

Technovation and Mechatronics

Patri K. Venuvinod

Executive Director

International Organization for Developing Universities

(IODevUni)

Chicago, U.S.A.

Hong Kong

- *Laissez faire* (non-interventionist).
- Industrial directions totally left to people.
- Government's role: only law and order and basic infrastructure.
- Excellent communication infrastructure.
- Autonomous and horizontally integrated small and medium-sized enterprises.
- Global links.

Per Capita GDP Ranking, 1997

1. Luxembourg
2. USA
3. Switzerland
4. Kuwait
5. Hong Kong (US\$26,400)

China in 1978

- Economy in shambles owing to cultural revolution.
- Closed doors.
- Ideology more important than progress.
- On par with India.
-

Deng Xiaoping takes up reforms.

- Open door policy.
- Four modernizations.
- Focus on economics while leaving political setup relatively unchanged.
- Market-oriented policies.
- 70% FDI boost from HK entrepreneurs.
- Shoots far ahead of India.
- Now, OEM leader in the world.

Factors of Production and Economic Growth

- Capital
- Raw materials
- Land
- Labor
- Technology and Technovation

Technology and its development need to be managed effectively for the generation of wealth and resources.

Technology can be defined as the assembly of hardware and software means and tools used by human beings to achieve socioeconomic goals.

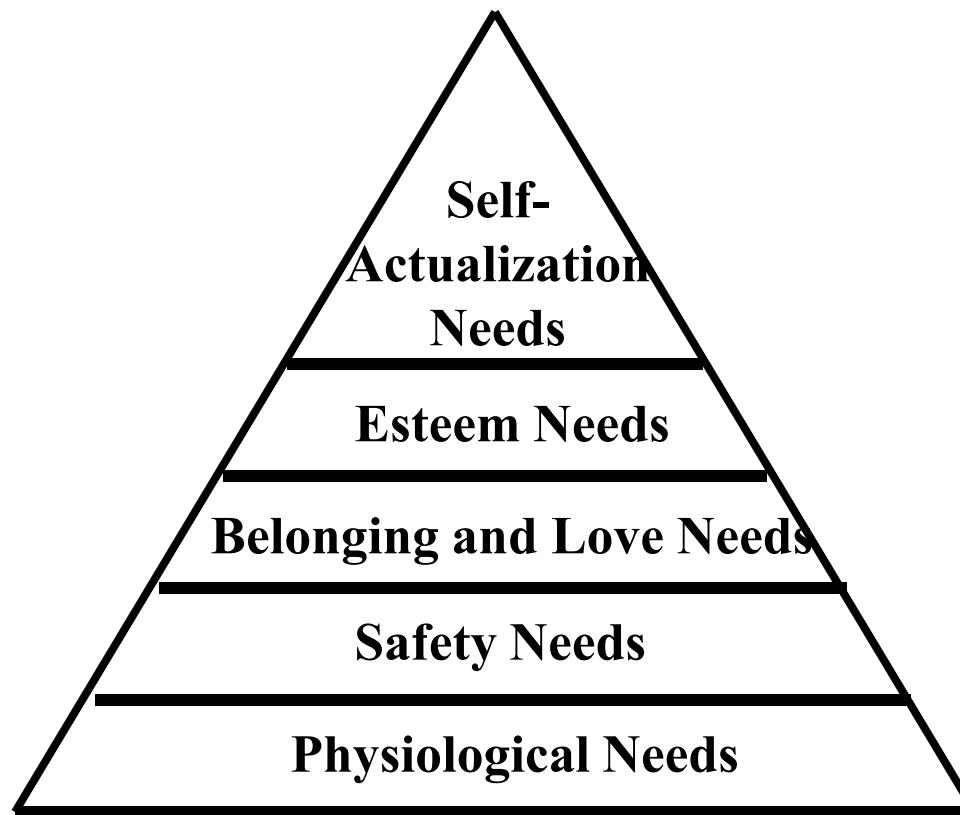
Science is the discovery and understanding of nature.

Many **modern technologies** depend upon science and the applications of scientific knowledge and principles.

Each advance in pure science creates new opportunities for the development of new designs and ways of making things to be used in daily life.

Technology provides science with new and more accurate instruments for investigations and research.

Maslow's Theory of Human Needs



Innovation

Innovation is introducing a new or improved product, process, or service into the marketplace.

Innovation is about new ways of delivering customer value.

Innovation need not relate only to the product or service itself—it can apply to any part of the business system or value chain associated with delivering the product or service to the customer.

Innovation, therefore, can consist of changes to a particular link in the value chain, or to the creation of a fundamentally new value chain, bypassing the traditional approach.

A company need not be big to innovate (Most HK companies are small)

- Apple Computers began in Steve Job's garage.
- People Express started out in 1981 with three used Boeing 737s.
- Tie Rack was founded with two shops in 1979 by entrepreneur Roy Bishko.
- Sea Containers was a start-up run by three partners when it entered the container leasing business.
- Kwik-Fit started with one outlet in 1971.

- Industrial innovation includes the technical design, manufacturing, management and commercial activities involved in the marketing of a new (or improved) product or the first commercial use of a new (or improved) process or equipment.
- Innovation can be incremental.
- Drucker says that innovation is capable of being presented as a discipline, being learned, and being practiced.

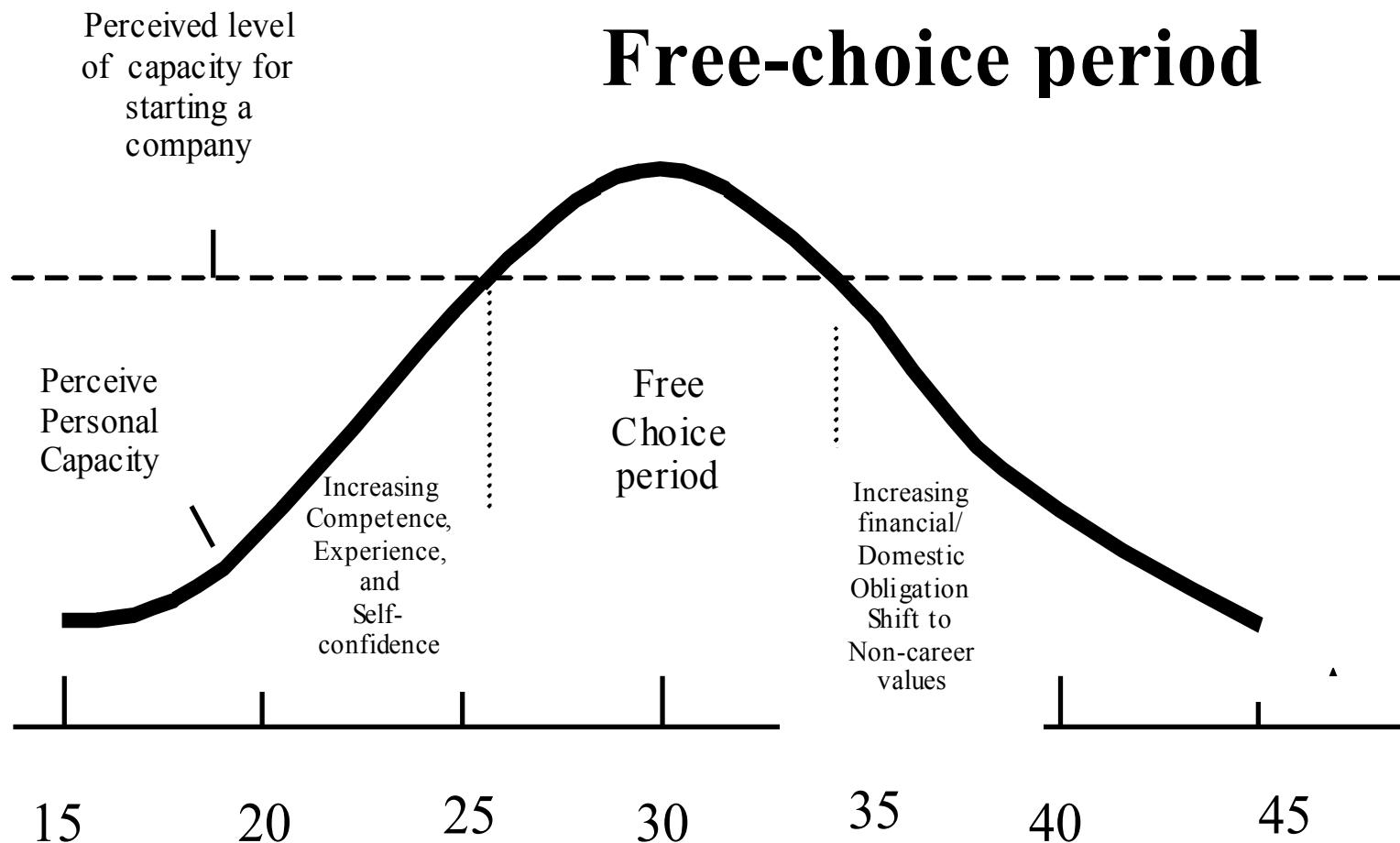
- Large organizations (e.g., governmental units) find it very difficult to innovate because of bureaucratic legacies and/or close public scrutiny that severely constrains their options.
- Quite often small can be beautiful by providing agility.
- Bureaucratic organizations impede innovation by giving precedence to procedures over goals.

Who drives innovation?

- Webster dictionary defines an entrepreneur as someone who undertakes to “organize, manage and assume risk of business.”
- The entrepreneur typically assumes responsibility for creating and developing new living businesses rather than burying old dead ones.
- This quality converts inventions into innovations.

- The French verb *entreprendre* (literally between-taker) means to undertake or to assume a responsibility or task.
- Unfortunately, many English speaking people outside USA equate an entrepreneur with a “get-rich-quick fast-buck artist.”

Free-choice period



- Entrepreneurial teams are common.
- Many entrepreneurs do not succeed and get back to professional work.

But there would be better professionals.

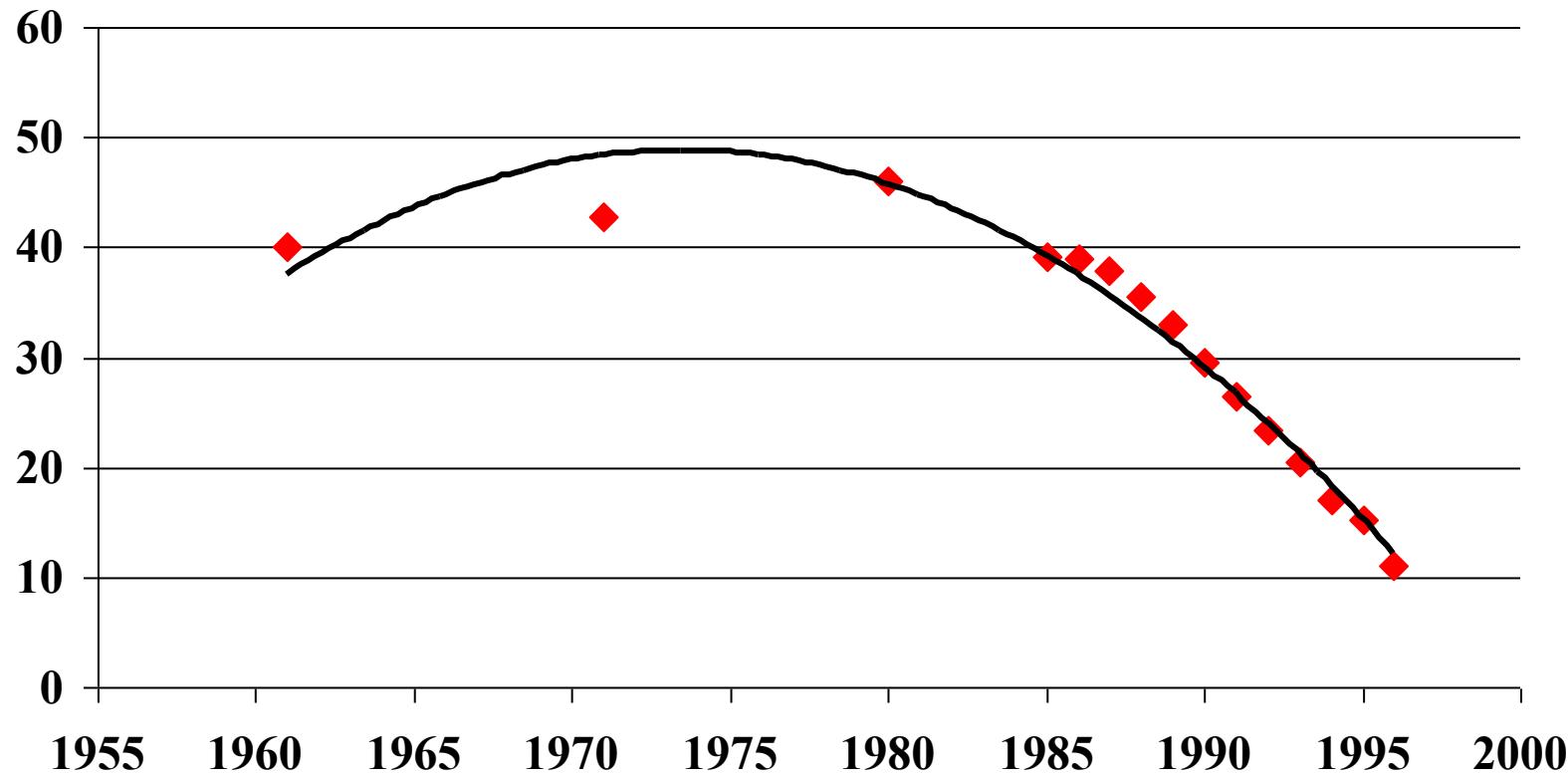
Spirit of entrepreneurship grows in the society.

- Many people disguise themselves as entrepreneurs ('scams'). Govt. needs to develop checks.
- Venture capital, not loan from a bank, is needed.

Technological developments

- Mechanical to electronics to computers.
- Digital communications.
- Intelligent machines.
- Flexible manufacturing systems and their failure due to reliance on hierarchical organization.
- Migration of HK industry to China.

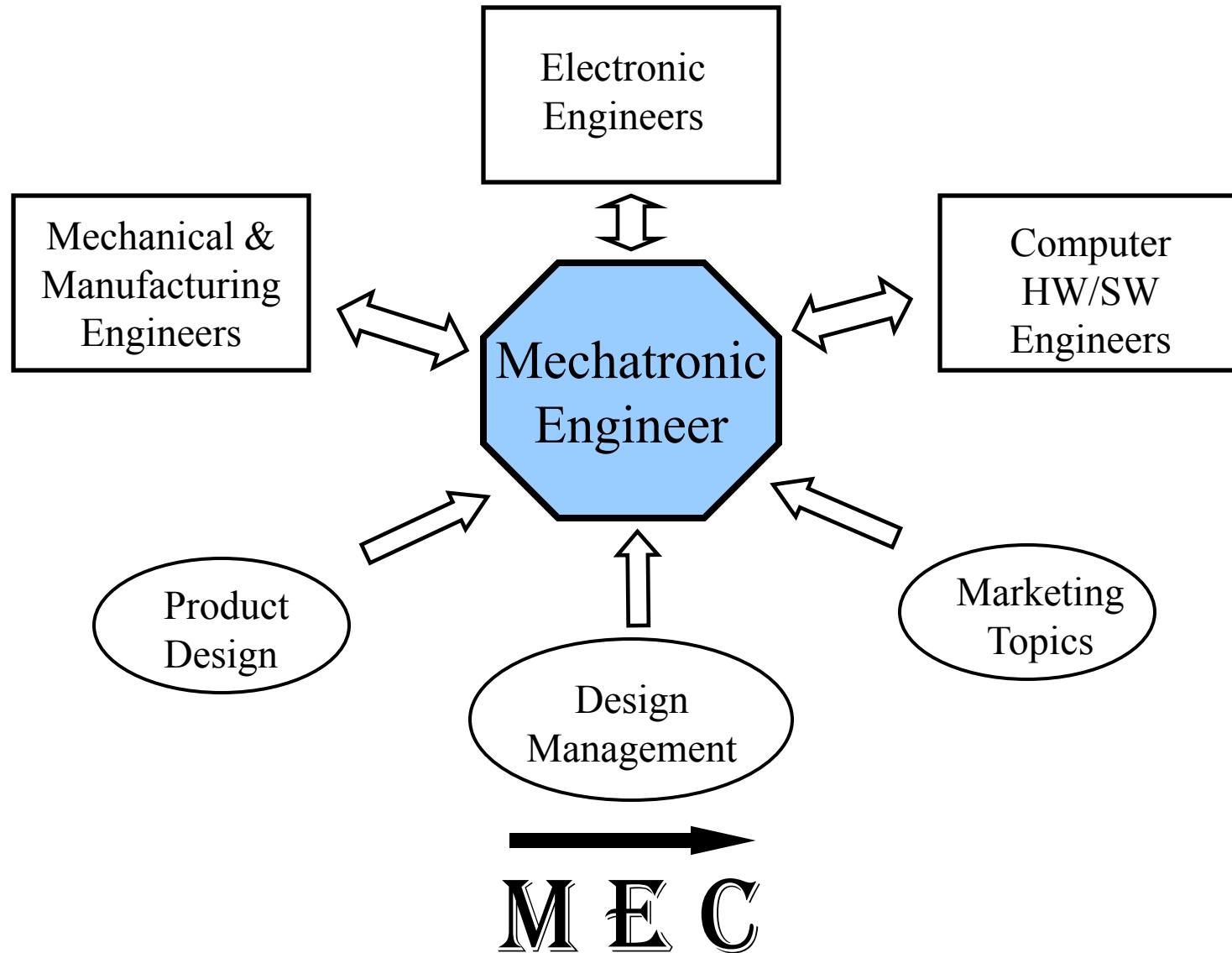
% Share of Mfg in HK Employment

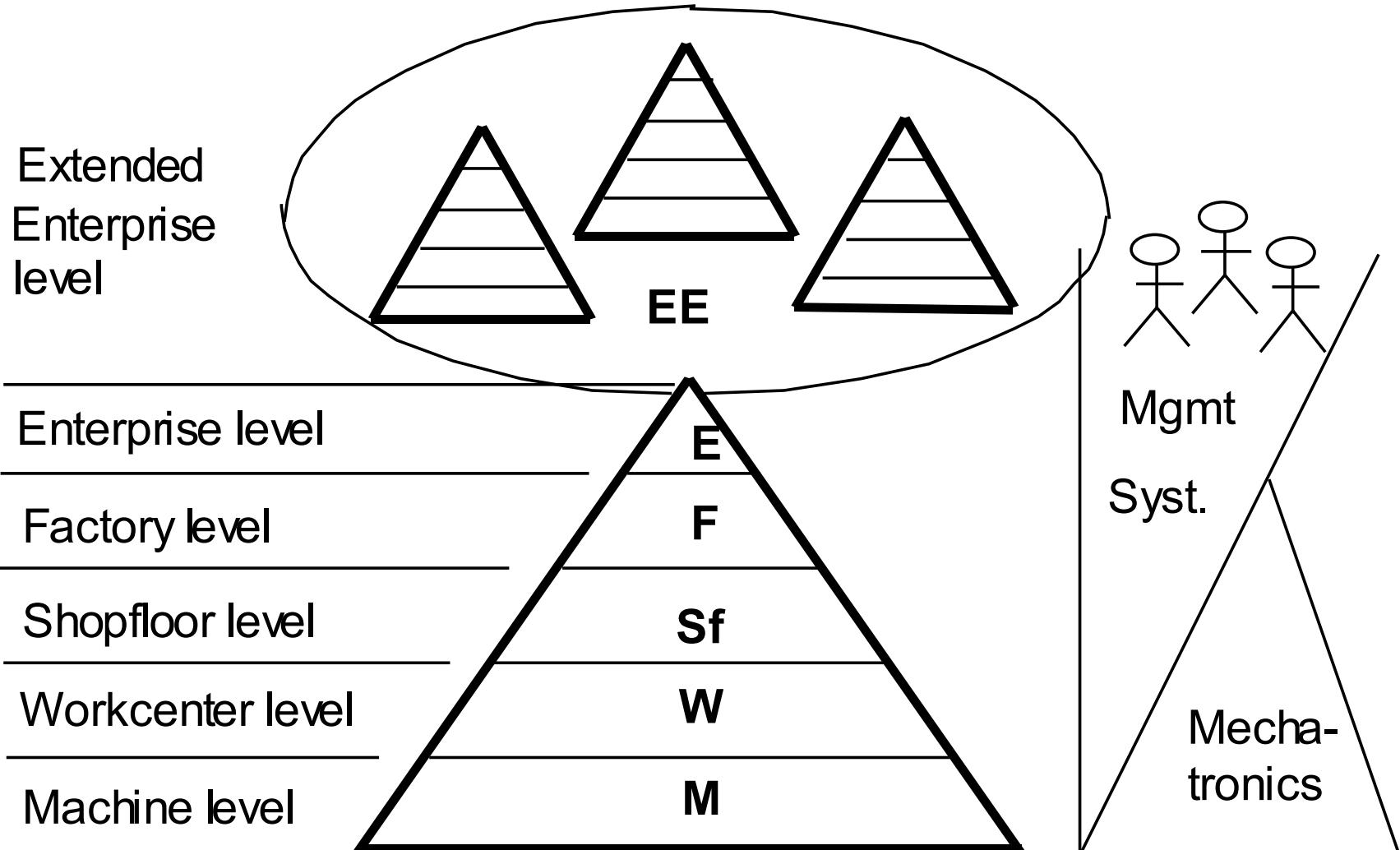


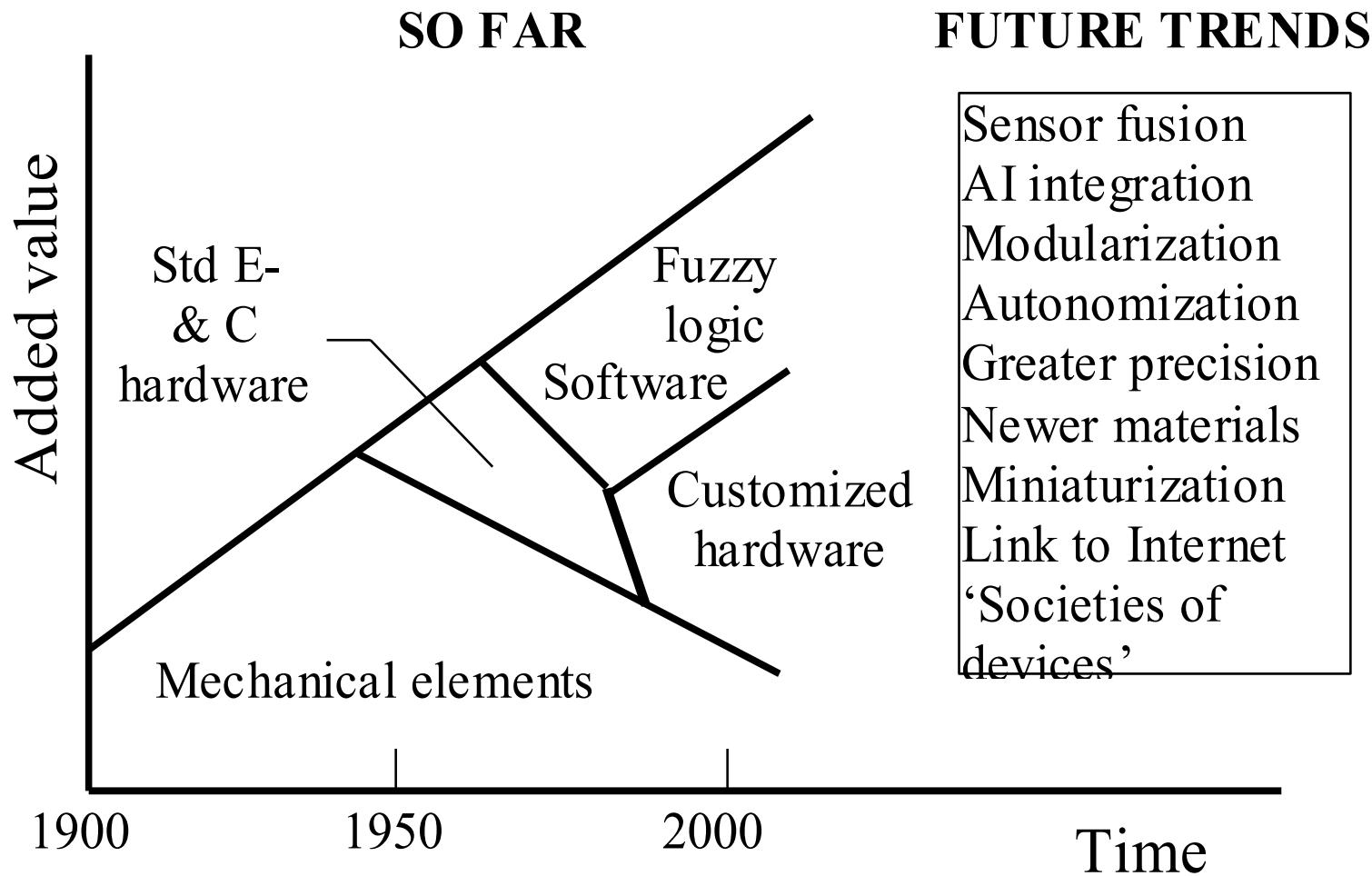
Mechatronics

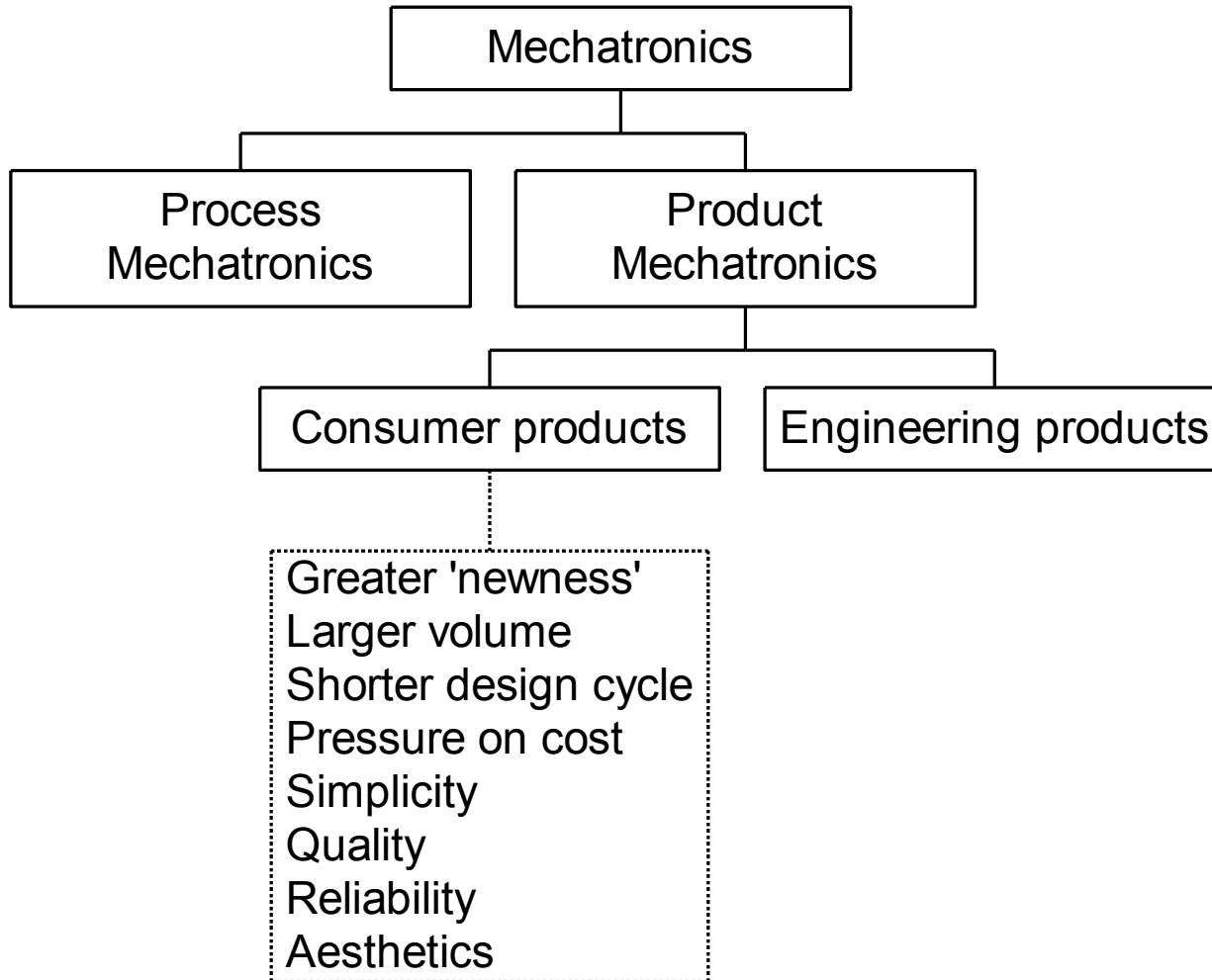
A synergistic combination of precision mechanical engineering, electronic control and systems thinking in the design of products and manufacturing processes.

+ product DESIGN, aesthetics, marketing









Technology Strategies

1. **Offensive: Leadership - ‘First to market’**
2. **Defensive: Follow the leader**
3. **Imitative: ‘Me too’**
4. **Applications Eng.: Interstitial**
5. **Dependent: Branch plant, Business Process Outsourcing (BPO)**
6. **Absorbent: Licensing**
7. **Traditional: Keep doing what has worked so far**

Some time in the future

China is yet to take up.
We could capture by
exploiting our trained
human resources through
horizontal integration.

We have lost
to China.

Original Brand Manufacturing
(OBM)



Original Brand Manufacturing
(OBM)



Original Brand Manufacturing
(OBM)

Andhra Pradesh

- **217 engineering colleges**
- **>60,000 intake.**
- **Only 30% get domestic employment.**
- **What do the rest do?**
- **One answer: Go abroad.**
- **Complementary answer: Work for yourself by becoming an entrepreneur and be a job creator.**

Educators should recognize that entrepreneurship is a youth-oriented activity by

- **Providing challenging tasks.**
- **Reducing power distance**
- **Promoting individuality**
- **Encouraging moderate risk taking and tolerating failure.**
- **Promoting all-round growth.**

Entrepreneurship thrives in an orderly but free society.

Corruption, whether public or private, strongly impedes entrepreneurship.

Where there is more government, there is less entrepreneurship.

I urge the Government to keep this in mind.

Thank you.