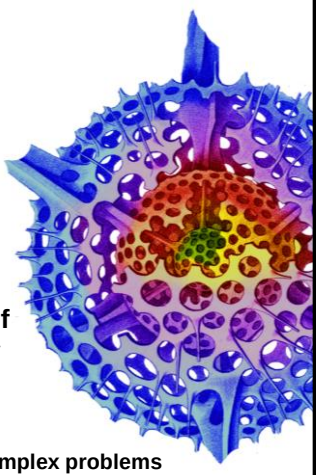


Dealing with complexity and coping with increasing dynamics is becoming management's & politics main challenge

4

The Sciences of Complexity as Basic Approach





System sciences are dealing mainly with social systems

Bionics are focused on learning from biological systems to solve complex problems

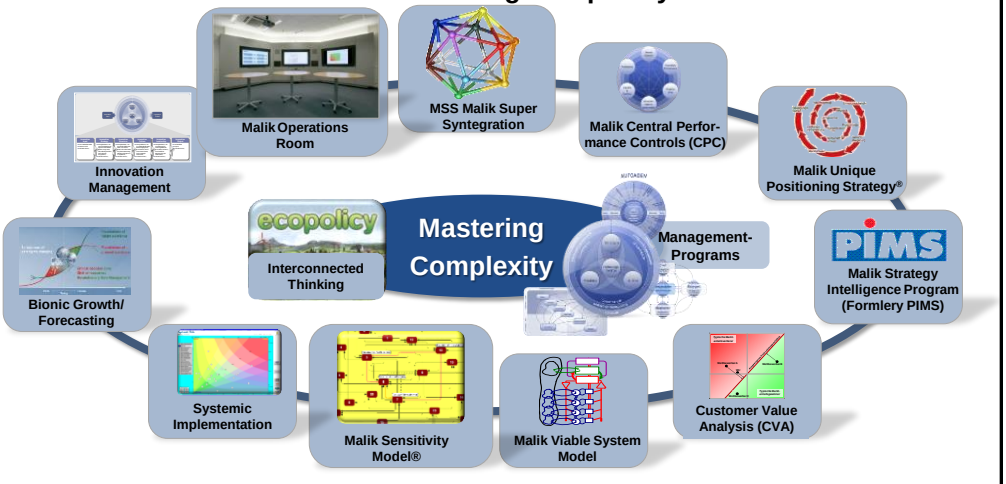
(Bio-) Cybernetics are dealing with control and regulation processes in living systems

5

malik

© Malik 2015

Malik Management Systems®
Solutions for Mastering Complexity

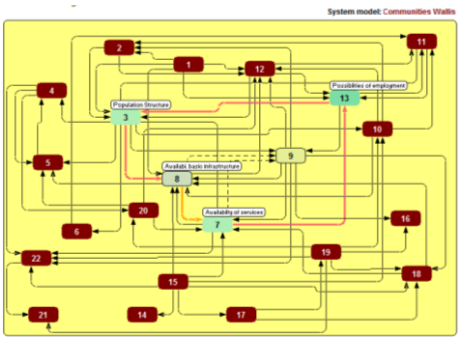


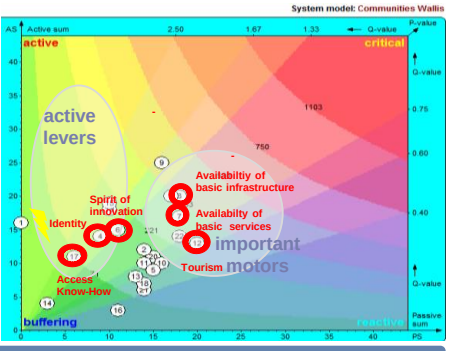
How to Control a Complex System: Turbo Tools guiding beyond Crisis…

page 6

Identify levers and motors

Malik Sensitivity Model®Prof.Vester





Benefits for learning about the system and developing sustainable strategies

- Which feed-back cycles can be used as motora for development?
- Which spiral effects could threaten the system?
- Which factors can be identified and used as control levers?
- Which investments and initivatives will increase the viability of the system?

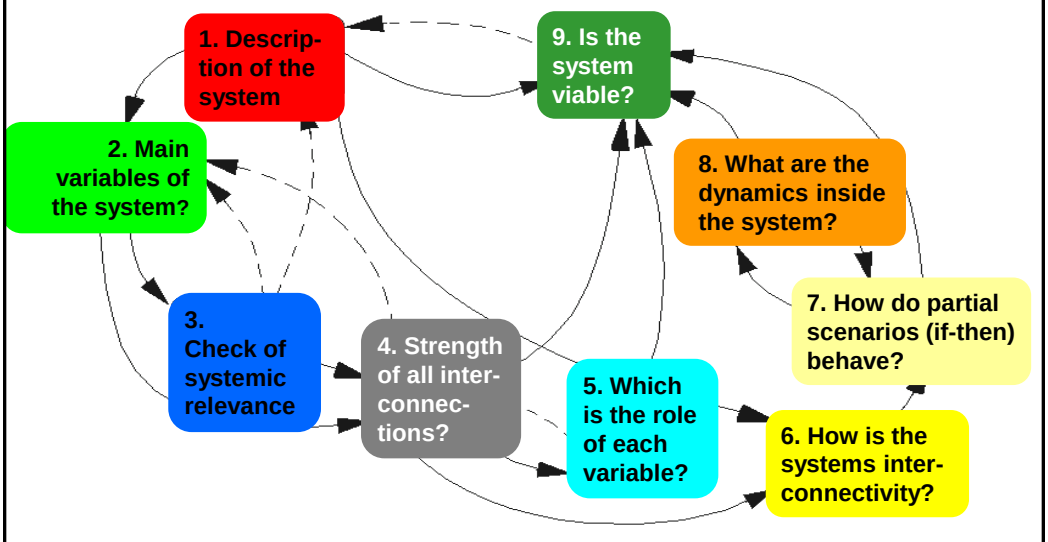
The Malik Sensitivity Model®Prof.Vester assures the holistic capture of complex systems

page 7

malik

© Malik 2015

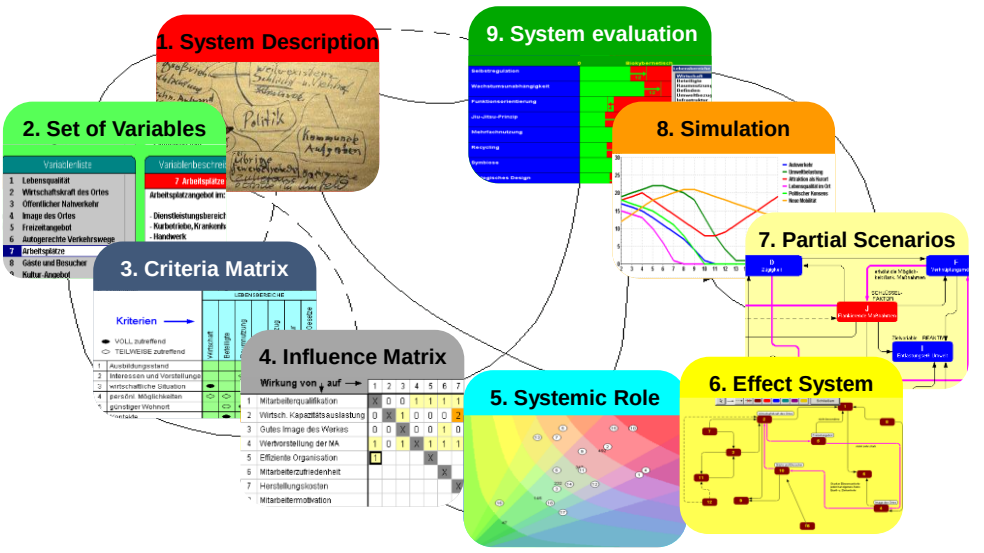
Nine iterative evolutionary development steps to build up a Sensitivity Model



page 8

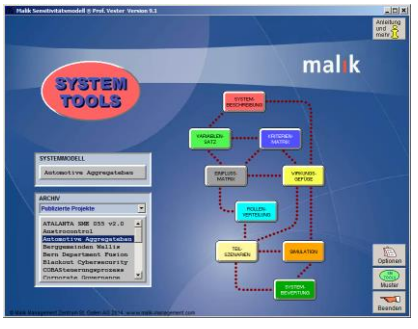
malik

Overview of Deliverables



malik

Scientific and technical development of the Malik Sensitivity Model®Prof.Vester



Pilot study **Urban Systems in Crisis** as German contribution for the UNESCO-Program **Man & Biosphere MAB**

Development of the methodology for **regional and urban planning** with A. v. Hesler, Regional Syndicate Frankfurt/Main

Philip-Morris-Research Prize for the application of the "Pueblo Frankfurt" leisure center

Comprehensive system studies and projects, e.g.
Herta AG: Hermannsdorfer Integrated Rural Workshops
Ford AG: Ford System Study
UNESCO: Tianjin Sustainable City
System Study Ökoland: integrated ecological agriculture

Computerised since 1991 as **System Tools** of the Sensitivity Model Prof.Vester®. Continuous further development integrating feedback of practical applications

30 years of application. Licensees & users e.g.
- Regional Planning: Frankfurter Aufbau AG, Urban Systems
- Financials: Postfinance, Commerzbank, Hypobank
- Car Industry: BMW, Daimler, VW, Ford
- Insurance: Swiss Re, Mobiliar
- Cities & Communities: Munich, Preetz, Kanton Wallis

Integration and further development by Malik Management St.Gallen AG "Malik Sensitivity Model®Prof.Vester"

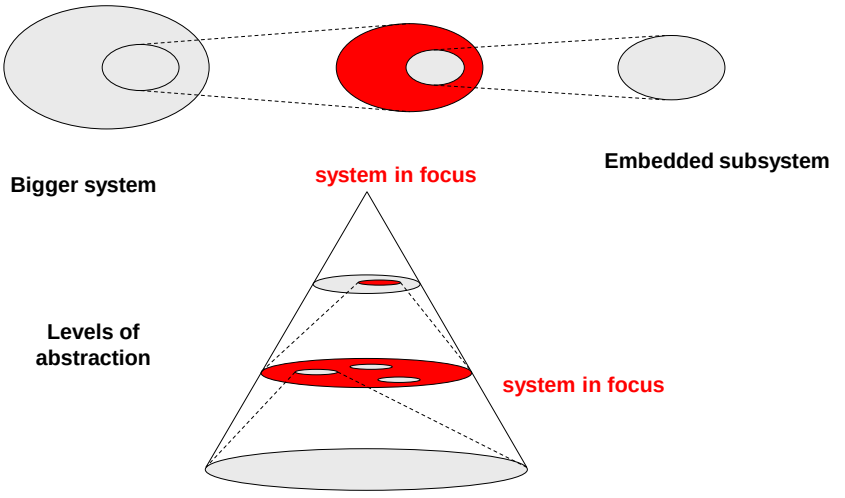
Selection of published projects

Organization		
Kanton Wallis	-	Regional Model „Viability“ of 52 mountain- and rural communities (participatory project, 2011)
EU-Project Future Forest	-	**Forestry and climate change (seven EU-countries, u.a. Brandenburg 2009-2011)**
Einsatzführungskommando der Bundeswehr (Command center unit German Armed forces)	-	Impact control of the efficiency of military actions (e.g. Somalia, 2010-2013)
Smart Cities: Morgenstadt	-	Governance and System Modeling (2014-2015)
Health Care / Hospitals	-	Viability of health care systems / hospitals concerning questions of management (2010-2015)
Ecopolicyade®	-	Playfully experiencing „Interconnected Thinking“ for students (around 200.000 young 2006-2015)

11

malik

1. Defining the system and its boundaries



12

malik

2. Set of variables & description (Forestry & Climate Change)

Variable“ are the influence factors in a system
They can be of ***qualitative*** or ***quantitative*** nature
We try to represent the main aspects by ***20-30 system relevant*** variables
Variables can be ***operationalized*** with the help of fuzzy scales

List of variables	
1	Co2 Concentration
2	Stand productivity
3	Forest products (wood)
4	Employment in forest sector
5	Management of tree species
6	Structure of forest
7	Rate of CO2 - sequestration
8	Quality of soil
9	Biodiversity (non tree)
10	Abiotic damages
11	Biotic damages
12	Ground Water availability

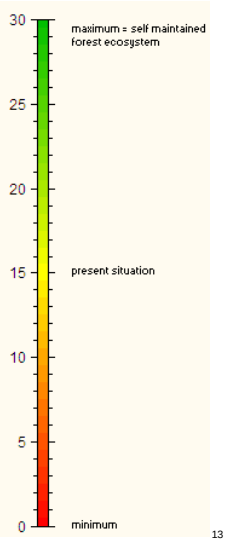
Description of the variables

9 Biodiversity (non tree)

Biodiversity (non productive tree)

Diversity of plants (non tree) and animals
- number of native species
- number of invasive / non native plants

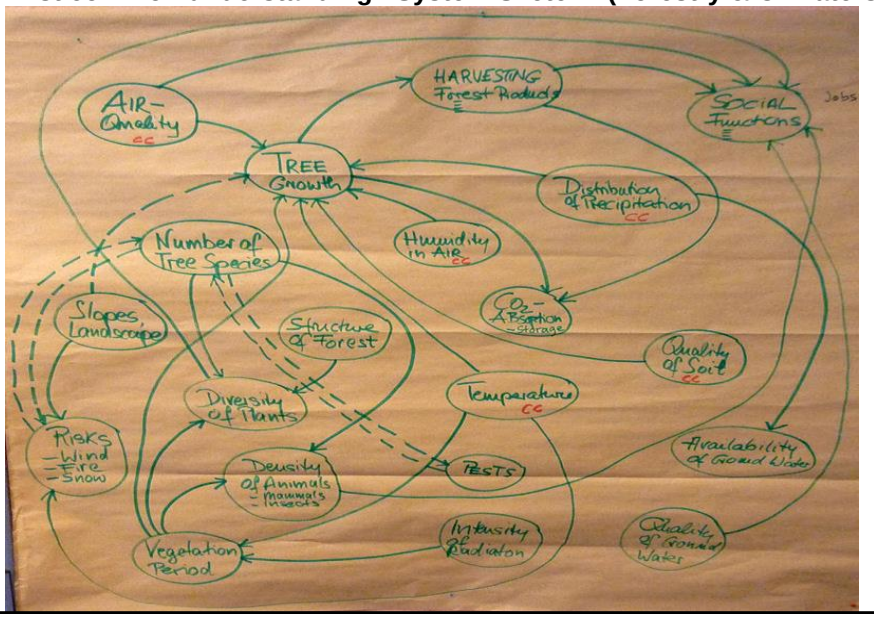
Diversity of animals
- mammals
- non mammals



13

malik

2. First common understanding «System Sketch» (Forestry & Climate Change)



14

malik

4. Influence Matrix – from the components/variables to the relations

Inquiry of the strength of relations between the variables (potential and direct effects)

«How do changes in variable X effect direct changes on variable Y?»

0	no relation
1	weak relation
2	proportional relation
3	intensive relation

Result / overview:

- influences
- strength of influences
- interactions in the system
- patterns of relations

Influence by variable ↓ on variable →

		1	2	3	4	5	6	7	8	9	10
1	Co2 Concentration	X	2	1	0	0	0	2	1	0	1
2	Stand productivity	1	X	2	2	1	1	2	1	0	1
3	Forest products (wood)	0	0	X	2	2	0	0	0	0	0
4	Employment in forest sector	0	0	0	X	0	0	0	0	0	0
5	Management of tree species	0	2	2	2	X	3	1	1	1	1
6	Structure of forest	1	2	2	1	3	X	2	1	2	1
7	Rate of CO2 - sequestration	2	1	1	0	0	0	X	0	0	0
8	Quality of soil								X		
9	Biodiversity (non tree)									X	
10	Abiotic damages										X

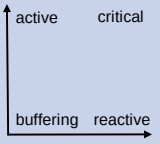
15

malik

5. Result of the influence matrix: cybernetic role of the variables:

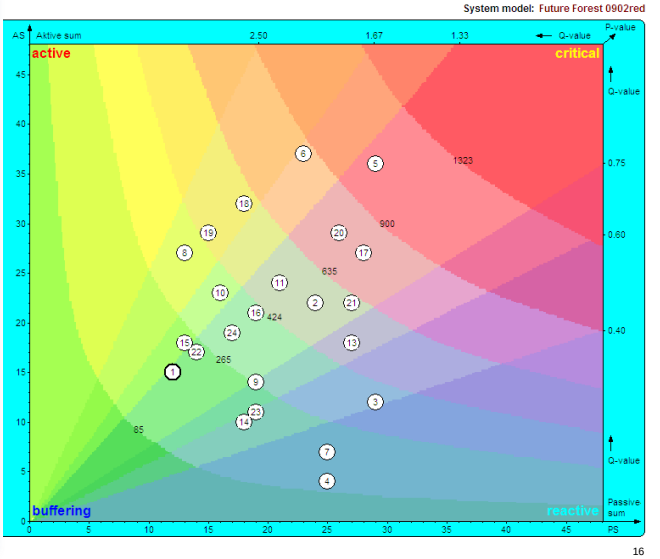
Each variable plays a special role in the system: maybe as lever, stabilizer, regulator, indicator or critical factor:

- active
- reactive
- Neutral
- Critical
- buffering



Also the whole system shows its character, whicht can be

- buffering and stable
- easy to regulate & change
- highly dynamic
- mainly reactive
- …..



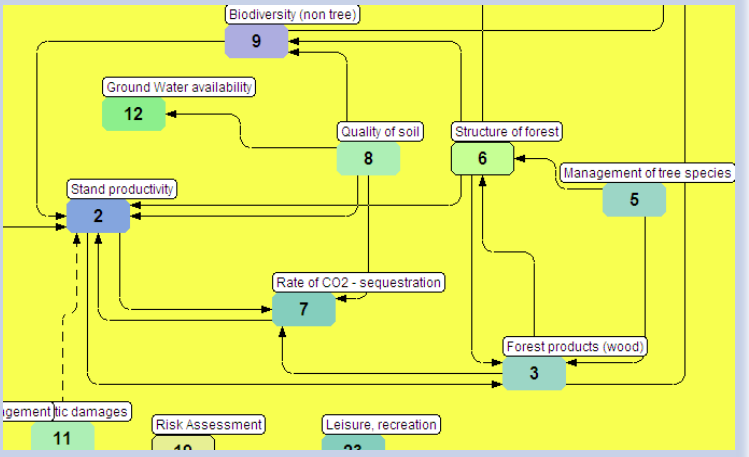
16

malik

6. Effect system
Visualization of the interconnctions and feedback cycles of the system

Equal effects are represented by full lines

Opposite effects are represented by dotted lines



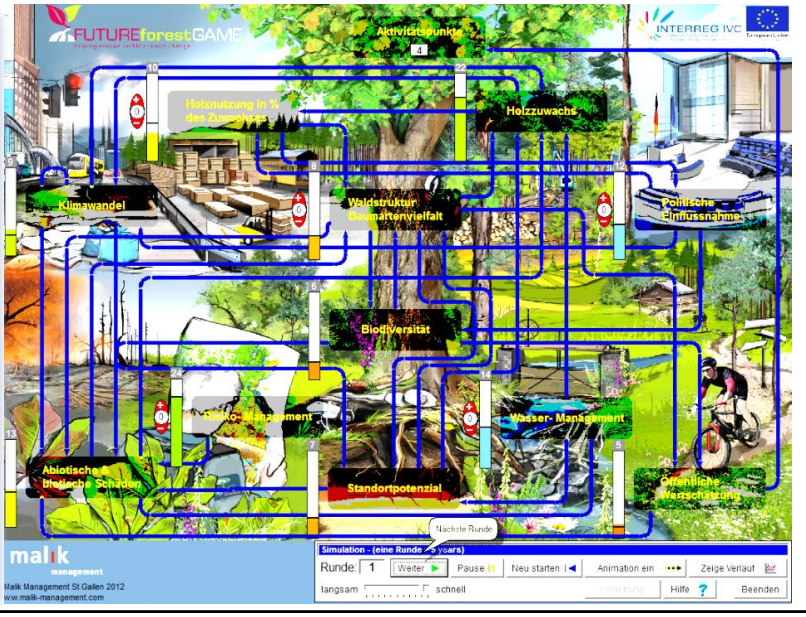
17

malik

7. Partial Scenario & Simulation: EU-Project Future Forests & Climate Change

Especially interesting variables and their interconnections or if-then questions are analyzed in «Partial Scenarios» and with transparent «Simulation».

Optinally these steps can be transferred into an illustrated decision-making game as it was done in the project «Future Forest» shown here (2012)



18

malik

Results and Benefits of a Malik Sensitivity Analysis

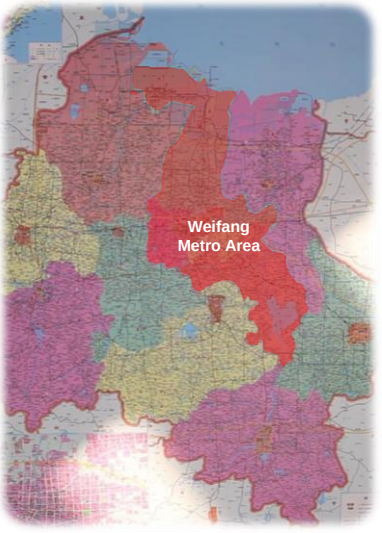
1. **Common understanding:**
   Collection and visualization of the relevant areas and elements which influence a system from within and without.
2. **True Cybernetic control:**
   Identification and systemic use of the relevant control variables for sustainable development.
3. **Transparency:**
   Profound understanding of relevant interrelations and interdependencies.
4. **Simulation 'in silicio':**
   Check of system intervention through 'if-then-questions' to evaluate effects, behavior and tendencies.
5. **'Permanent' Decision-Model:**
   For monitoring and alert functions of system development and for decision making.

19

malik

Sensitivity Model Application: City of Weifang, China (2014)

Starting Point for the strategic cooperation between the leadership of Weifang and Malik



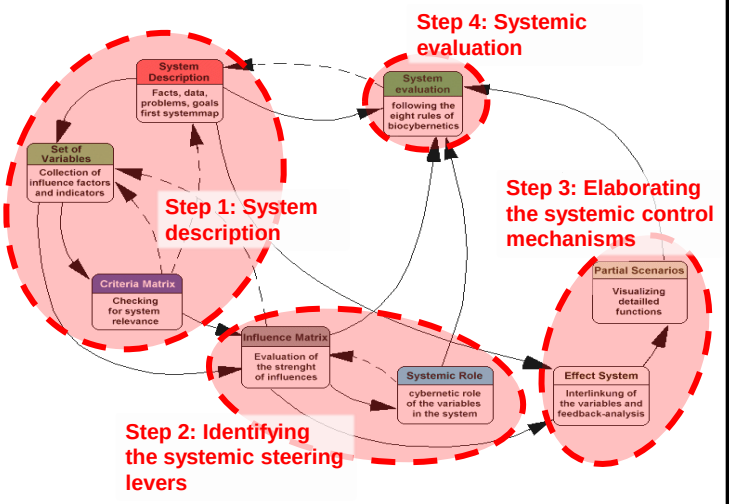
1. The first phase in this strategic cooperation is developing a systemic model of Weifang and its environment based on the specific profile of Weifang. The key objective for this phase is to support Weifang's Leadership to design / adjust the economical development of Weifang metro area.
2. The basis for a common systemic model is a specific question: **«What are the relevant key factors and their interconnection for a sustainable social, economical and environmental development of Weifang's metro area?»**
3. The main focus for the economical development is the tertiary industry sector. Therefore further questions have to be answered:
   - Which levers have to be pulled for initiating Weifang's development and how those levers are influencing each other?
   - What has to be considered while developing measures for Weifang's development?

20

malik

Modeling the Weifang Metro Area through workshops and interviews with administrators, district heads and representatives of industry and citizens

1. In order to answer the key question, the system is described through a relevant set of variables.
2. The steering character of the system was identified and evaluated (based on all influences within the system).
3. The main control-loops have been worked out based on the importance of the variables and their interconnection.
4. In-depth analysis and elaboration of courses of action based on a holistic understanding of the system.



malik

Clarity and consensus about the relevant and necessary variables has been elaborated to describe the system (Example, Steps 1-5)

Nr.	Variable
1	Health of Real Estate Market
2	Capabilities of Talents
3	Qual. of Transportation System
4	Capab. to attr. & land Inv't.
5	Mgmt-Effectiven. of Government
6	Ecology & Environment Quality
7	Coherence of Urban Planning
8	Maturity of the Market Economy
9	Quality of Life
10	Capital Investment
11	Quality of Education
12	Quality of Health Care
13	Quality of Social Security
14	Development of Service Ind.
15	Prof. of Gov. Officials
16	Scientific & Tech. Innovation
17	Development of city Industry
18	Qual. of Basic Infrastructure
19	Social Governance
20	Demographic Structure
21	Clear strat. Positioning of W.
22	Internationalization
23	Level of Collaboration

Operations Room: Cybernetic and real time control at your fingertips

- ➔ The Operations Room is an environment for decision, to facilitate and enable managers to take decisions on complex situations under uncertainty in due time.
- ➔ The models comprise the knowledge of the involved specialists on business and the system‘s behaviour.

Based on concept of the Operations Room of Stafford Beer, Malik Management has developed and implemented several specially designed operations rooms in international companies.

ecopolicy® strategic game

How can our brain be opened for the understanding of complex systems?

By training, by learning by doing, by trial and error, by mapping out by experiencing and by playing.

Prof.Dr.Dr.h.c. Frederic Vester (1925-2003)

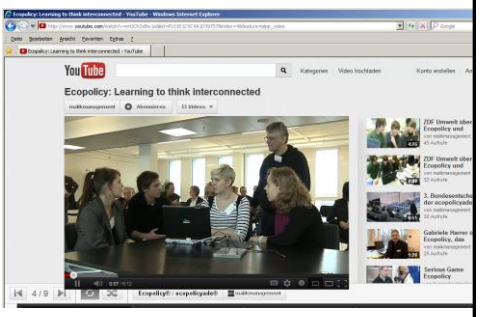
German Systems Researcher and Bio-Cybernetician Member of the Club of Rome


malik
Die Ecopolicyade - Windows Internet Explorer
http://www.ecopolicyade.info/de/
Datei Bearbeiten Ansicht Favoriten Extras ?
Die Ecopolicyade
ecopolicyade | Facebook
Die Ecopolicyade
HOME
Search...
malikecopolicyade
management for a functioning society
Learning Networked Thinking as a Game
Students train for a future with system


malik
© Malik 2015
Finals in the German Parliament, Berlin 2010 – Students and politicians
Page 26

Ecopolicy® in the German and international project „Interconnected thinking for the young“ ecopolicyade® from 2005 – 2015

2005 first ecopolicyade Schleswig-Holstein
founded by two teachers
1.000 schools, 2.000 students, German Parliament



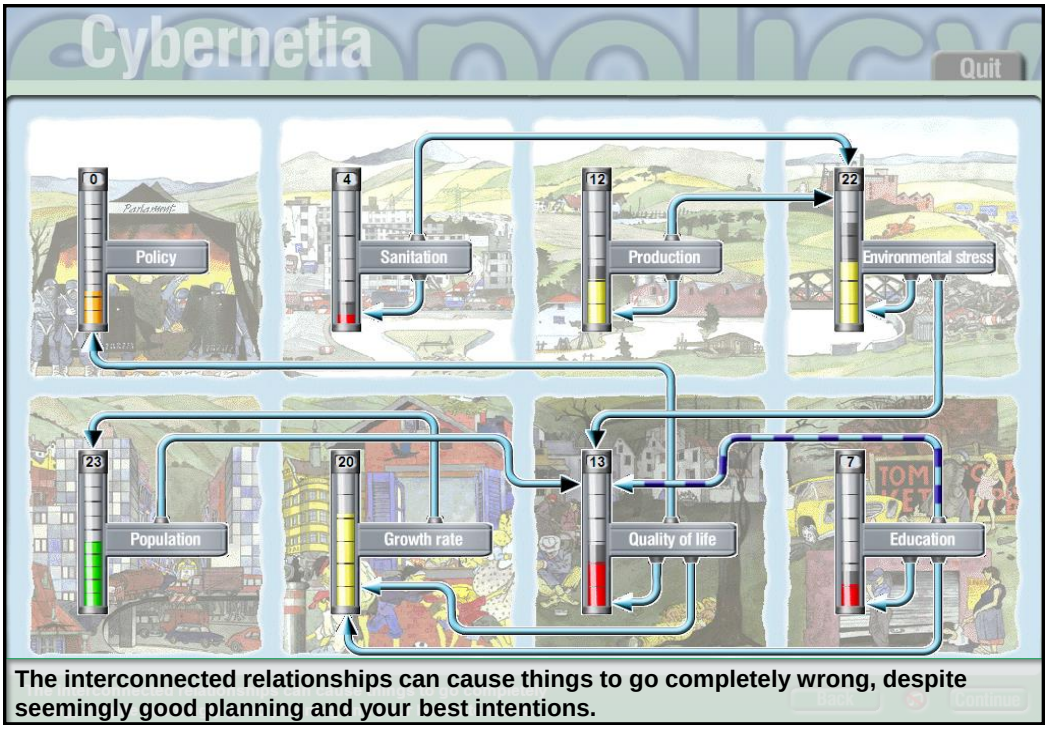
2006 Lower Saxony & Schleswig-Holstein
200 schools, 8.500 students

2007 Berlin & Schleswig-Holstein
100 schools, 3.000 students

2008 the Center for Political Education, Bonn is funding the contest, supporters are Members of the Parliament, Prime Ministers & Lord Mayors of the cities Munich and Berlin

2010 & 2011 German finals with 16 federal winning teams in the German Parliament, Berlin
200.000 students have been participating in Germany until then.

2013 - 2015 international projects: Australia, Vietnam, Netherlands, Poland, Austria Italy, …
In **Vietnam Malik cooperation partners Ockie Bosch & Nam Nuygen reached 50.000 …**



The interconnected relationships can cause things to go completely wrong, despite seemingly good planning and your best intentions.

http://www.thp.org.vn/artice/1914/ban-tin-thoi-su-toi-ngay-14052013.html

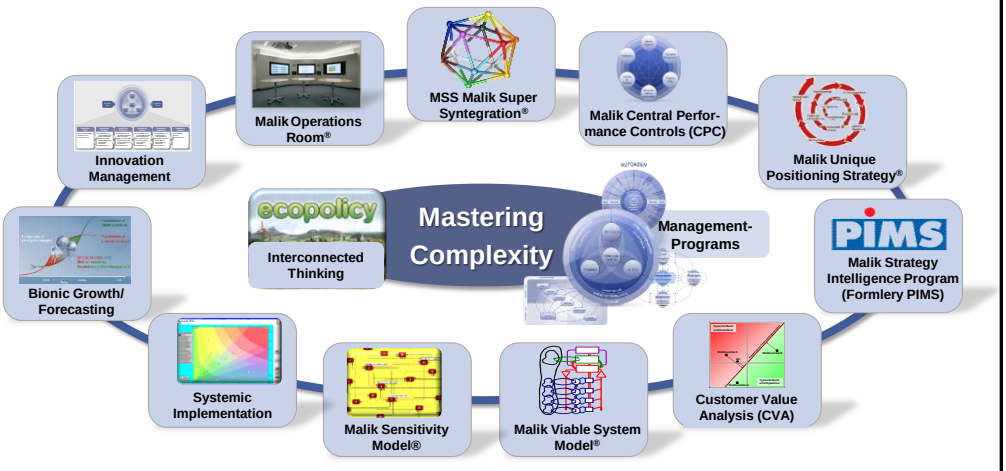
malik

Ecopolicy Vietnam 2013 50.000 students reached
Project: Malik cooperation partners Prof. Ockie Bosch and Dr. Nam Nuygen

malik

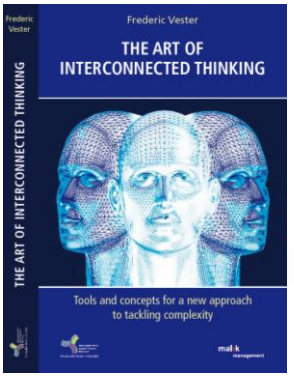
© Malik 2015

Malik Management Systems®
Cyber-Systemic Solutions for Mastering Complexity



How to Control a Complex System: Turbo Tools guiding beyond Crisis…

malik



Frederic Vester
The Art of Interconnected Thinking
Ideas and tools for tackling complexity.
2nd edition, *MCB Publishing House 2012*

Frederic Vester
ecopolicy®
Cybernetic simulation &
strategy game
CD-ROM for Windows.
Chinese/English Version 3.0
MCB Publishing House Munich 2012

Fredmund Malik
Strategy
Navigating the Complexity
of the New World.
Campus Verlag
Frankfurt / New York 2014

31

malik

Gabriele.Harrer@mzsg.ch

Malik Management AG
Geltenwilenstrasse 18
CH-9001 St. Gallen

T +41 71 274 34 00
F +41 71 274 34 99

www.malik-management.com

System-kybernetische
Malik ManagementSysteme®
für das Meistern von Komplexität