

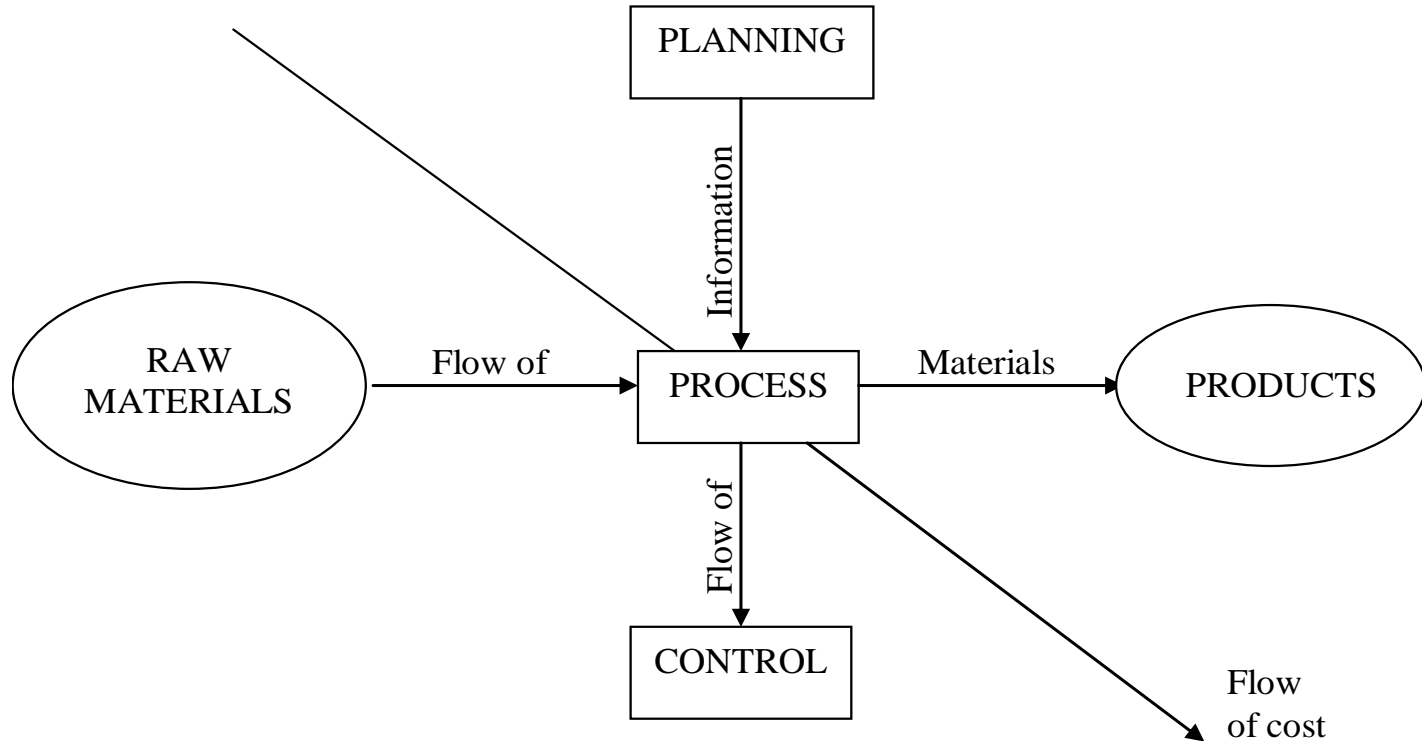
# A Systems View of Manufacturing

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# A Systems View of Manufacturing

- Manufacturing can be viewed either as a transformation process or as a system.
- **As a Transformation Process:** A narrow definition of manufacturing is that *it a process of transformation where raw material are converted into products*.
- **As a System:** Manufacturing is not limited to materials transformation performed in a factory. Rather, *it is a complex system comprising of several elements*.

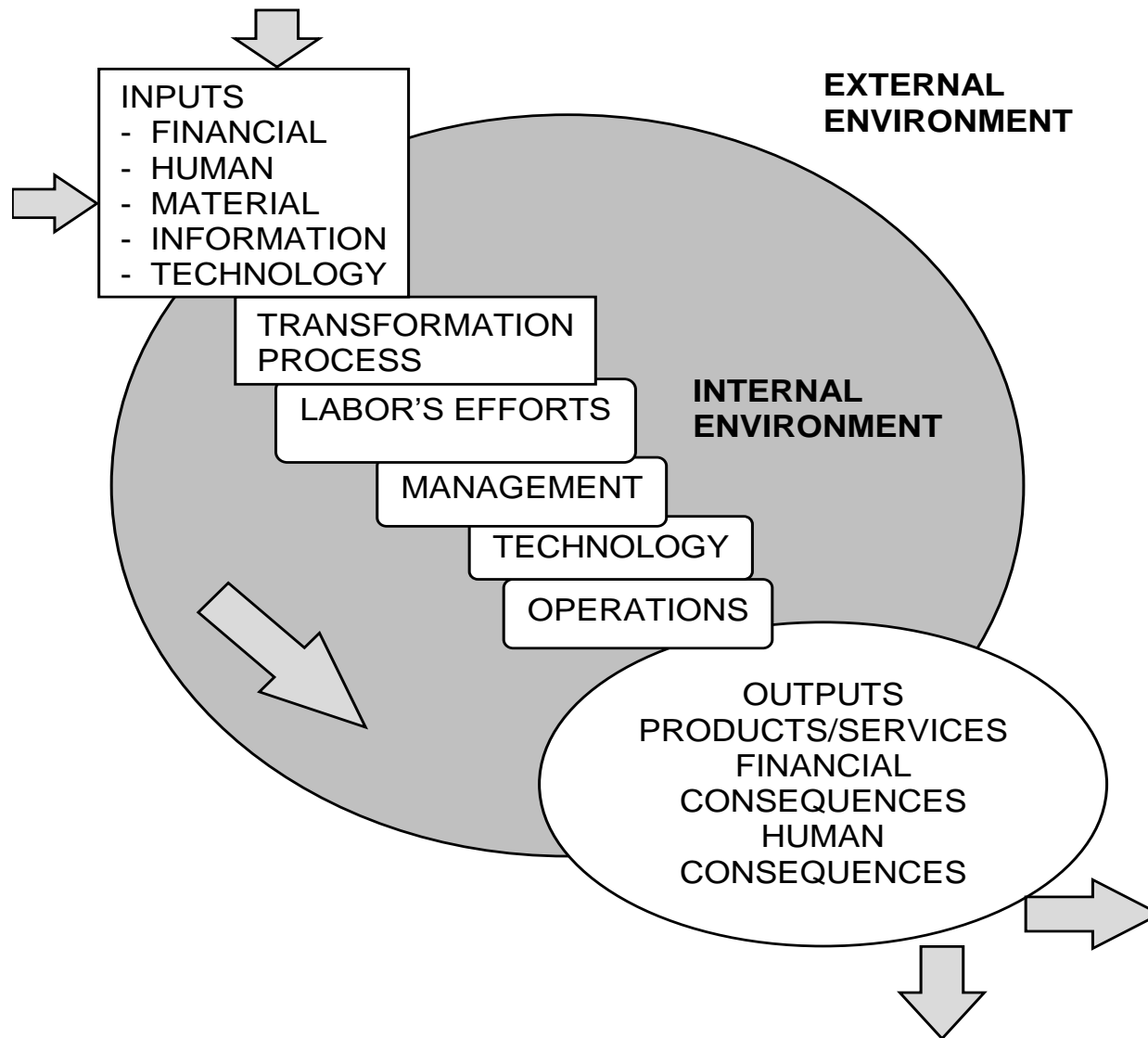
# Flow of Materials, Information and Cost



**Figure 2.3: Flow of Material, Information and Costs (Hitomi, 1996)**

# A Systems View of Manufacturing

- This involves an internal environment and an external environment.
- The inputs are from the external environment and involve several variables.
- The outputs are to the external environment and also involve several variables.



**Figure 2.2: Systems View of Manufacturing (Murthy, 1995a)**

# A Systems View of Manufacturing

- Can be viewed from three different Aspects:
  - ***Technical:*** Dealing with engineering, science and technology issues.
  - ***Commercial:*** Dealing with financial, marketing, legal issues
  - ***Management:*** Dealing with planning, operations and other related issues such as information. And also organisational issues dealing with human related issues.

# MANUFACTURING: DIFFERENT PERSPECTIVES

- It can also be viewed from three different perspectives:
  - Firm level,
  - National (Industry) level and
  - Regional or global level.

# Firm Level

- Manufacturing at the firm level involves several variables which can be broadly grouped into the following three categories:
  - Technical
  - Commercial
  - Management



# Technical

- The technical side has been discussed before and involves various issues related to the science, engineering and technology aspects of manufacturing.

# Commercial

- The commercial side deals with issues such as costs, sales, revenue and profits. Each of these involves many variables.
- For example, the costs can be investment costs, unit manufacturing costs, cost of rework and so on. The basic bottom line for a firm is that it must make reasonable profit for its investment.

# Management

- Deal with managing the various activities at strategic and operational levels taking into account the many different legal and socio-political aspects and various constraints.
- Another very important issue relates to the organizational side that deals with the human related issues – organisational structure, communication and flow of information, skill base of the workforce and so on.

# National Level

- In the national level, a manufacturing firm is influenced by factors such as market competition and government policies.
- Obviously, the market competition is not only determined by manufactured goods within the nation but also affected by imported manufactured goods.

# National Level

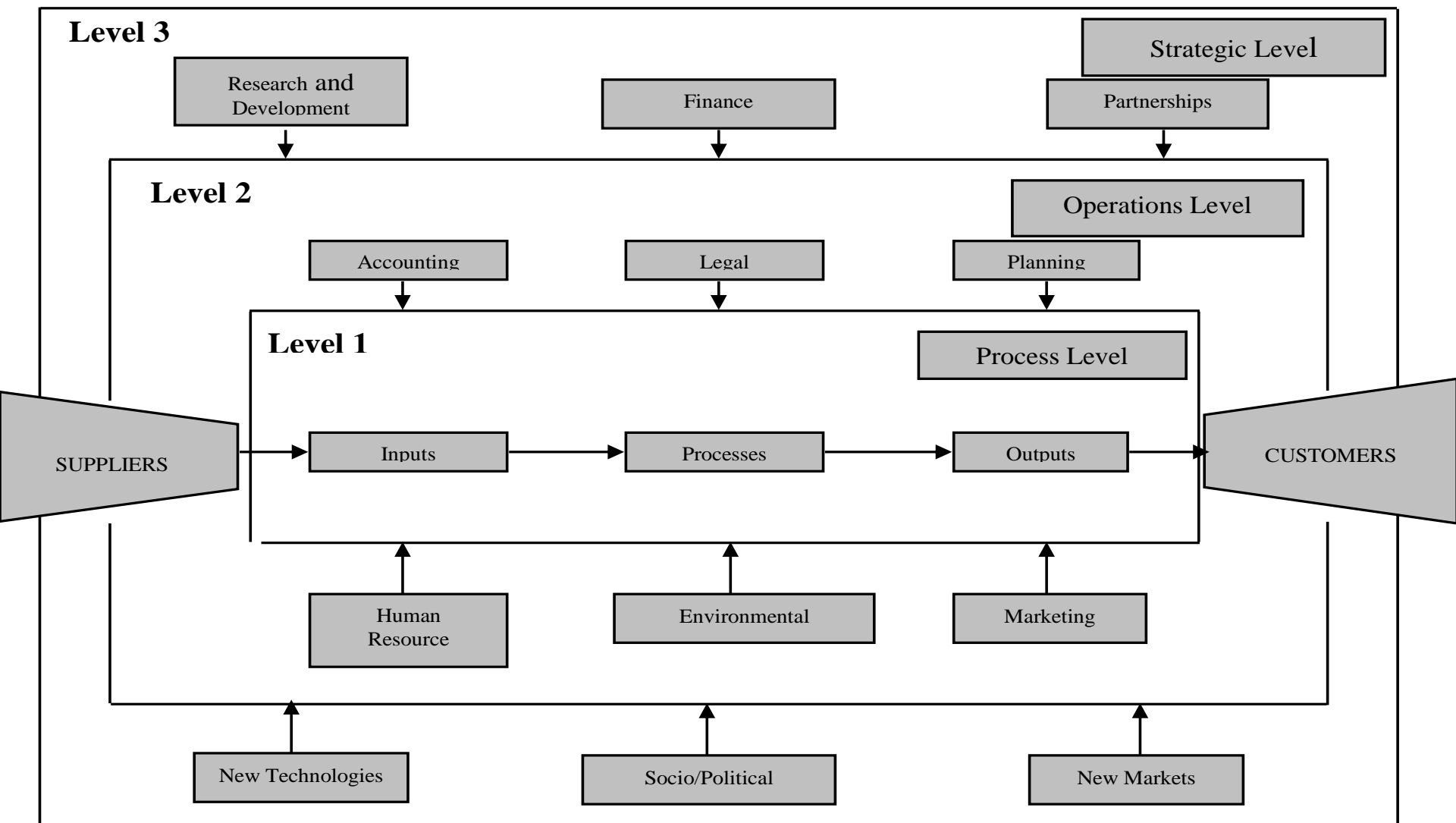
- Some of the government policies that affect the manufacturing enterprise are indicated below.
  - Industry or Technology development policies,
  - Taxation policies,
  - Environmental policies.
  - Trade policies – export and import subsidies, protection
  - Financial investment

# Regional and Global Levels

- Manufacturing at the regional and global levels deals with the following factors :
  - Fierce competition
  - Open market - free trade
  - Trade organization - regional partnerships

# **A Three Level Model of Manufacturing**

- Manufacturing is a complex system involving several elements. It can be viewed as a three level system (Level 1 - 3)
- Note that Level 1 is nested within Level 2, in turn, is nested within Level 3. We briefly discuss the elements at each of these levels.



**Figure 2.9: Three Level Model of Manufacturing (Murthy, 1995b)**



# Level 1

- This level corresponds to the shop floor level and has three key elements - Inputs, Process and Outputs.

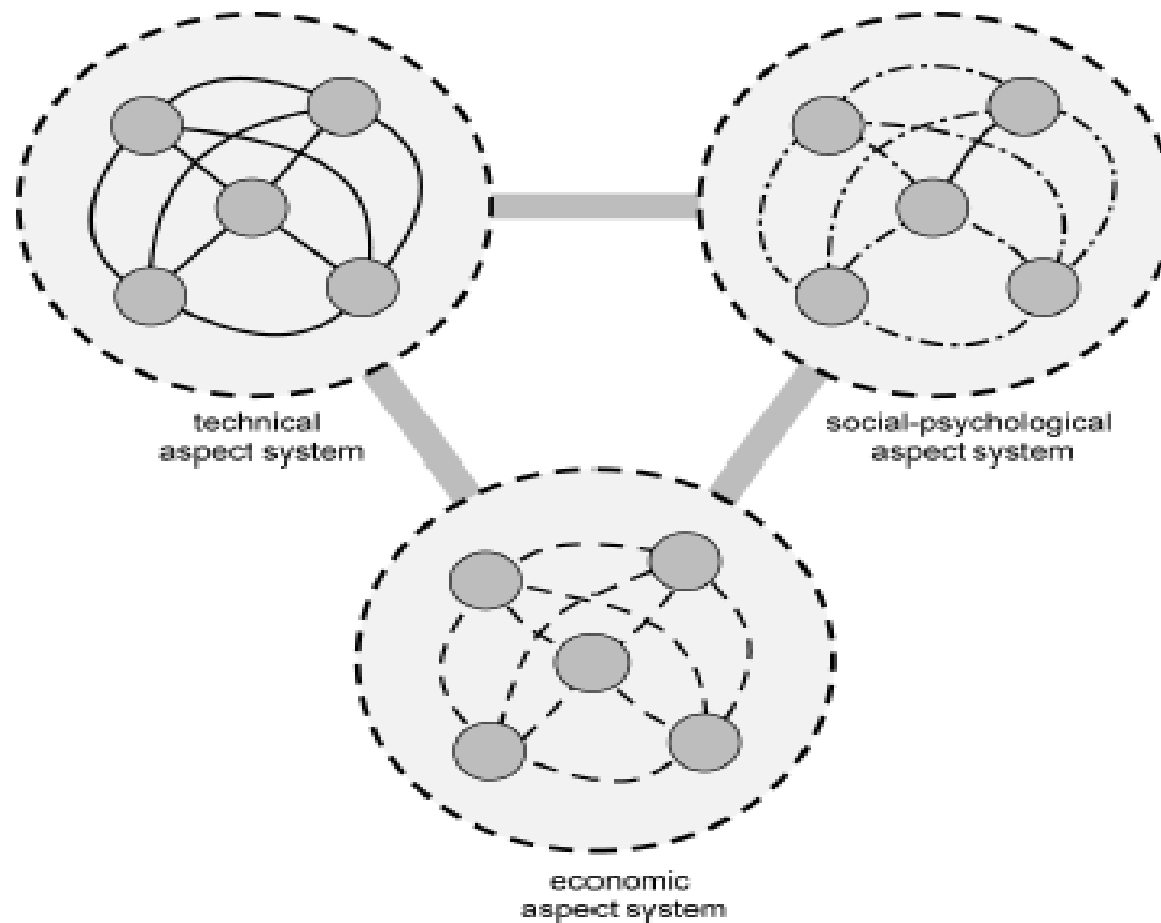
## Level 2

- This level includes Level 1 as well as six new elements. The focus of this level is management of business at the operations level and the six new elements with a range of operational issues.

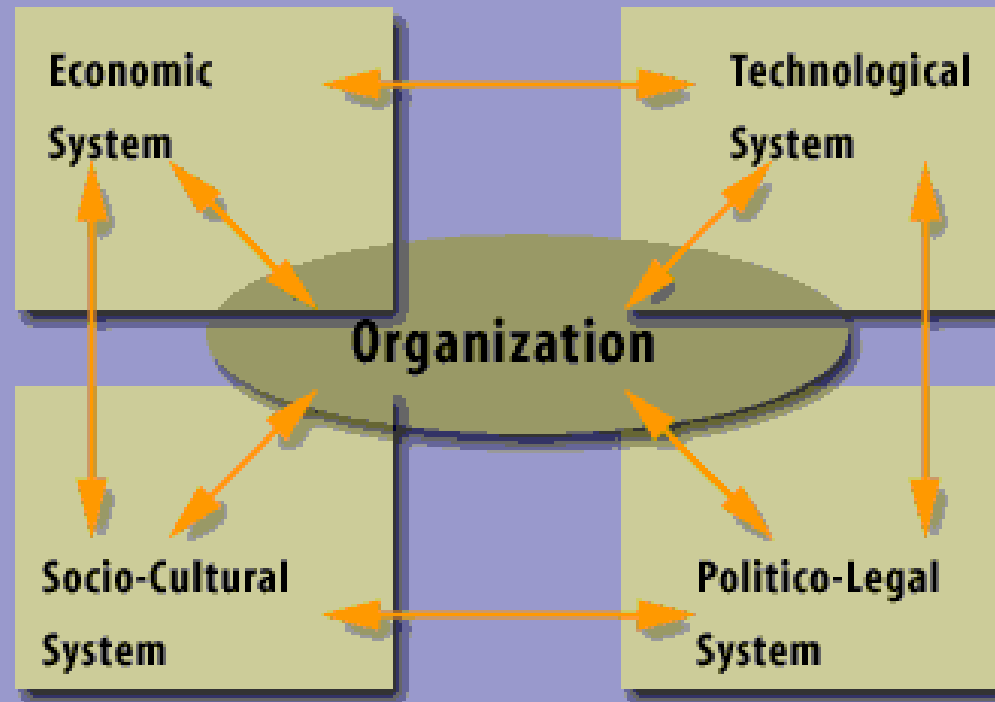
# Level 3

- This level includes the Levels 1 and 2 and six new elements. Here, the management focus is long term and strategic.
- This is important, as survival of businesses in the fiercely competitive global market requires long term strategies. The six new elements deal with a range of long term issues.

# Integrated System



**Fig.3 Organization in its environment**



Thank You