2017 Workshop on National Spatial Planning - A Futurology Approach -

Lecture 1

Futures Studies and System Dynamics

National Development Council Conference Hall, Taipei, Taiwan

14:10-15:40, March 2, 2017

Kaoru Yamaguchi, Ph.D. Japan Futures Research Center, Japan E-mail: <u>director@muratopia.net</u>





Four Key Questions to Study Futures

① Can we **predict** the future?

2 Can we know the future?

(3)

Earthquakes, March 11, 2011 Lehman Shock, Sept. 15, 2008 Weather Forecasting: Chaos

Scenario Analysis of Multiple Futures

Self-organizing Complex Systems

(4) Can we **influence** the Future?

Can we control the future?

Take Actions guided by Visions and Simulations

arthquakes, March 11, 2011



Futures Seminars in Awaji Island Japan, 1993 - 1999

What are Futures Studies?



Renewing Communities as Sustainable Global Village Aug. 16 – 19, 1993



Edited by Kaoru Yamaguchi

1996

Five Inseparable Fields of Studies

- 1. Wisdom and Self-Awareness Studies (Mind) Keys: Enlightenment, Meditation, Well-being
- 2. Future-Oriented Methodological Studies (Model) Keys: Non-linear Modeling and Simulations
- 3. Human-Nature Interface Studies (Nature) Keys: Natural Farming, Sustainable Environment
- 4. Human-Technology Interface (Technology) Keys: Renewable Energies, High Technologies
- 5. Inter-Human Networking Studies (Economy) Keys: Network Economies, Diversified Cultures

How are Five Fields of Studies Related?



FOCAS: Future-Oriented Complexity and Adaptive Studies





FOCAS: Future-Oriented Complexity and Adaptive Studies

Missing Fields of Studies

Mind				Culture
	Model			Paradigm
		Nature		Environ- ment
			Tech- nology	Develop- ment
				Economy

FOCAS: Future-Oriented Complexity and Adaptive Studies

Missing Fields of Studies

Mind				Culture
	Model			Paradigm
	(Climate Change)	Nature		Environ- ment
(Social Media)	(Electronic Money)		Tech- nology	Develop- ment
(Local Community)	(Money)	(Sustainable Taiwan)	(Solar Energy)	Economy

ISSUES AND CHALLENGES

by Institute for Physical Planning & Information

Sustainable development of national land is vital for a country's longterm peace and stability and for its people's happiness and well-being. Future planning issues, including international relationship, social problems, nature conservation, economy growth and effective governance, will require further research and policy implementation.



Try FOCAS Dynamics Analysis!



What is System Dynamics?

"Renaissance man"

Prof. Jay Forrester 1918 – 2016 (aged 98)











Michelangelo 1475 - 1564 Architect Sculptor Painter Poet

Leonardo de Vinci 1452 - 1519

Artist, Mathematician Engineer, Doctor





What is System Dynamics?



What is System Dynamics?



There is now a promise of reversing the trend of the last century



Jay Forrester

"Renaissance man"

We can now work toward an integrated, systemic, educational process that is more efficient, more applicable to a world of increasing complexity, and more compatible with a unity in life. --- The Beginning of System Dynamics, 1989

Banquet Talk, Stuttgard, Germany, p.15---

System dynamics provides a foundation underlying all <u>subjects.</u> When that foundation is mastered, an individual will have mobility to move from field to field.

- Keynote Address for Systems Thinking and Dynamic Modeling Conference for K-12 Education, June 27-29, 1994, at Concord Academy Concord, MA, USA - The 27th International Conference of the System Dynamics Society (Program by Thread) Albuquerque, New Mexico, USA July 26 – 30, 2009

You can see the Forrest (whole) for the Trees (parts)!

- Business
- Challenges of Terrorism & Military
- Economics
- Education (K-12)
- Energy & Resources
- Environment & Ecology
- Health Policy
- Information Science

- Infrastructure & Resiliency
- Methodology in SD
- Operations Management & Supply Chains
- Organization
- Psychology
- Public Policy
- Strategy



By Chelsea Green Publishing Company

Beyond the Limits(1991)

-WORLD3-91:Standard Run -

State of the World



Resource unit

Nonrenewable Resources : Current -

Limits To Growth (2004) - The 30-Year Update -

 This book was published by the three original authors of "The Limits to Growth" as the 30-year update of the. The previous model World3-91 is renamed World 3.





Prof. Dennis Meadows at the 23rd SD Conference, Boston, USA, July 25-29, 2005



"Modeling Long-Term Sustainability" Sustainability as Reproducibility (1) Physical Reproducibility Keys: Investment and Capital Depreciation, SECOND EDITION Non-renewable Resources (2)Social Reproducibility Keys: Consumption and Population (3) Ecological Reproducibility Keys: Sink(Garbage & Wastes) and Source(Regeneration)

Chapter 4 Edward Elgar Publishing, 2013

環境モデリング入門&ワールド3モデル

Handbook of Sustainable **Development Planning**

^{サステーナブル} 持続可能な社会を考えるガイダンス システムダイナミックスによる

🔺 物的再生症

エコロジカル再生産

日本未来研究センター システムダイナミックスグループ 山口 薫

2016

Studies in Modelling and **Decision Support**

Edited by M.A. Quaddus • M.A.B. Siddique

Modeling Long-Term Sustainability







Modeling Long-Term Sustainability



Accounting System Dynamics - Financial Statement: Balance Sheet-



Solar Panel Modeling - Accounting System Dynamics -



Solar Cell Power Generation (Kw) in 2001 at Prof. Yamaghi's House

Month	1	2	3	4	5	6	7	8	9	10	11	12
Generation	121	169	230	264	267	207	270	265	228	208	173	154

Solar Panel Modeling - Accounting System Dynamics -



Solar Panel Modeling - Accounting System Dynamics -





For A Better Future out of the Fragmented World-View

Use your Brain (FOCAS Dynamics)



