

# MANUFACTURING PROCESSES (SME 2713 )

## *Introduction 4*

Dept. of Materials, Manufacturing and Industrial Engineering,  
Faculty of Mechanical Engineering,  
Universiti Teknologi Malaysia

## Basic stages in Manufacturing

1. Product research and development
2. Production planning and tooling
3. Manufacturing (production)
4. Marketing & sales

# 1. Basic Stages in Manufacturing

## Stage 1 : Product Research and development – Product design

*Entails developing the product concept into a physical product in order to ensure that the product idea can be turned into a workable product.*

- Generating product idea
- Conceptualizing the idea and defining the problem
- Back ground research on the idea
  - Patent search
  - Consumer research and market research
  - Feasibility studies and preliminary cost estimates

# Stage 1 : Product Research and development – Product design

- Think of a **PRODUCT.....that appeals to you.....**
  - Does it appeal because it looks good?
  - Helps you do something not possible before?
  - Is fantastic value for money?
  - Improves your quality of life?

# Methods of Generating Ideas

## 1. Direct search

- To effectively tap external idea sources, information collection of what's out there

## 2. Exploratory consumer studies

- Observing how people use the product already
- Activity & product analysis – what problems do the consumers have can they be solved with new or improved products?

# Methods of Generating Ideas

3. Technology information forecasting
  - Careful projection and monitoring of trends in all environments.
4. Consumer engineering
  - Look at consumer markets and match engineering to meet the needs of a particular market segment.
5. Creative group method/brainstorming
  - Encourage individuals to draw upon their personal knowledge, to develop creative solution
6. New product idea stages
  - Concept, prototype, product.

# Idea Sources

- Market needs and user solutions
  - Marketing, sales persons
- Technological developments
  - Can present new opportunities to meet consumer need
- Improvements in engineering and production
  - Often as a result of R & D

# Idea Sources

- Inventions and patents
- Competitors actions and other firms
- Management & employees.



# What is a Concept

- A concept is
  - Something conceived in the mind
  - An abstract or generic idea generalized from particular instances
- A design concept is an approximate description of the technology, working principles and form of the product.
- Concept can be represented in
  - A rough sketch, or flow diagram
  - A set of calculations
  - A prototype
  - Textual descriptions

# Problem Clarification

- Collect customer needs
- Establish
  - Requirements
  - Objectives – an objective is a desired feature or characteristic of the designed system or artefact
  - Constraints – a constraint is a mandatory requirement (mandatory objective) to be fulfilled

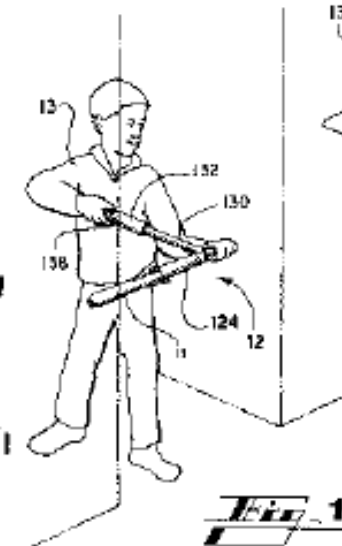
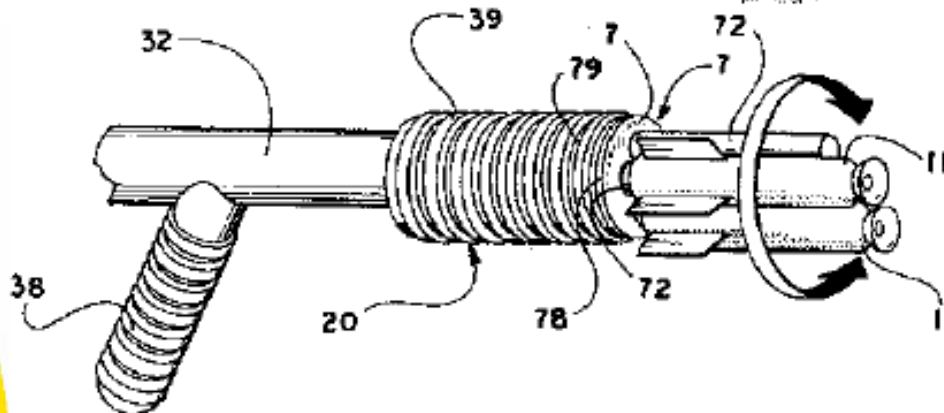
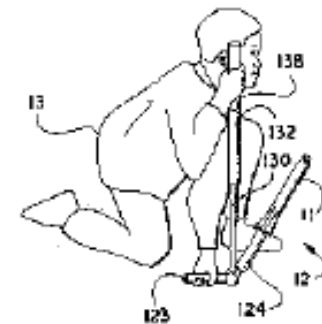
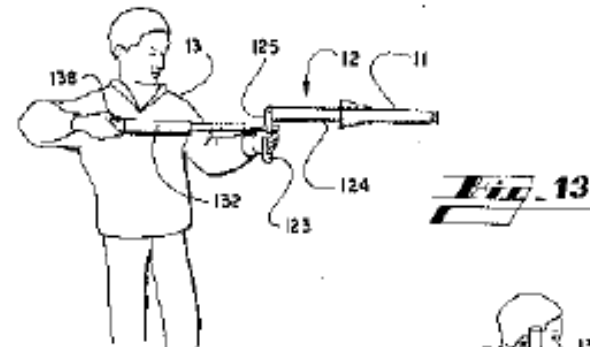
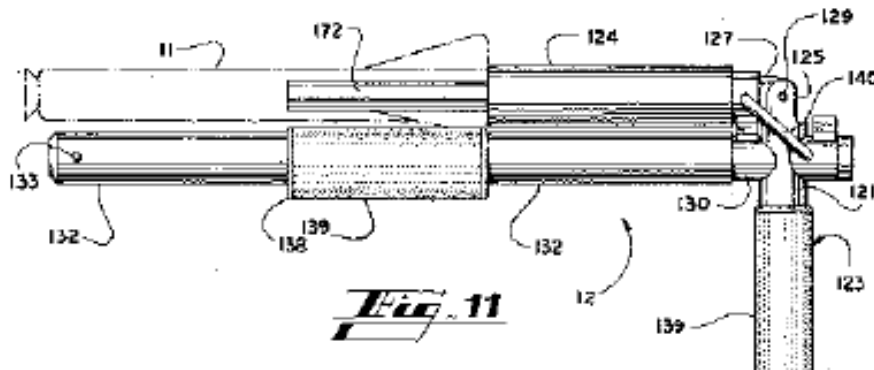
# Patent Search

- Intellectual property
  - Any patents, trademarks, copyrights, or trade secrets held by the entrepreneur
- Patents
  - Once product is designed, patent it!!
- Disclosure document
  - Statement by inventor disclosing intent to patent idea
- The patent application
- Registering the trademark

# Example of patent search

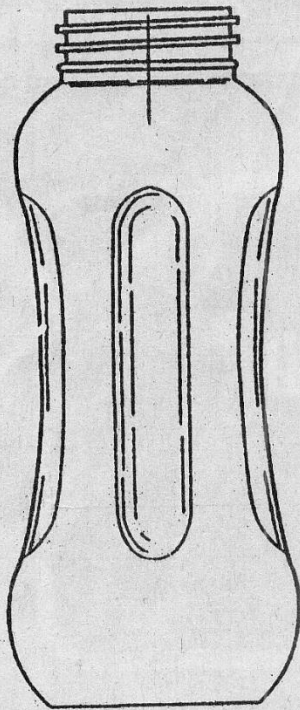
Keywords: **toy** and **projectile**

187 patents found

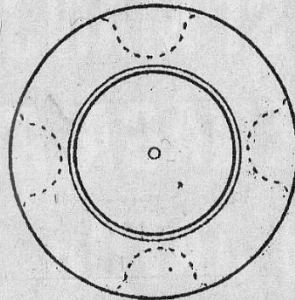


# NOTIS AMARAN

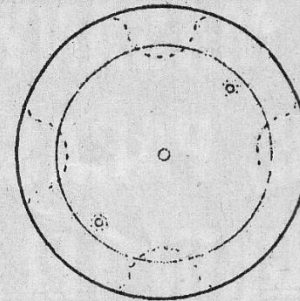
13/12/98  
BM



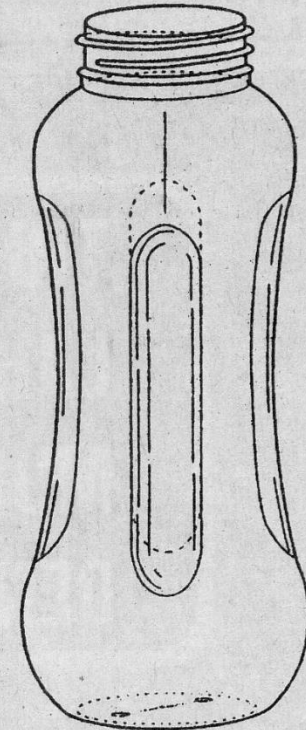
A. Pandangan dari Sisi



B. Pandangan dari Atas



C. Pandangan dari Bawah



D. Pandangan Perspektif

**NOTIS** kini diberi kepada perdagangan dan orang awam bahawa **TAKASO RUBBER PRODUCTS SDN. BHD.** (No. Sykt: 87327-V) dari No. 4 & 5, Lorong Jelawat (2), Taman Sungai Abong, 84000 Muar, Johor, Malaysia adalah pemilik berdaftar hakcipta bagi rekabentuk **Botol Susu 'Easy Grip'** sebagaimana yang tertera di dalam gambarajah di atas. Hakcipta untuk rekabentuk itu telah didaftarkan di bawah peruntukan Akta Rekabentuk Berdaftar 1949 di United Kingdom dan mempunyai Sijil Berdaftar Nombor 2071334.

# Consumer & Market Research

- Market definition - Who will buy your product?
  - How many potential customers are there?
  - What are their characteristics?
  - How do you know what they want?
  - How well does your product fit the needs?
  - Why do they want your product?
  - What are they prepared to pay?

# Merc isn't housewife's choice

**U-TURN:** It's back to the drawing board for designers of the new too-mini Merc



## Importance of Market Research

By **DAVID WILLIAMS**  
Motoring Correspondent

**MERCEDES** has been forced into a multi-million-pound rethink after housewives gave its radical new town car the red-light.

The perfectionist German firm's top designers spent years creating the family car of the future.

But mothers invited to try it took only a few minutes to find a vital flaw. The boot was too small to carry a pushchair.

Men in the test were equally

## Baby car too small to carry a pushchair or set of golf clubs

was too compact to hold a set of golf clubs. The first-ever mini-Merc was originally shown as a concept vehicle at motor shows where it attracted admiring attention.

Then the company decided to invite likely buyers to take a closer look at their new baby at "cus-

countries. Yesterday Mercedes admitted it was back to the drawing board after one of the main target groups — women customers — revealed serious reservations.

"Reaction was generally very good, but housewives said the boot should be larger because it could

a spokesman. "Golfers told us the same story with their golf clubs.

"Now we've stretched the design by three inches to overcome the problem." Barring any more unforeseen hitches the as yet unnamed five-door car will be on sale in about two years.

■ German and Japanese cars have overtaken British in a new popularity league table.

Just 13 per cent of British buyers now believe that home-built cars are best.

German cars get 54 per cent of

After two years





# Avoid Mismatch

- Product development

*How successful?*



Conceived by R&D



Planned by Marketing



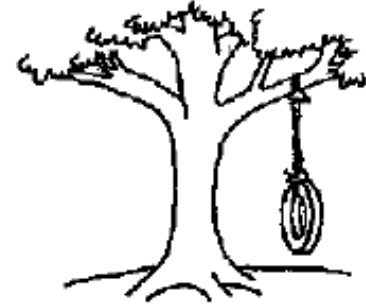
Designed by Engineering



Built by Manufacturing



Installed

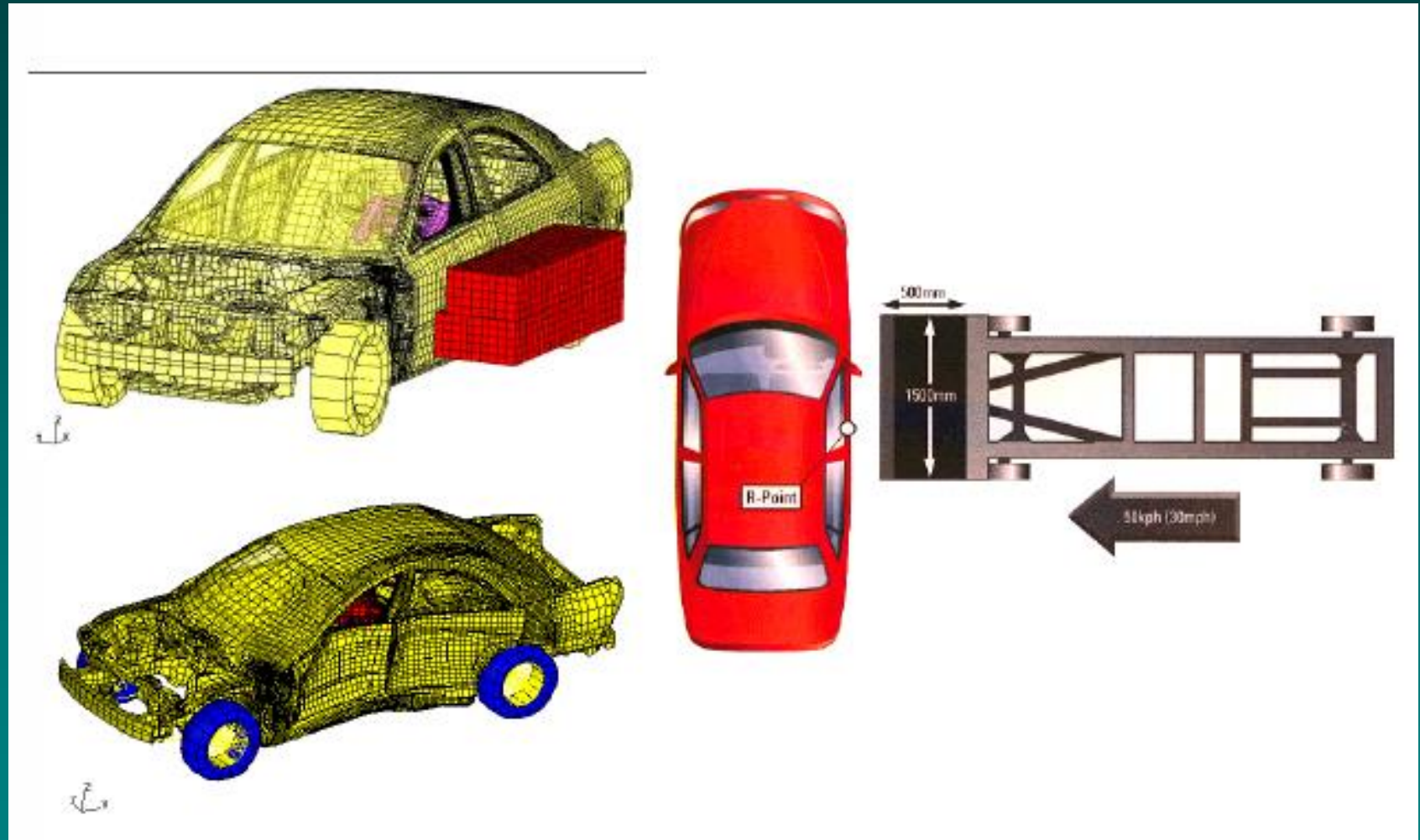


What the customer wanted

# 1. Basic Stages in Manufacturing

- Approval of product idea
  - Preliminary designs
  - Preliminary drawings
  - Construction of first prototype or model
  - Testing of prototype
  - Revising prototype
  - Final testing and approval of prototype
  - Completion of production (working drawings)
- Approval of final prototype for production
  - Patent application
  - Release of production drawings

# Vehicle Crashworthiness design



# Vehicle crash tests



# Product Quality problem



# Product quality problem



# Product quality problem





**DEMI KESELAMATAN... Toyota Motor Corp menarik semula 43,600 unit kenderaannya.**

## Toyota tarik balik 43,600 unit dari seluruh dunia

TOYOTA Motor Corp baru-baru ini berkata, ia akan menarik semula 43,600 unit kenderaannya membabitkan tiga modelnya berikutan kerosakan pada sistem kawalan kestabilannya.

Kereta terbabit ialah 27,000 unit model Aristo, Caldina dan Granvia yang dijual di Jepun dan 16,600 unit model Aristo di luar negara, kata jurucakap syarikat itu.

Aristo dijual di Amerika Syarikat dan Kanada sebagai model Lexus 300GS.

Ketiga-tiga model kereta yang terbabit dalam penarikan semula itu dikeluarkan di antara Ogos, 1997 dan Februari, 1998.

Sebanyak 15,000 unit kereta Aristo dijual di Amerika dengan menggunakan nama jenama Lexus, manakala 1,000 unit lagi di Britain dan 600 unit di Kanada, katanya. – AFP



# 1. Basic Stages in Manufacturing

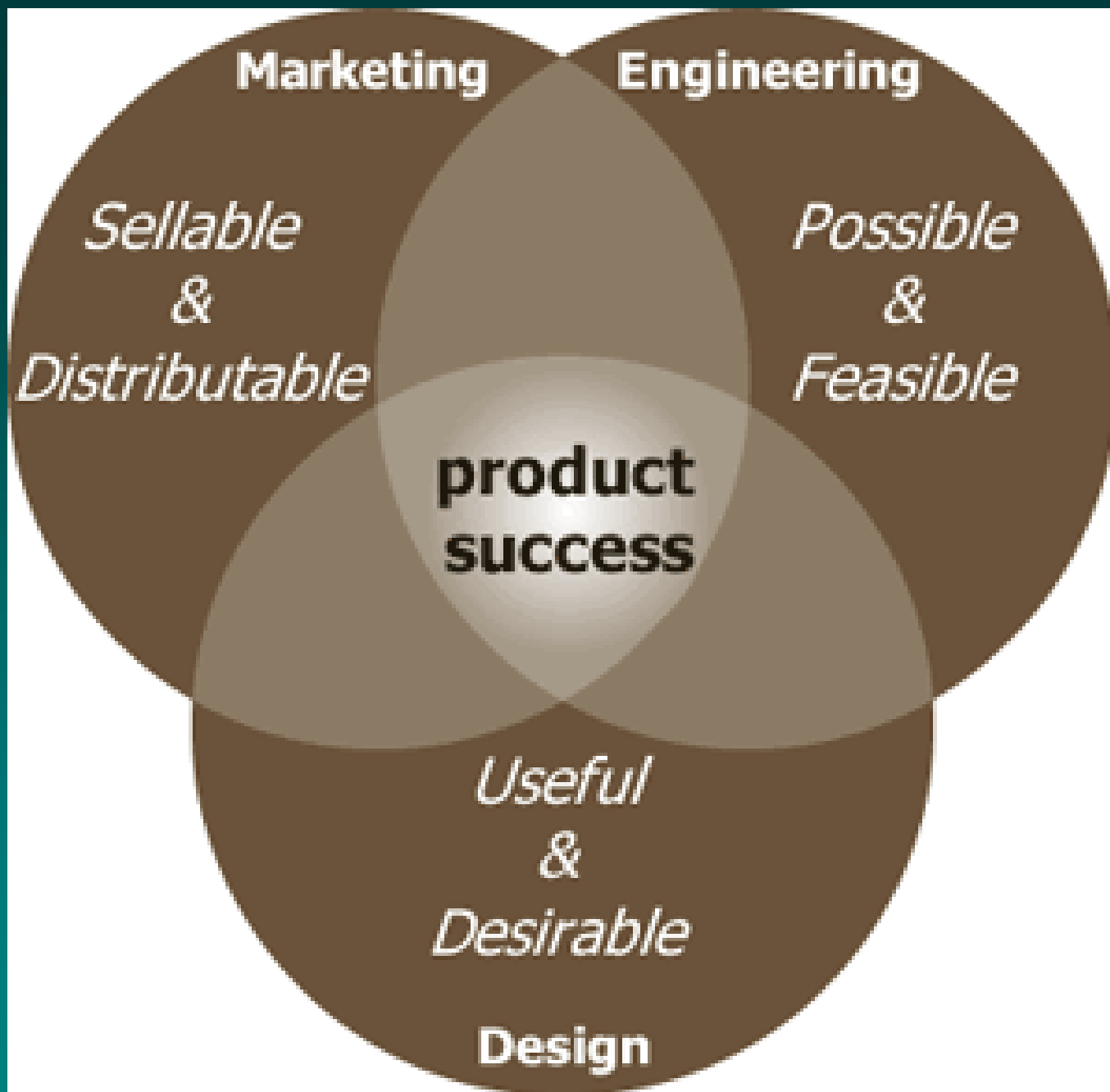
- Stage 2 : Production Planning & Tooling
  - Production planning
    - Cost estimates
    - Routing & scheduling
  - Material planning
    - Specifications
    - Acquisitions
  - Tooling planning
    - Selection
    - Construction

# 1. Basic Stages in Manufacturing

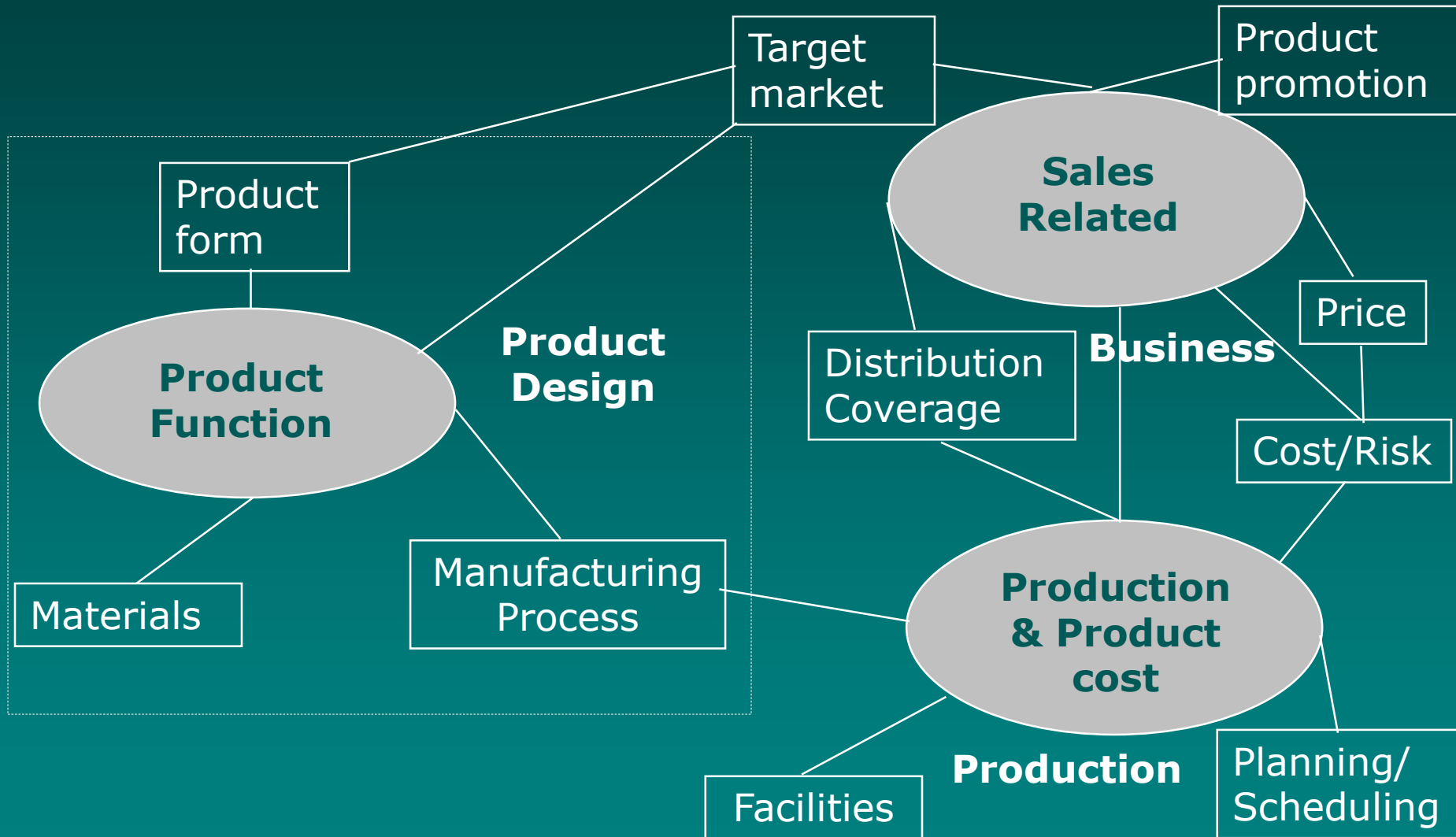
- Facilities planning
  - Installing
  - Layout
  - Material handling
- Manpower planning
  - Hiring
  - Training
  - Retraining

# 1. Basic Stages in Manufacturing

- Stage 3 : Manufacturing (Production)
  - Initial pilot run
  - Make necessary changes
  - Full production schedule
- Stage 4 : Marketing & Sales
  - Advertizing
  - Warehousing
  - Transportation
  - Sales



# Factors influencing Success or Failure of a Product or System



# Question

**Explain the major activities at the production planning and control stage of product development**

*Terangkan aktiviti-aktiviti utama di peringkat perancangan dan kawalan pengeluaran bagi proses pembangunan produk.*