Product Compliance & Life Cycle

Lecture 6

Legal & Ethical Considerations

Legal and ethical consideration

Laws that govern the aspect of product and its specifications can generally be classified into the following categories:

- **Product Safety rules** enacted at the level of government; if a company ignores it, can worsen a company's image (and so for its earnings).
- **Regulations:** rules formed by the administrative agencies for promulgation and enforcement of safety guideline in the industries which comes under such agencies;
- **Litigation:** applied not only when prevention fails, involving assessment and assigning liabilities and compensating the injured party. It can also be used as prevention tool: transferring the cost of injuries through litigation, from the damaged person to the person or corporation who could have but did not prevent the injury, demotivates to invest in prevention rather than to pay the penalty of neglect.

Types of litigation that can **be** generated by a product are: individual personal injury cases, consumer class actions, State attorney general/regulatory investigations and cases, securities and/or shareholder derivative actions, Inquiries and investigations by foreign regulator.

Legal and ethical consideration

Examples:

Ethical responsibility: Nestlé case in India.

Its Maggi noodles contained unsafe levels of lead and traces of monosodium glutamate (MGS), contrary to the food's labelling.

After authority analyzed the levels of MSG and public opinion blamed Nestlé for the mistake, the company had to recall its product, the country's largest food product recall equal to 27k tonnes!

The recalled product are being incenerating cement factories to convert the waste into energy, a relatively environmentally friendly way of destroying the unwanted stocks.

Legal and ethical consideration

Examples:

Product safety: where the law protects the consumer's interest companies would recall faulty products

- Brands like Ford, Sony, Dell, Apple, Lenovo recalled their products for that reason
- In 1959, Cadillac cars with weak steering in cage were called back
- Companies do not recall products in India while recalling the same in developed countries. It is imperative that the Indian government introduces appropriate rules to ensure that consumers are not discriminated against their counterparts in developed nations.
- The Indian Consumer Protection Act, 1986, does not contain any provisions for product recall and consumer products in India are sold with a Guarantee or Warranty limiting the extent of liability of the seller to mere replacement of the product with a new one or removing defects in the product.
- Grants the consumer the right to only receive the value of the products purchased, along with any damages suffered as a consequence of use of defective products.
- In USA, the CPSC and FDA provide 24 hour help line for consumer to register complaints, posting of recalled brand sand names on the website and also let the consumer check the track records of a company.

Compliance management

Aim: detect and prevent corporate crimes and mistakes, minimize the damage of arising issues, prevent recurrence, improve business and control processes.

Scope: varies from one corporation to the other. it may include compliance to business related laws and inner regulations, environmental issues, labor and wage regulations, data security, health and safety issues, equal employment opportunity, antitrust considerations and competition, fund raising, etc.

Compliance risk: risk that compliance initiatives address too many areas but bring fewer results than a strictly defined scope.

These days, compliance officers are in charge. Though the state is the main source of regulations, compliance management deals with other forms of regulations as well, such as internal corporate policies, professional groups (e.g. the Basel Committee), industry associations, etc.

Organizations ensuring compliance: standards body, standards developing organization (SDO), or standards setting organization (SSO). Any company whose primary activities are to develop, coordinate, promulgating, revising, amending, reissuing, interpreting, or producing technical and non-technical standards that are intended to address the needs of some relatively wide base of affected adopters.

Compliance management

International Organization for Standardization (ISO): The most influential standards organization;

At the EU level, there are three organizations that constitute the European Standards Organizations (ESOs) that are officially recognized by the European Commission and act as a European platform through which European Standards are developed:

- **CENELEC** (European Committee for Electrotechnical Standardisation),
- **ETSI** (European Telecommunications Standards Institute), and
- **CEN** (European Committee for Standardisation) which covers technical standards beyond the electrotechnical and telecommunications domains.

Certification organizations are independent entities that provide an assurance that a product, service, system or organization meets specific requirements,

Accreditation organizations generally are organizations or bodies that provide formal recognition that certification bodies operate according to accepted (international) standards.

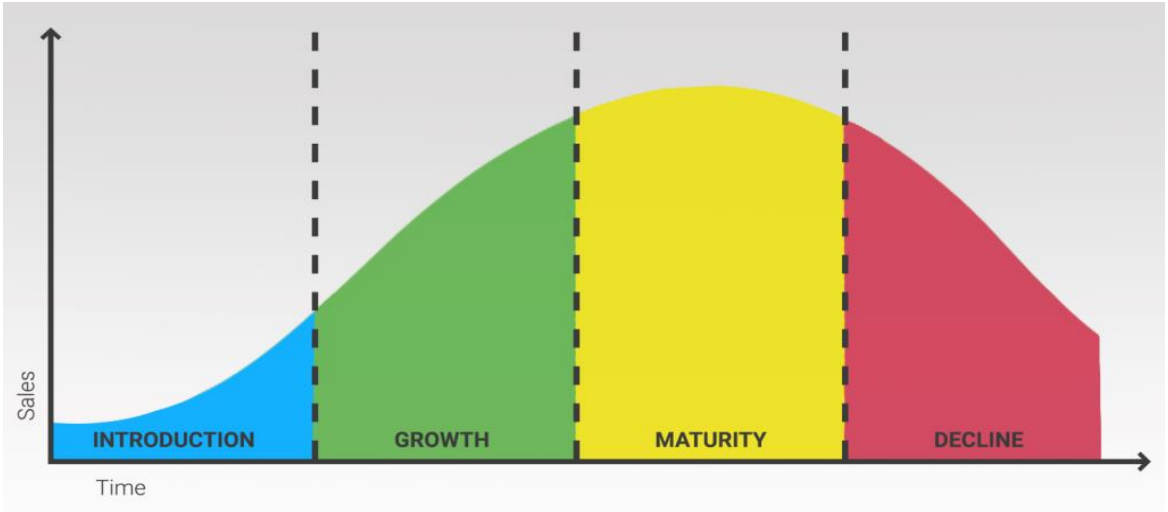
There are no organizations that indulge specifically and solely in setting ‘ethical standards’ or in conducting ethical assessment.

Product life cycles

Product Life Cycles

- The product lifecycle model is a simple representation of the cumulative impact of changes in the business environment on the life of a manufactured product.
- Important strategic management tool to understand the product and its finite lifespan and develop the understanding of the situation so that strategies for survival and growth can be effectively advanced.
- Statistical regularities show that the product lifecycle can be used to forecast the way the product attributes, demand, production and competition will change as the product matures
- A product passes through the following stages of development:

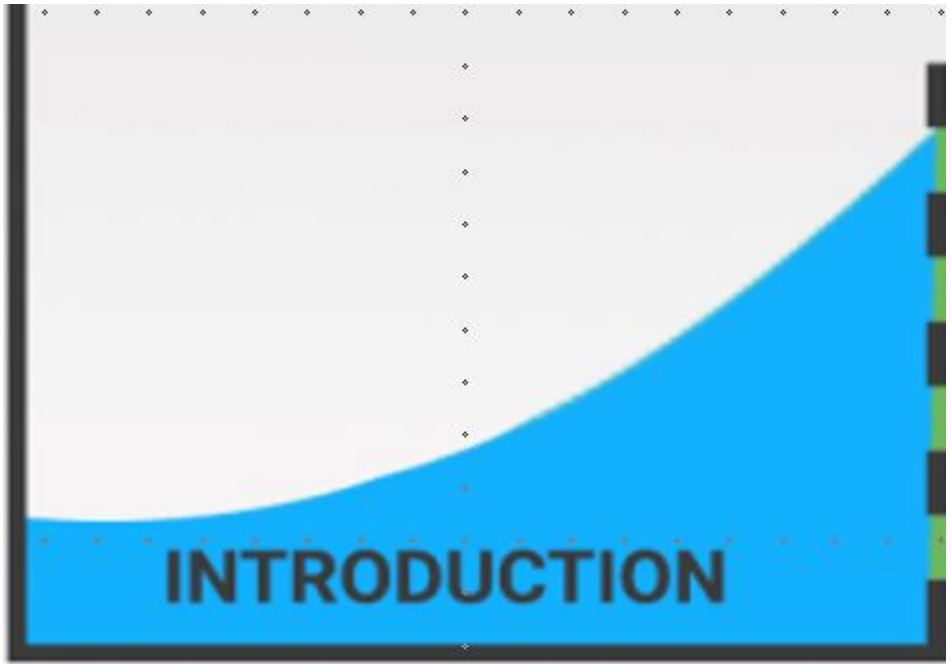
- 1. introductory phase;
- 2. growth phase;
- 3. Maturity phase;
- 4. Decline

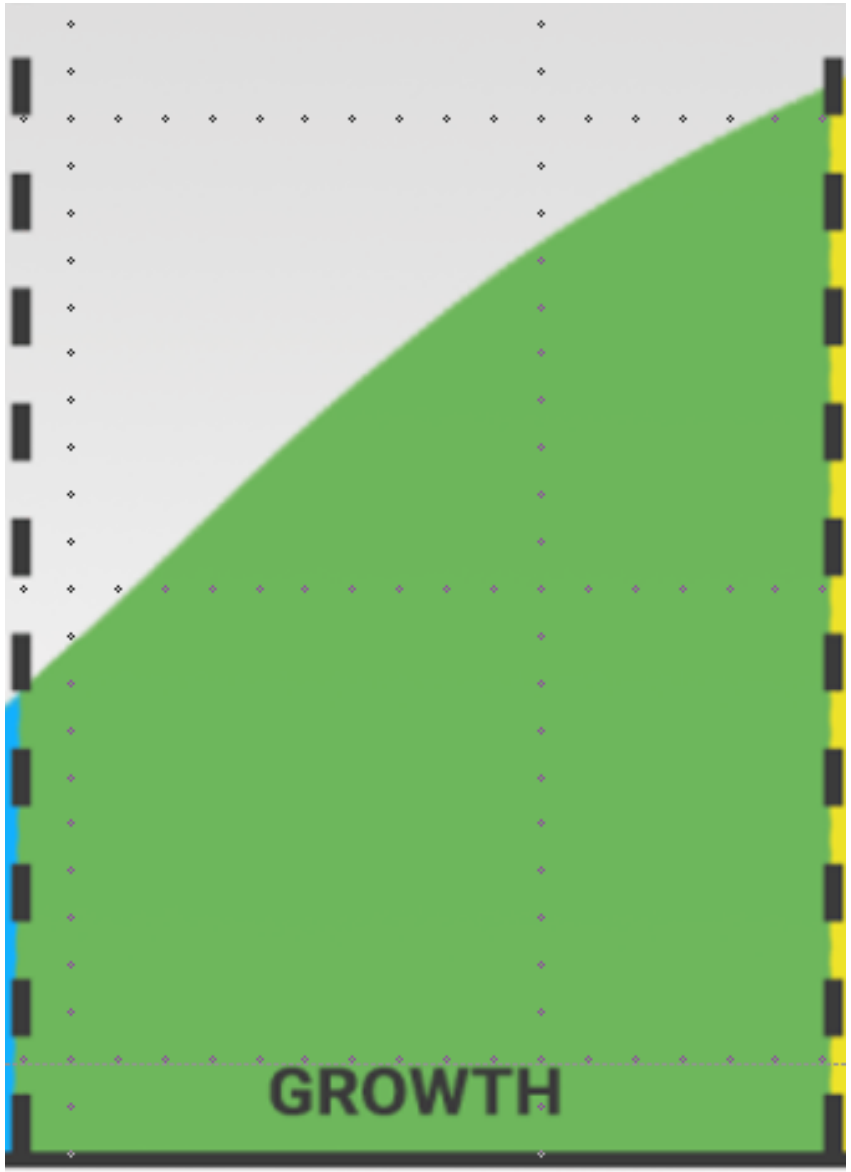


Product Life Cycles

- **1. introductory phase:**

- Product is new to the market and the consumers have to be motivated to try and accept the product. This is a stage when the product volumes are low and profit is normally down. Customers must be convinced the product provides benefits to them: promote it through marketing!!
- Pioneers, companies that launch new products, will be in a risky position: profits will be lower in the long run with respect to followers (companies following pioneers that imitate the product) because pioneers need to invest heavily to develop the product and build the market.
- Early adopters will try the products firstly.





Product Life Cycles

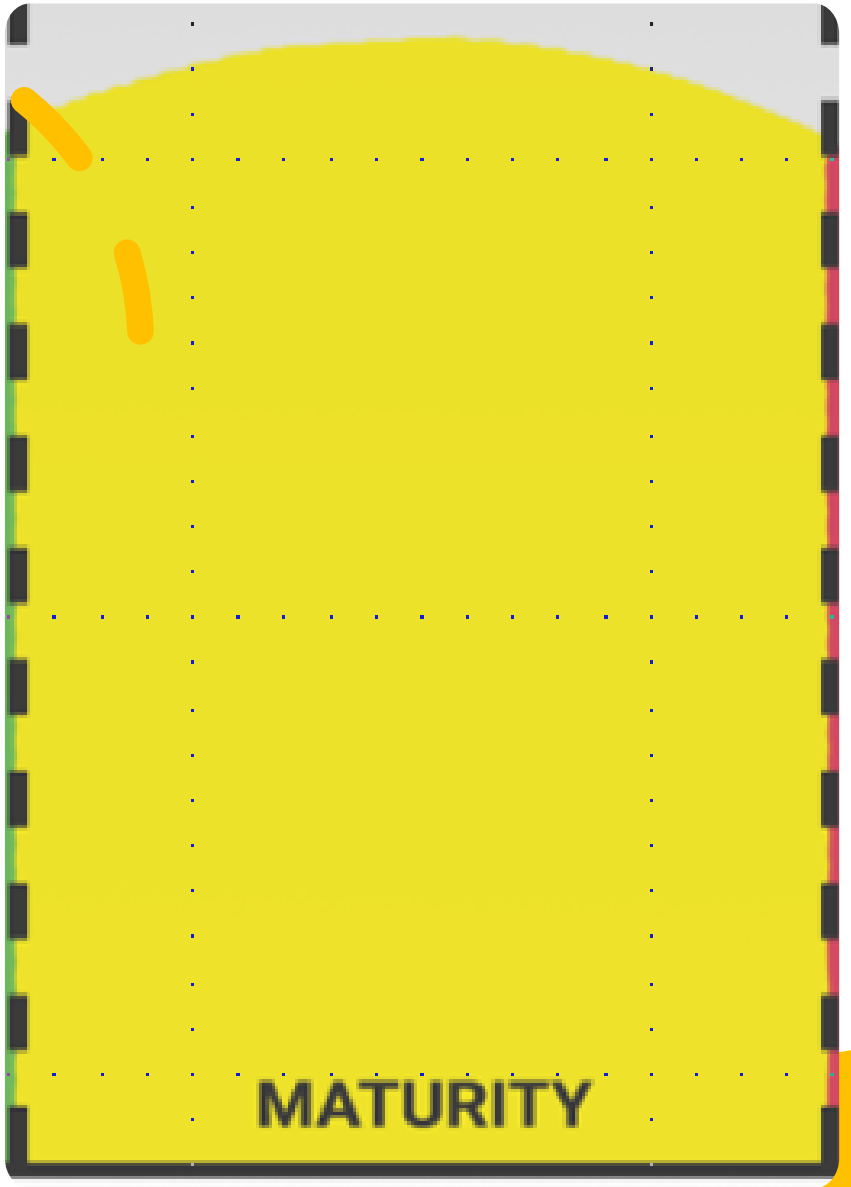
- **2. Growth phase:**

- When product finds market acceptance. During this stage, there is an exponential growth of the volumes accepted by the market.
- New competitive products are introduced and there is a significant change in the product features due to continuous improvements.
- Because of competition, market segmentation becomes a key issue. So the price.

Product Life Cycles

3. Maturity phase:

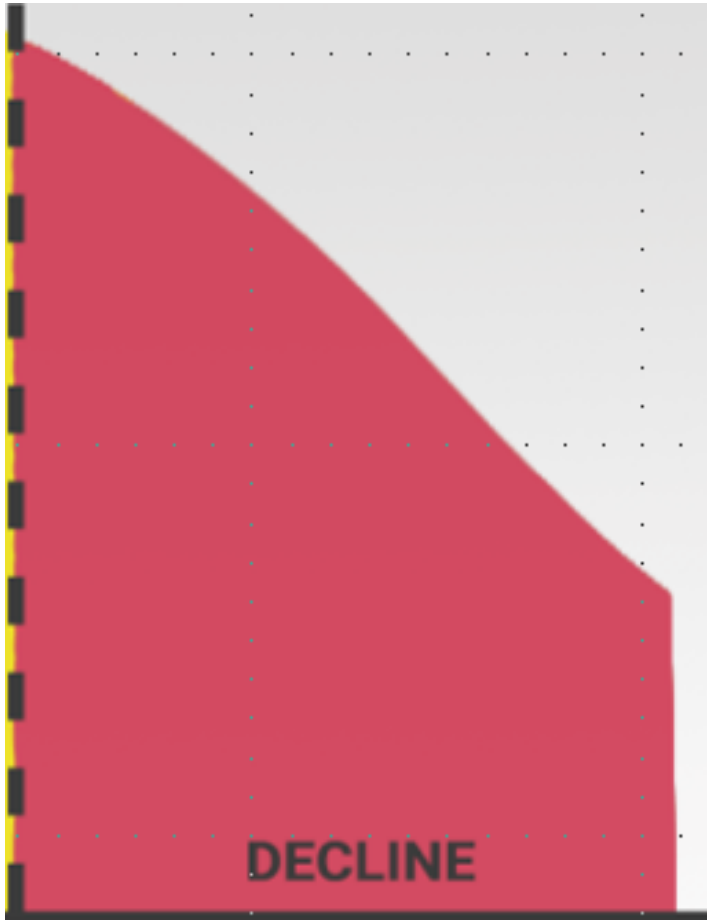
- The product is established, and the demand and quality of the product does not undergo much change. However, this is the stage of cutthroat competition, with competitors competing on the basis of providing value to the product.
- The sales curve has flattened out and few new buyers are in the market.
- New market segments are difficult to find: invest just enough money to maintain market share.



Product Life Cycles

4. Decline:

- New product categories are introduced into the market that provide better value to the consumer for that particular need or there is a change in the needs of the consumer.
- If the market is truly dying, you might find it very profitable to be the “last iceman” (Winer and Dhar, 2015). A product will gain monopoly rights to the remaining customers, which results in the ability to set high prices (Landsale Semiconductor, the last company making the 8080 computer chip introduced by Intel in 1970s. This chip is still used in military systems).



Technology Life Cycles

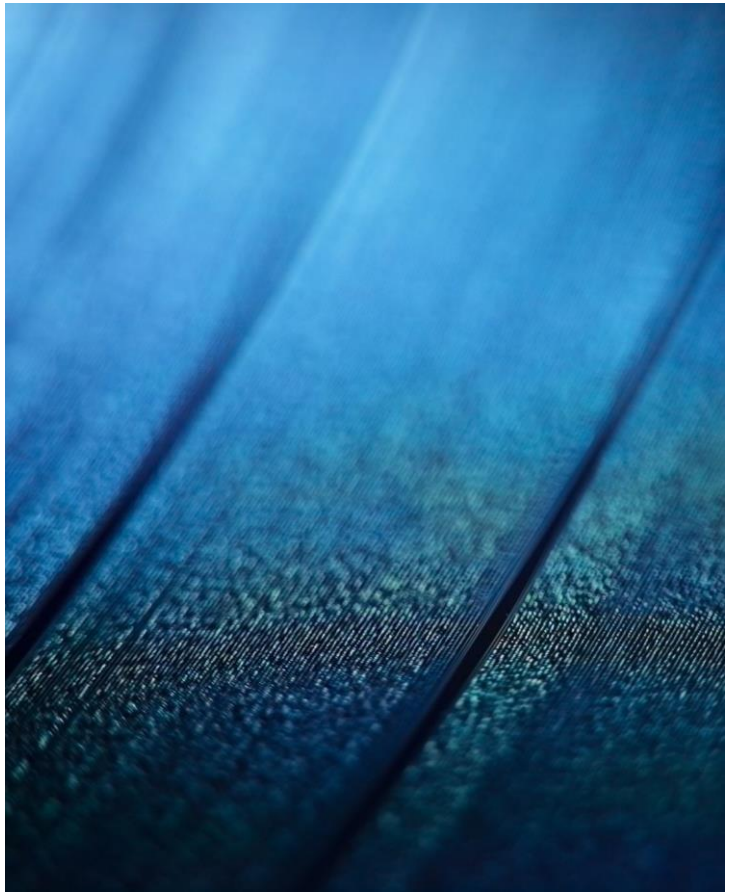
Technological lifecycle links market growth and technology.

By plotting the market volume over time for any industry, one can identify the changes in the industry.

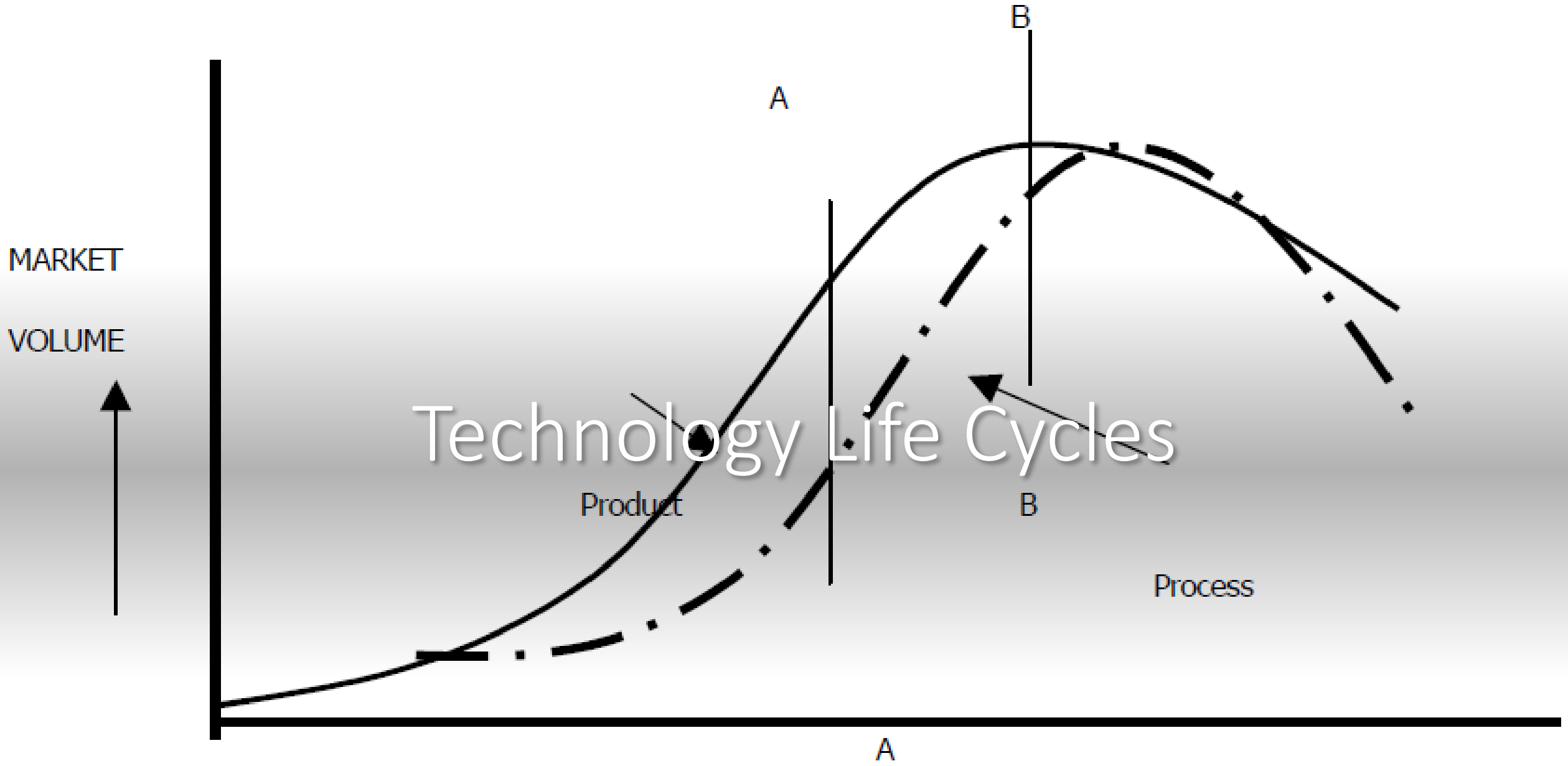
This is called technological aging of the industry.

This exercise can be carried out both for the product as well as the process.

When a new industry based on new technology is begun, there will come a point in time that one can mark as the inception point of the technology.



Technology Life Cycles



Technology life cycles

1. Technology Development
2. Applications Launch
3. Applications Growth
4. Mature Technology
5. Run Out of Innovations

Technology Life Cycles: example

In 1887, Gottlieb Daimler manufactured the first gasoline-powered automobile. In 1909 there were 69 auto-manufacturing firms in USA. Only half the firms survived by 1916.

Phase I: Technology Development

1. Then the first technological phase begins with the rapid development of the new technology. This phase is called the Technology Development phase. In the case of the automobile, it would be from 1887 to 1902, as experiments with steam, electric and gasoline powered vehicles were conducted.

2. This is an exciting time, because product improvements continue and improved processes for producing cheaper, better products are innovated.

3. This is the time of eliminating weak competitors.

Technology Life Cycles: example

Phase II: Applications Launch

- This phase is the creative period of product experimentation.
- It lasts till the time a standard design has been worked out and rapid growth of the market begins. This occurred with Ford's Model T design.
- During this phase, failure rate of firms in the industry continues to be high, but successful firms grow. Corporate R & D becomes important to maintain incremental model improvements.
- For example, by 1923 only eight major American firms had remained in the automobile industry, capturing 99 per cent of the market.

Technology Life Cycles: example

Phase III: Applications Growth

1. During this phase there is a rapid growth in the penetration of technology into markets.

2. After some time, however, the innovation rate slows down and the market peaks; no new markets are created.

Technology Life Cycles: example

Phase IV: Mature Technology

1. In this phase, process innovations are dominant.

2. Very few firms survive, of the original lot.

3. Competition is primarily on price and segmented market lines.

4. Production is specialized and efficient.

5. Economies of scale and marketing dominance continue to whittle down competitors, to the final few.

Example: By 1965, only General Motors, Ford, Chrysler, and American Motors had survived in the American automobile industry.

Technology Life Cycles: example

- **Phase IV: Mature Technology**
  - A mature industry can continue indefinitely.
  - Competitors with more abundant resources, cheaper labor or subsidized capital can obtain a competitive advantage.
  - When market saturation is taking place, it is important to continue technological innovation to extend the product life and delay market saturation. Innovation succeeds in:
- 1. Creating succeeding generation products with significantly improved performance,
- 2. Creating multiple applications,
- 3. Lowering of price to facilitate ownership of multiple copies of the product for convenience

Technology Life Cycles: example

Phase V Final phase – Run out of Innovations

- Finally, competing or substituting technologies overrun the mature technology and the last phase is reached.
- At this stage, the industry has run out of significant innovation.
- Changes in demography, replacement and foreign markets now primarily determine the market size.

Reliability and standardization

Reliability

It serves as a measure of quality of the product and service design. The quality associated with a product often increases with the dependability of the product customer experience.

Example: Patients expect the hospitals to have competent staff. People expect mobile networks to be congestion free etc.

One of the emerging disciplines is Design for Reliability (DFR) that refers to the process of designing reliability into products:

- This process encompasses several tools and practices and describes the order of their deployment that an organization needs to have in place in order to drive reliability into their products.
- Typically, the first step in the DFR process is to set the system's reliability requirements. Reliability must be "designed in" to the system.
- During system design, the top-level reliability requirements are then allocated to subsystems by design engineers and reliability engineers working together.
- Reliability design begins with the development of a model using block diagrams and fault trees to provide a graphical means of evaluating the relationships between different parts of the system. These models incorporate predictions based on parts-count failure rates taken from historical data. While the predictions are often not accurate in an absolute sense, they are valuable to assess relative differences in design alternatives.

Reliability: design techniques

- **Redundancy**: one of the most important. If one part of the system fails, there is an alternate success path, such as a backup system to be used in case part of a system fails. Redundancy significantly increases system reliability and is often the only viable means of doing so. However, redundancy is difficult and expensive, and is therefore limited to critical parts of the system.

  Example: An automobile brake light might use two light bulbs. If one bulb fails, the brake light still operates using the other bulb.

- **Physics of failure**, relies on understanding the physical processes of stress, strength and failure at a very detailed level. Then the material or component can be re-designed to reduce the probability of failure.

- **Component de-rating**, common design technique: Selecting components whose tolerance significantly exceeds the expected stress, as using a heavier gauge wire that exceeds the normal specification for the expected electrical current.

Standardization

Eli Whitney's use of standard parts enabled his firm to gain a competitive advantage in its bid for an army rifle contract. Henry Ford's assembly lines were made possible by improved manufacturing processes that allowed unskilled workers to quickly attach standard parts to standard cars.

Standard end products enable manufacturers to use 'make to stock' market orientations, thereby dissociating manufacturing decisions from market transactions.

Standardization

Standardization of products and manufacturing inputs can also help a firm to achieve:

1. Lower Product Costs: Economies of scale occur when product design costs are spread over a large volume. Very often, a standard component in a product provides the same functionality without paying for new engineering work and customization. Standardized products often justify investments in more efficient production processes. Higher volume production systems often allow the process to use less skilled employees. However, such standardized parts often result in reduced flexibility.

2. Quicker Product Design: Standardized product interfaces often reduce product design periods as has been demonstrated in personal computer designs. Manufacturers have benefited by industry standards that define the protocol that must exist between each module.

3. Enhanced Product Flexibility Capabilities: Standardized features that use standard interfaces permit designers to enhance its offerings without risking incompatibility as long as they stay within the specified parameters.

4. Delivery: Standard products may create economies of scale in transportation. Inventories of standard products can also be placed at sites near customers to facilitate a rapid response to any order, often providing a competitive advantage with time-conscious customers.

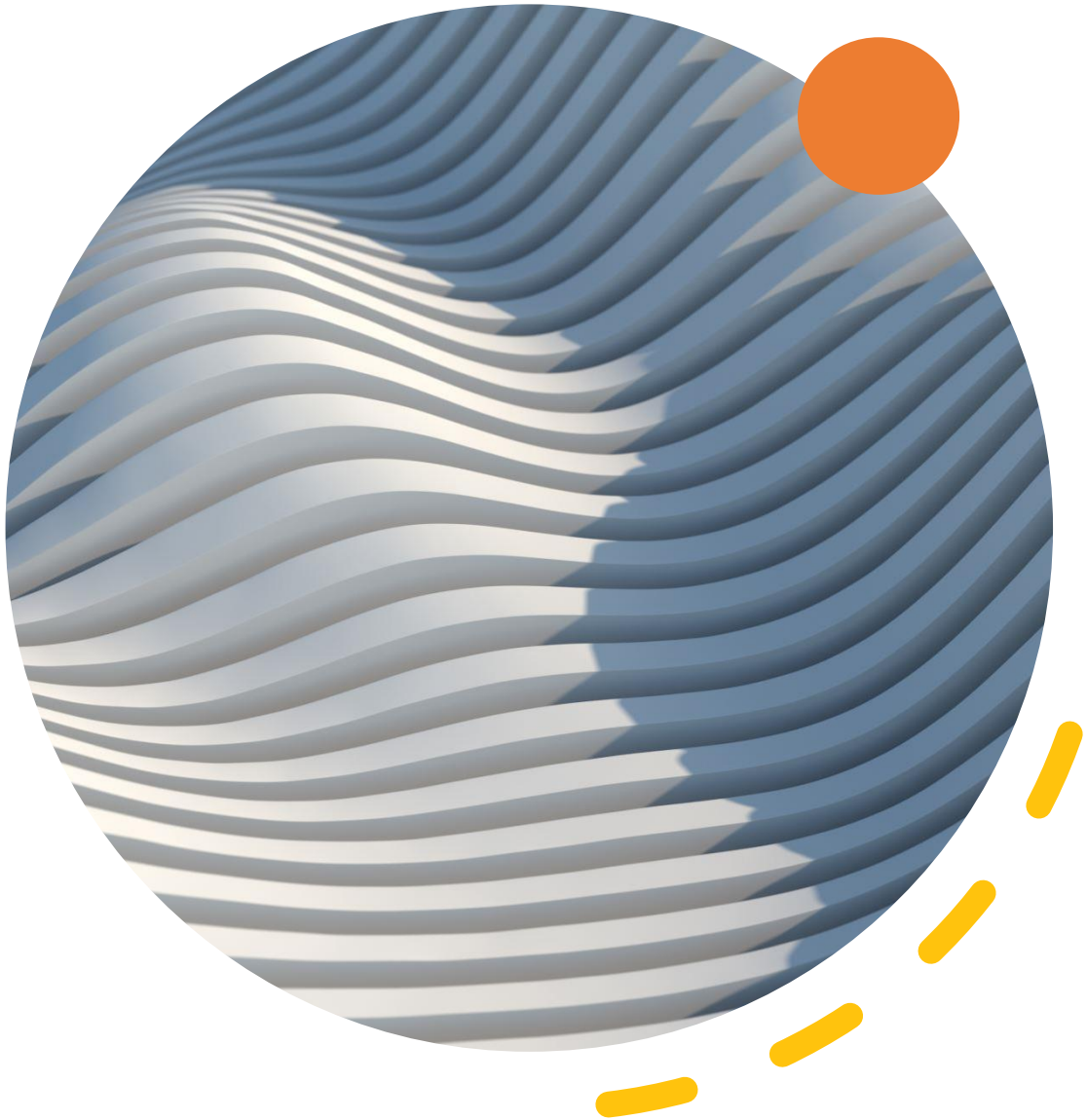
5. Simplified Value Comparisons: Standardized goods help consumers to shop for the best price or product performance. People can easily compare the cost of a 60-watt Philips bulb with a Laxman & Sylvania bulb. It also provides consumer protection as the performance standards are often regulated.

Standardization

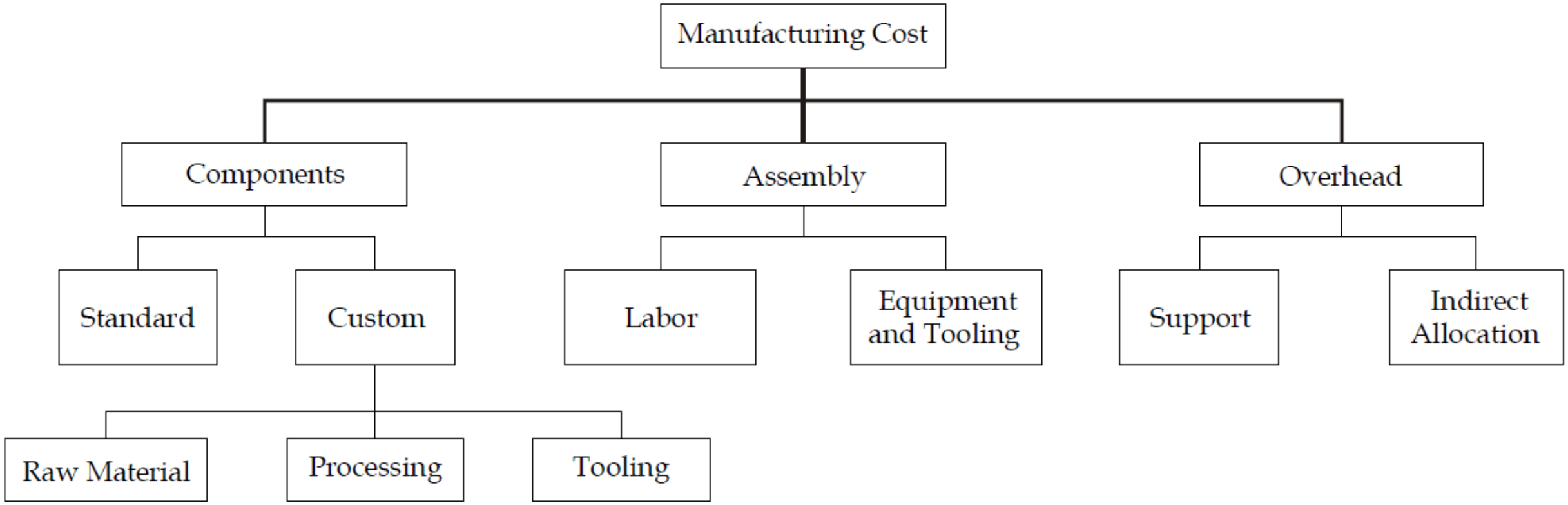
Though the points mentioned below are applicable to all designs, they are especially important in designing products using standard parts. Standard components require little or no tooling and processing.

However, in such products it is essential to ensure and take extra care so that the product:

- 1. Functions to perform as intended;
- 2. Reliability is ensured so that the product will perform consistently;
- 3. Is maintainable so that maintenance is economical;
- 4. Is safe so that it will perform with minimal hazard to the user and the environment; and
- 5. Production process is simple, so the product can be produced at the intended costs and volumes.



Standardization



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