

From Leonardo to Gabor

- Potential Impacts of Science Centres in Asia Pacific

Dr Paul Cheung

Lead Shepherd

APEC Industrial Science and Technology
Working Group



ASPAC Conference
Hong Kong Dec 1-4, 2004



Outline

- The APEC Industrial Science & Technology Working Group (ISTWG)
- The Pacific-Century Dream – what went wrong?
- The Renaissance and Leonardo da Vinci
- Dennis Gabor and Holography
- The AP Renaissance and the Science & Technology Centres
- Conclusions – the APEC 3rd Youth Science Festival

The APEC Vital Statistics

- 21 member economies
- Spans 4 continents
- 2.6 billion people (more than one third of world's population)
- Over 50% of world GDP (US\$19,254 billion)
- In excess of 41% of world trade
- Generated 70% of global economic growth in the first 10 years (since 1989)

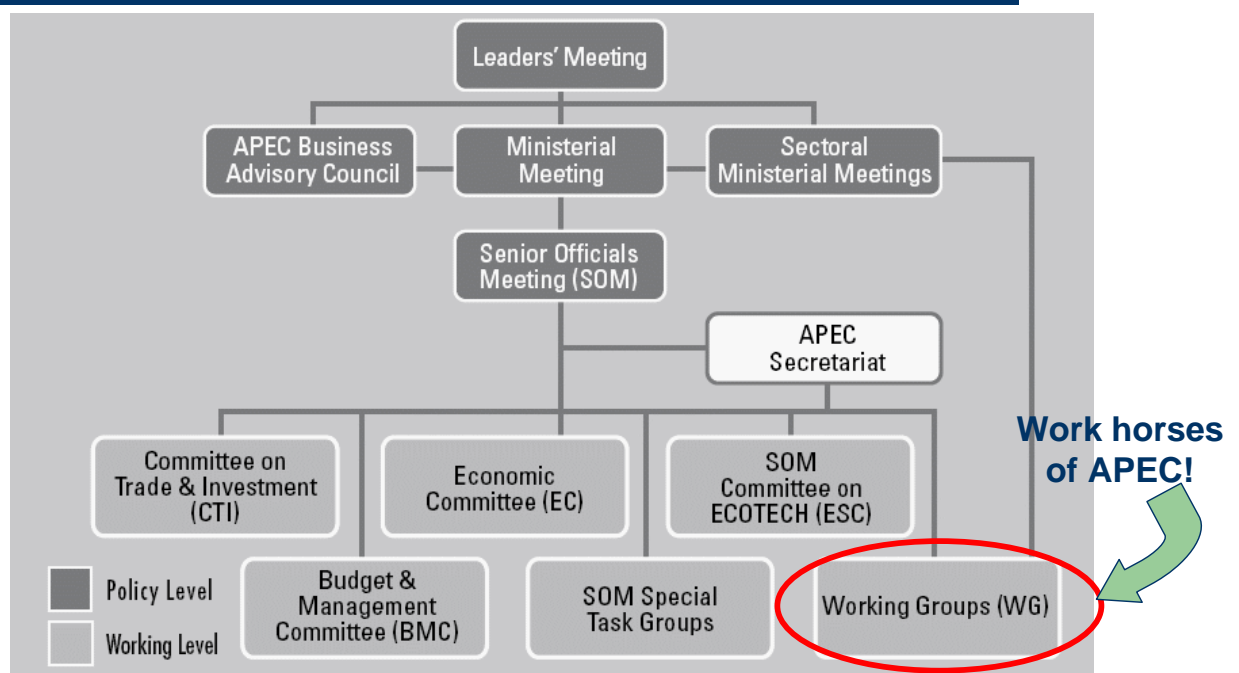
The APEC 21 Economies

1. AUSTRALIA
2. BRUNEI DARUSSALAM
3. CANADA
4. CHILE
5. THE PEOPLE'S
REPUBLIC OF CHINA
6. HONG KONG, CHINA
7. INDONESIA
8. JAPAN
9. KOREA
10. MALAYSIA
11. MEXICO
12. NEW ZEALAND
13. PAPUA NEW GUINEA
14. PERU
15. REPUBLIC OF THE
PHILIPPINES
16. THE RUSSIAN
FEDERATION
17. SINGAPORE
18. CHINESE TAIPEI
19. THAILAND
20. UNITED STATES
21. VIET NAM

APEC's Focus (3 Areas)

- Trade and Investment Liberalization
- Business Facilitation
- Economic and Technical Cooperation

APEC Organisation



The APEC Industrial Science & Technology (ISTWG) Working Group Mission

One of 11 Working Groups of APEC:

*"Our vision for the **21st century** is of a **dynamic and prosperous** Asia-Pacific region built on the **development and application** of industrial science and technology which **improves quality of life** while **safeguarding the natural environment**. Elements related to the IST WG set the broad vision, goals and priorities for the Working Group".*

APEC Osaka Action Agenda

The 4 APEC ISTWG Priorities

- Human Resource Development (Korea)
- International S&T Networks (Chinese Taipei)
- Connecting Research and Innovation (New Zealand)
- Technological Co-operation and Strategic Planning (China)

The Dream Unfulfilled

- The Pacific-Century Dream
 - “The 19th Century was the century of the Atlantic, The 20th Century is the century of the Pacific”
(Quoted frequently in the 1990s)
- 1997 – Asia Economic Crisis, the Pacific Century Dream was unfulfilled
- What has gone wrong?

What has gone wrong?

- Weak monetary system?
- Overheated economy?
- Corrupted financial market and system?
- Government failure or market failure?

- Weak economic structure and weak science and technology culture?

Personal Observations

- Science and Maths are emphasized in Asia
- Asia-Pacific economies are excellent in production, manufacturing and adoption of technology
- Good in incremental improvement
- Poor in innovation and creativity

- We need an 'Asia-Pacific Renaissance'!!

The Renaissance

- The “rebirth” through the discovery of
 - The Past
 - The Self
 - The World
- The bringing together of
 - The Art
 - The Science
 - The Technology

Leonardo the Artist



Artist

Scientist

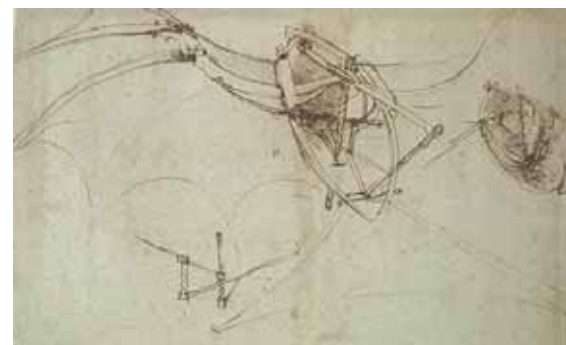
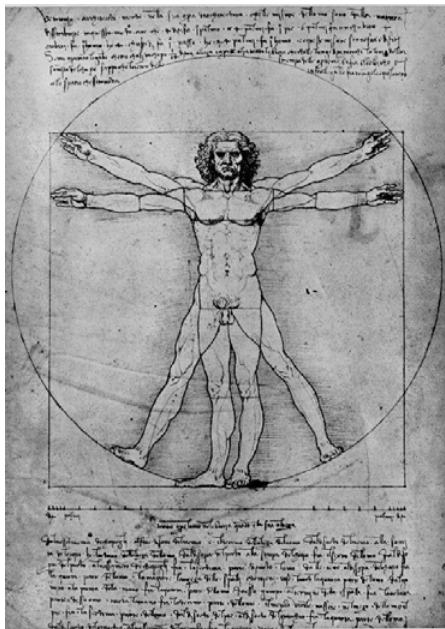
Inventor

Technologist

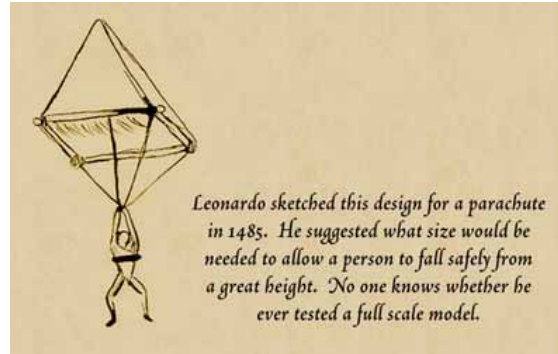
Musician

Architect

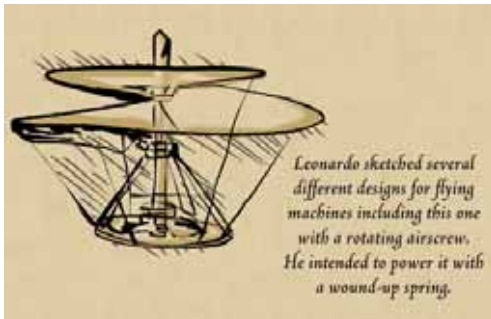
Leonardo the Scientist



Leonardo – the Technologist



Leonardo sketched this design for a parachute in 1485. He suggested what size would be needed to allow a person to fall safely from a great height. No one knows whether he ever tested a full scale model.

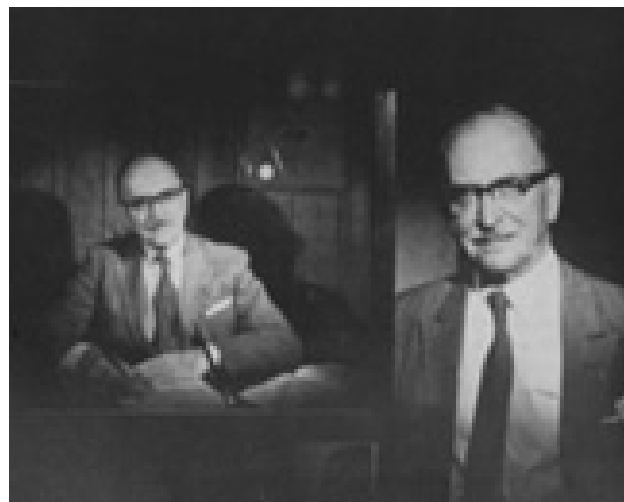
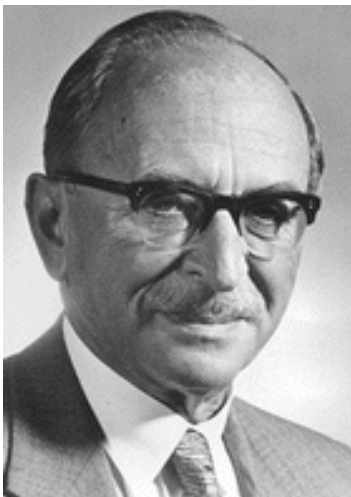


Leonardo sketched several different designs for flying machines including this one with a rotating aircrew. He intended to power it with a wound-up spring.



Dennis Gabor

Nobel Laureate 1971 in Physics for invention of Holography

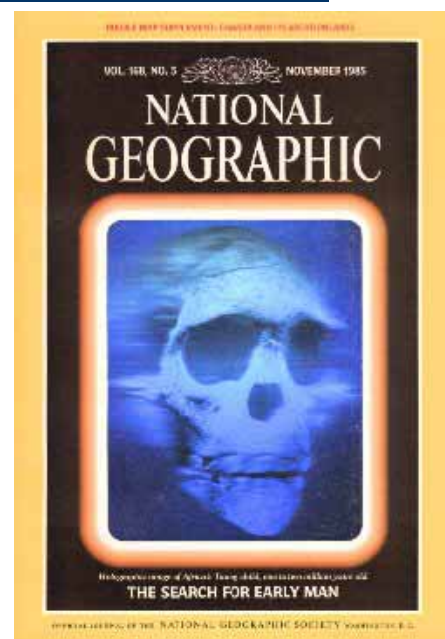


Master of Serendipity

- Serendipity - the art of looking for something and finding something else
- Invented high pressure quartz mercury lamp (used in millions of street lamps) while trying to build a cadmium lamp
- Discover holography while working on improving electron microscope

Holography in Art and Science

“The Search for Early Man“
In National Geographic
November 1985



What are the common trails?

- Think outside the box
- Dare experimenting
- Always ask why, and why not
- Practice the “art of serendipity”
-

The Asian Renaissance

- A “rebirth” based on own culture, integrating art-science-technology
- Rediscovery of “the Past”, “the Self”, “the World”
- Need more than trade, business and manufacturing
- Promote lateral and innovative thinking
- Need stimulation, deduction, induction and innovation
- Need science centres and museums

Role and Impact of Science Centres

- To stimulate
 - To educate
 - To innovate
 - To network
-
- APEC ISTWG fully support the project on “Study of the Impacts of Science Centre and Museum programmes and activities on their communities” headed by Questacon, Australia

Conclusion – The Third APEC Youth Science Festival

The Third APEC Youth Science Festival
Beijing August 3-9, 2004