



PRODUCT DESIGN

Reference Text:

- William Stevenson, Operations Management —13th ed., McGraw Hill Education, NY
 - *Chapter-4: Product and Service Design*
- Chase, Shanker and Jacobs, Operations and Supply Chain Management, 15th Ed. Tata McGraw Hills.
 - *Chapter 3: Design of Products and Services*
- The Elements of Value, E. Alamquist, J. Senior and N Bloch, 2016, Harvard Business Review

What is a Product ?

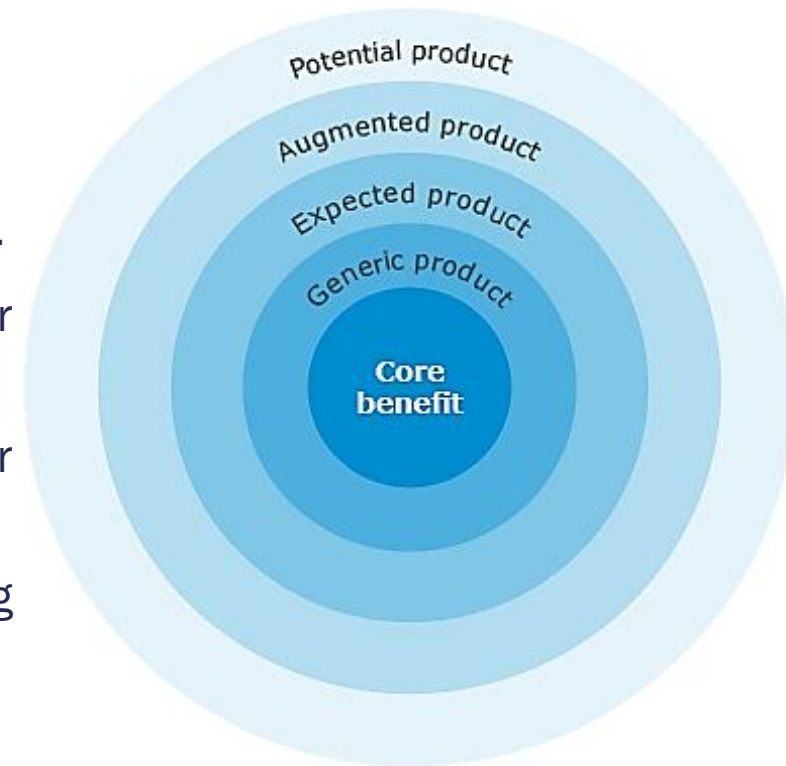
- Anything that can be offered to the market to satisfy a 'need' or 'want'.
 - *E.g., cereals, beverages, furniture, automobile, events, experiences, place & property, organizations, information, systems, ideas etc.*

Need:	A basic requirement for survival (e.g. physiological needs).
Want:	A specific requirement or desire of products to satisfy a need.
Demand:	A set of wants or desire plus the ability to pay for the product.

Product Levels:

Five Product levels given by Philip Kotler

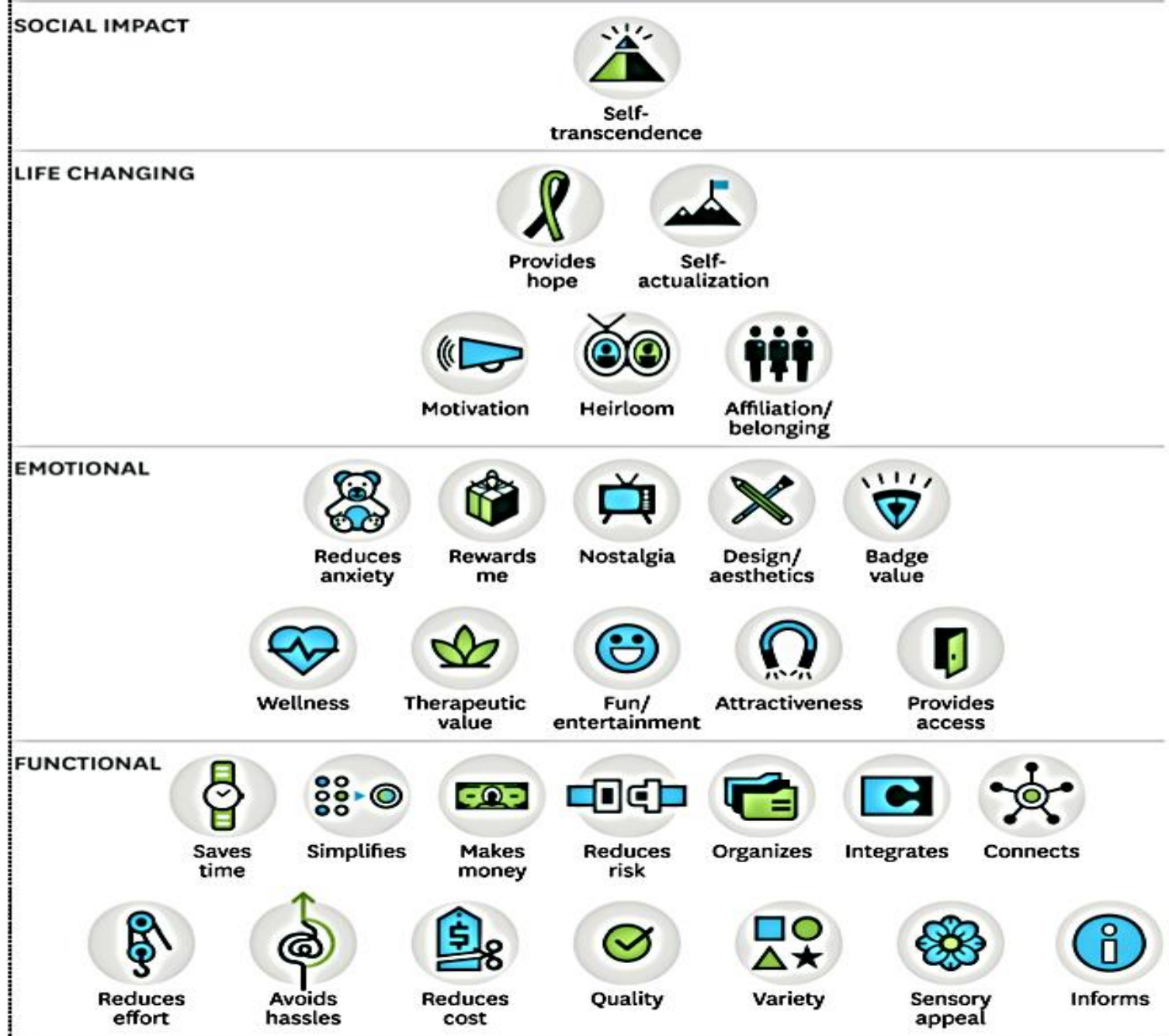
- **Core Benefits:** The Fundamental Requirement
- **Generic Product:** Absolutely basic attributes of a product to make it work.
- **Expected Outcome:** Product Attributes tailored to specific customer needs.
- **Augmented Product:** Product Attributes tailored to specific customer needs and differentiated from competitors.
- **Potential Product:** Augmentations required for future to satisfy emerging needs of the market.



The Elements of Value

(in Goods & Services)

- Functional Value
- Emotional Value
- Life Changing Value
- Social Impact
- ...Environmental Impact..



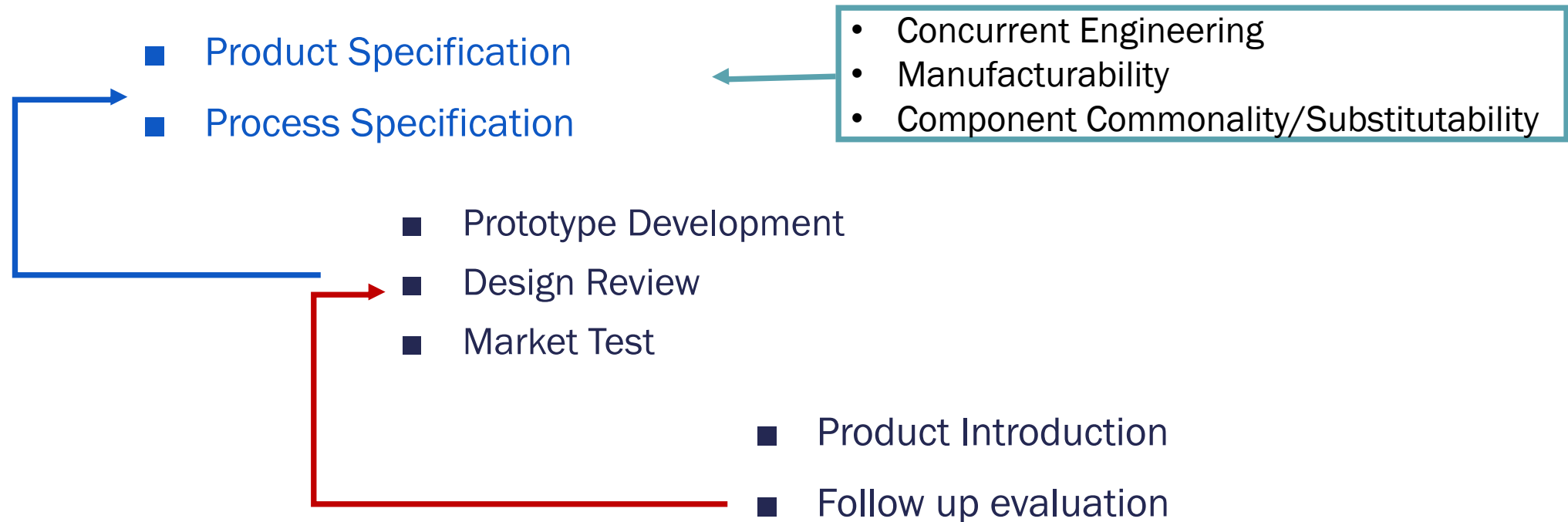
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FROM "THE ELEMENTS OF VALUE," SEPTEMBER 2016

<https://hbr.org/2016/09/the-elements-of-value>

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Phases in Product Design and Development

- Feasibility Analysis (demand, capacity, quality & cost)



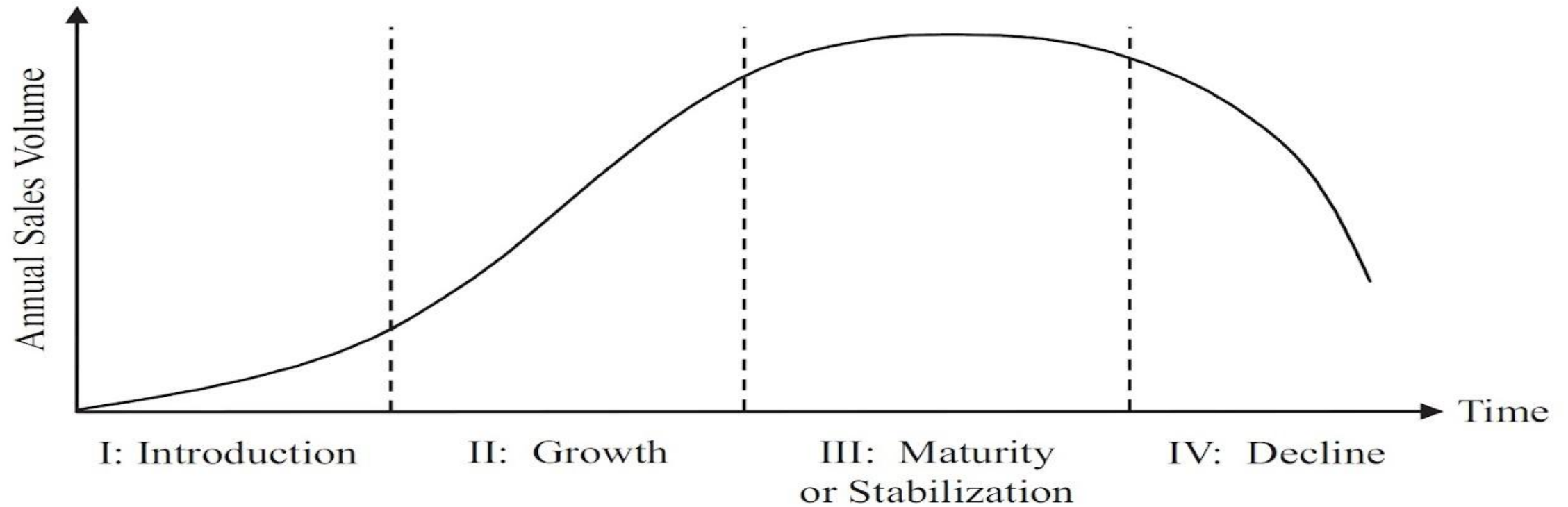
Idea generation

- Market Research
- R&D/Innovation
- Reverse Engineering

Key Considerations for a product design:

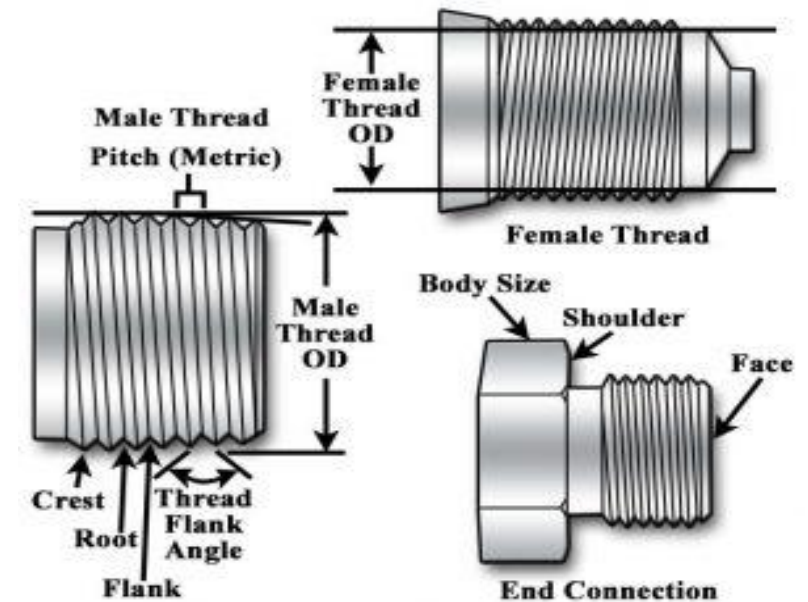
1. Norms of sustainability
 - *Cradle to Grave Assessment*
 - *End of Life Program*
 - *3Rs: Reduce, Reuse and Recycle*
2. Legal and ethical concerns (product liability)
3. Cultural factors
4. Product Lifecycle (PLC)
5. Degree of standardization
6. Mass customization
7. Reliability
8. Robustness

Product Lifecycle: Design Considerations ?



Design for Standardization

- Standardization: A way of introducing technical standards with the consensus of multiple stakeholders in a given Industry.
- Standardization helps:
 - *Uniformity of procedures*
 - *Interchangeability of parts/components*
 - *Scalability; Mass Production*
 - *Compatibility (or components across different assemblies)*
 - *Efficiency ; Less time to market*
 - *Product with shorter lifecycle*



- STANDARD DIMENSIONS
- STANDARD MATERIAL
- STANDARD MANUFACTURING PROCESS

Mass Customization

A strategy to allow consumer to co-design products that fit their individual needs by using different design and style options. Customers are provided with a basic (standardized) product and a range of (modular) features that they can add or subtract to get a unique product of individual need at the same price.

Example:

- *Netflix customized recommendation*
- *Assembled products*
- *ERP systems etc.*

Implementation:

- Delayed Differentiation
- Modular Design

Modular Design of a software system

