



# INTERNATIONAL TELECOMMUNICATIONS UNION

Kaleidoscope 2011

*Jules Verne Corner:  
Atlas of Technology*

Rias van Wyk

Director: Technoscan Centre  
P.O. Box 390516  
Edina, MN 55439, USA  
Web: [www.technoscan.com](http://www.technoscan.com)  
Telephone 952 885 1979

December 12 to 14, 2011

University of Cape Town  
South Africa

Proprietary materials: Copyright applies 2011

## Why we need an atlas of technology

- Support the CTO
- Increase the success rate in innovation
- Save the trillion dollars wasted annually on bad technological investments
- Maintain the life giving forces of nature

## Hallmarks of a CTO

- Superior technological vigilance
- A sense of the science of technology
- The ability to “take the measure” of technology

# “Taking the measure”

- In botany:
  - Select a generic unit – e.g., an organism
  - Focus on a key characteristic – e.g., reproductive system
  - Demarcate with the Linnaeus taxonomy
- In chemistry :
  - Select a generic unit – e.g., a chemical element
  - Focus on a key characteristic – e.g., atomic number
  - Demarcate with the periodic table
- In technology:
  - There is no scientifically based structure
  - “Missing, in other words, is a theory of technology — an ‘ology’ of technology.” [W. Brian Arthur (2009), *The Nature of Technology*]
  - There is no language of technology

# Technological knowledge is a science

- In 1777 it became part of an early line-up
  - Botany
  - Zoology
  - *Technology*
  - Chemistry
  - Physics
- It became less popular – it dealt with *human* creations while other sciences dealt with *natural* creations

# To take the measure of technology

- Do not:
  - Think of bits and pieces of hardware and software
- Do:
  - Focus on a key characteristic

Functionality

# There are nine fundamental functionalities

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

# The functionality grid

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

Van Wyk, Rias J: *Technology - A Unifying Code*, 2004, SMG, Cape Town, p. 34  
Based on: Ropohl, Gunter: *Eine Systemtheorie der Technik*, 1979, Carl Hanser Verlag, Munich and Vienna, p. 178.

## Atlas of technology 2010 - 2020

	Process	Transport	Store
<b>Matter (M)</b>	Low cost hydrogen (2017)	Planes that use virtual reality (2012)	Zero energy house (2015)
<b>Energy (E)</b>	Dispersed solar efficiency 40% (2013)		Metallic alloy for hydrogen (2011)
<b>Information (I)</b>	Anti-aging genetics (2011)	Foldable display screen for mobile (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.koreaitimes.com/story/5843/ministry-education-science-and-technology's-has-plan>)

## Atlas of technology 2020 - 2030

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

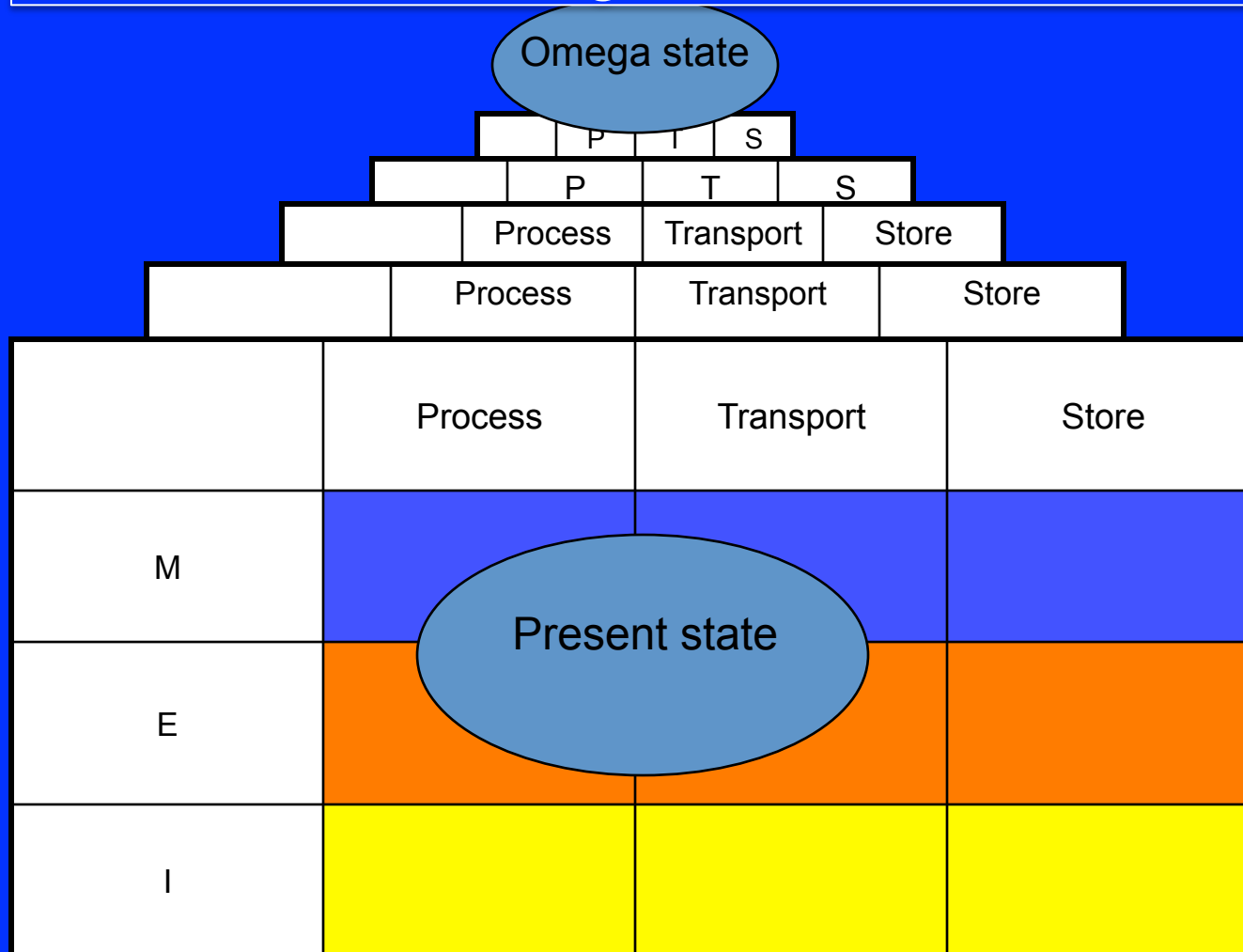
Source of entries: Daniel Ko: "The Ministry of Education, Science, and Technology's Has a Plan", *IT Times*, November 17, 2009, (<http://www.koreaitimes.com/story/5843/ministry-education-science-and-technology's-has-plan>)

## Atlas of technology 2030 - 2040

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

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

# Atlas of technology: Omega chart



# 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

# The three major technology developments

- A language of technology
- An atlas of technology
- A coherent science of technology

# References

1. Arthur, W.B. (2009) *The Nature of Technology*, New York, The Free Press
2. Ko, Daniel: (2009) “The Ministry of Education, Science, and Technology’s Has a Plan”, *Industry and Technology Times*, November 17, 2009  
(<http://www.koreaittimes.com/story/5843/ministry-education-science-and-technology's-has-plan>)
3. Ropohl, Gunter: (1979) *Eine Systemtheorie der Technik*, Carl Hanser Verlag, Munich and Vienna.
4. Technoscan® Centre (2012): Know-how seminar: *Capturing technology-based innovation opportunities*.
5. Van Wyk, Rias J. (2004) *Technology: A Unifying Code*, Stage Media Group, Cape Town.
6. Van Wyk, Rias J. (2011) *Technology: A uniform language*, Presentaton to Schwegman, Lundberg and Woessner, Patent Attorneys, Minneapolis, November 28.
7. Van Wyk, Rias J.; Karschnia, Bob; Ohlson, Wayne; (2007) “Atlas of Technological Advance” *Research. Technology Management*, Volume: 51, Issue: 5, pp. 61-66