INTERNATIONAL TELECOMMUNICATION UNION

Kaleidoscope 2011

Jules Verne Corner:
Atlas of Technology

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Why we need an atlas

- Technology is the major cause of economic growth
- But it poses many challenges
  - Troublesome to manage
  - Precipitates huge financial losses
  - Causes pollution

Think ahead

- Anticipate three developments
  - A language of technology
  - An atlas of technology
  - A science of technology
- Note existing roots

A language of technology

- Technological knowledge has a deep dichotomy
  - Knowledge of individual aspects is brilliant
  - Knowledge of overall structure is non-existent*
- Needs a uniform set of concepts and constructs
  - Roots in strategic technology analysis (STA), a specialty field in management of technology (MOT)**
- Key features
  - A central characteristic = functionality
  - An individual unit = technological entity
  - An assemblage of all units = the techno-sphere

* Arthur, 2009 **Van Wyk 2004

Functionality:
There are nine fundamental functionalities

- Process:
  1. Matter (M) – e.g. make steel
  2. Energy (E) – e.g. generate electricity
  3. Information (I) – e.g. calculate mathematical formula
- Transport:
  4. Matter (M) – e.g. send by rail
  5. Energy (E) – e.g. transmit through the grid
  6. Information (I) – e.g. display on e-book
- Store:
  7. Matter (M) – e.g. stockpile ingots
  8. Energy (E) – e.g. charge batteries
  9. Information (I) – e.g. back up on hard disc

Functionality grid

		Output		
		Matter (M)	Energy (E)	Information (I)
Action	Process			
	Transport			
	Store			

Based on: Ropohl, Gunter: *Eine Systemtheorie der Technik*, 1979, Carl Hanser Verlag, Munich and Vienna, p. 178.

Use functionality grid as foundation for an atlas

	Matter (M)	Energy (E)	Information (I)
Process	- Devices that self-assemble	- Kinetic generator	- Continuous orientation
Transport	- Magnetic levitation	-Wireless transmission	- Mind activated interfaces
Store	- Intelligent packaging	- Immobilized light	- Bio-based

South Korean technology foresight: Examples 2010-2020

	Matter (M)	Energy (E)	Information (I)
Process	Low cost hydrogen (2017)	Dispersed solar efficiency 40% (2013)	Anti-aging genetics (2011)
Transport	Planes that use virtual reality (2012)		Foldable display screen for mobile (2011)
Store	Zero energy house (2015)	Metallic alloy for hydrogen (2011)	Card to display disease history (2013)

Source of entries: Daniel Ko: "The Ministry of Education, Science, and Technology's Has a Plan", *IT Times,* November 17, 2009, (http://www.koreaittimes.com/story/5843/ministry-education-science-and-technology's-has-plan)

South Korean technology foresight: Examples 2020-2030

	Matter (M)	Energy (E)	Information (I)
Process	Nano-sized body cleaning machine (2024)	Solid fuel cell for cars (2020)	Criminal emotional control chip (2022)
Transport	Self directing car (2022)		3D display with a sense of touch (2021)
Store	City in the sea (2023)		

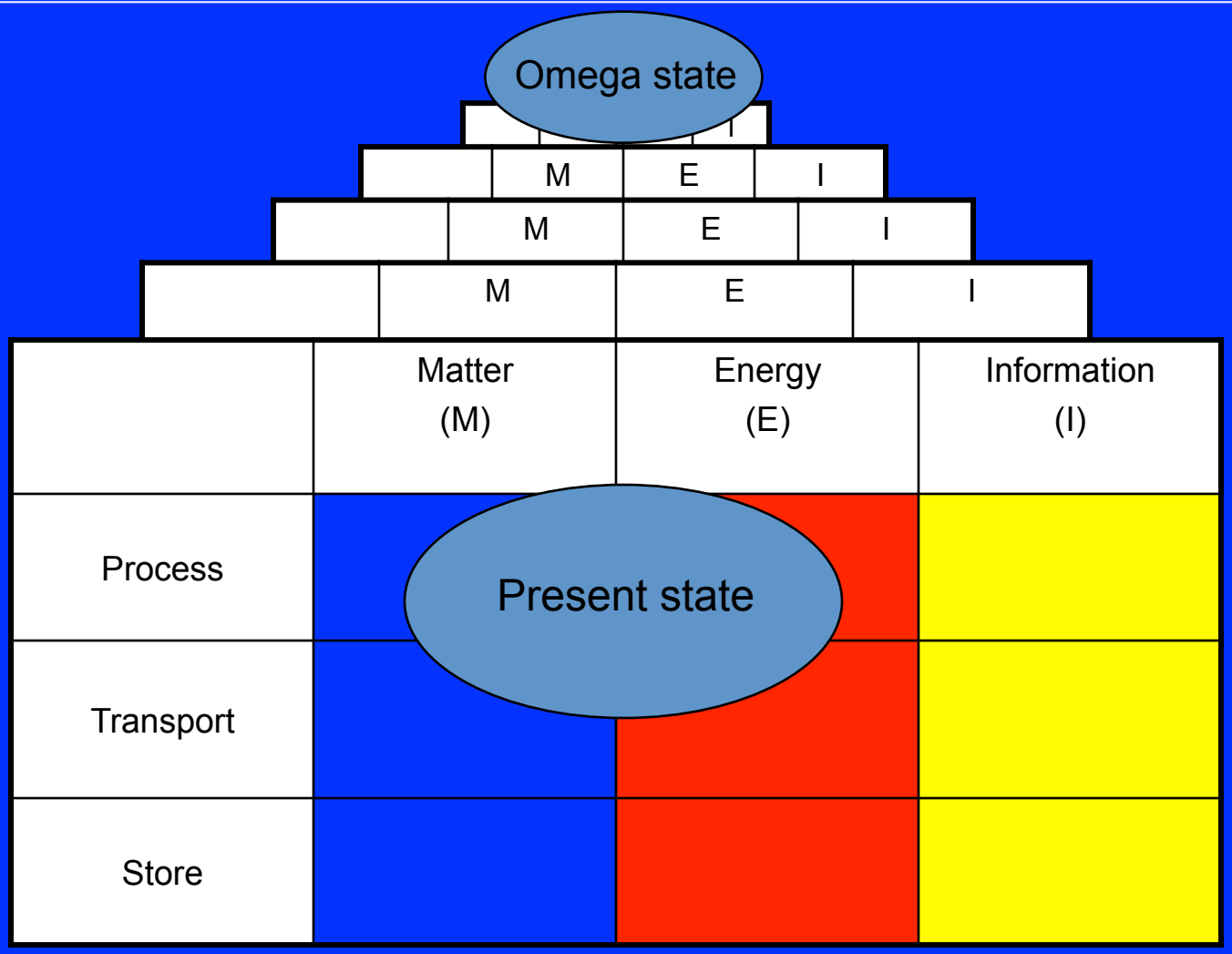
Source of entries: Daniel Ko: "The Ministry of Education, Science, and Technology's Has a Plan", *IT Times,* November 17, 2009, (http://www.koreaittimes.com/story/5843/ministry-education-science-and-technology's-has-plan)

South Korean technology foresight: Examples 2030-2040

	Matter (M)	Energy (E)	Information (I)
Process			Mind control of Mach 25 planes (2036)
Transport	Tours of space (2032)		
Store			Observational system for the universe (2040)

Source of entries: Daniel Ko: “The Ministry of Education, Science, and Technology‘s Has a Plan”, *IT Times,* November 17, 2009, (http://www.koreaittimes.com/story/5843/ministry-education-science-and-technology’s-has-plan)

Technology foresight:
Omega chart of achievable technologies



A science of technology

- The concept “technology” was created in Germany in 1777
- The name means “techno-science”; i.e., “Technikwissenschaft”
- Part of an early scientific line-up
  - Botany
  - Zoology
  - *Technology*
  - Chemistry
  - Physics
- Technology dropped out – possibly due to a lack of structure
- Will be revitalized using the “language of technology”

Jules Verne

- Tout ce que j'invente, tout ce que j'imagine restera toujours au-dessous de la vérité, parce qu'il viendra un moment où les créations de la science dépasseront celles de l'imagination. (*Lettre à Charles Lemire)*

- That which I invent, that which I imagine, rests on the truth, for there comes a moment when the creations of science surpass those of the imagination

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