- Cost (advantage)

Quality is a major influence on customer satisfaction or dissatisfaction

➔ Quality reduces costs
➔ Quality increases dependability

➔ Speed reduces inventories
➔ Speeds reduces risks

➔ Dependability saves time
➔ Dependability saves money
➔ Dependability gives stability

➔ Agility: the ability to respond quickly and at low cost as market requirements change.
➔ Flexibility speeds up response
➔ Flexibility saves time
➔ Flexibility maintains dependability

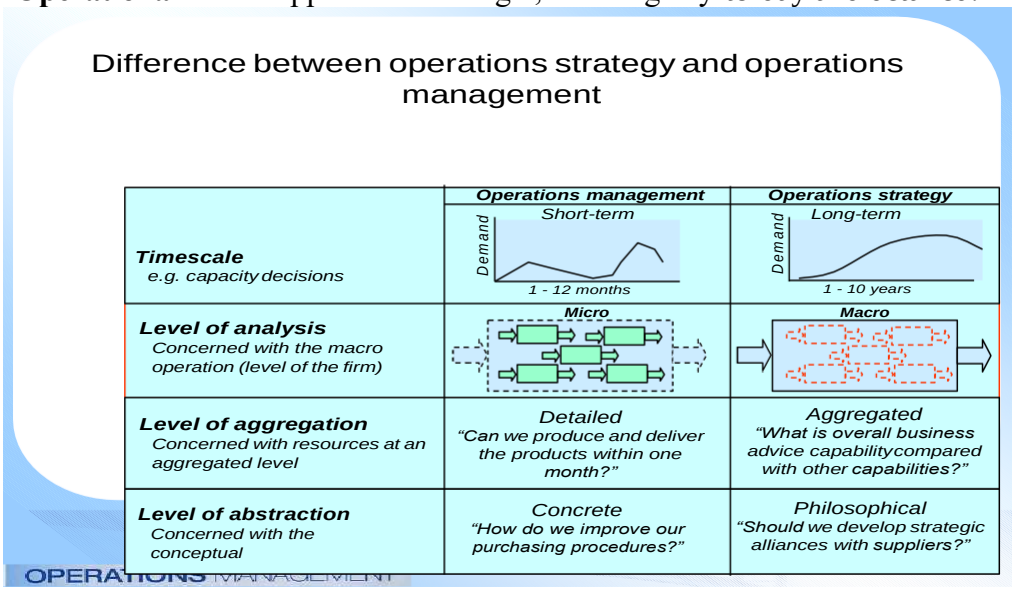
Productivity: Output from the operation/Input to the operation
Single factor productivity: Output from the operation/One input to the operation
Multi-factor productivity: Output from the operation/All inputs to the operation

➔ Improving productivity
➔ Cost reduction through internal effectiveness

Chapter 3: Operations strategy

Strategic decisions: Those which are widespread in their effect, define the position of the organization relative to its environment and move the organization closer to its long-term goals.

'**Operations**' are the resources that create products and services.
'**Operational**' is the opposite of strategic, meaning day-to-day and detailed.



- Businesses which see design as integral have developed new products and services in the last three years, compared with only a third of businesses overall.
- Effective users of design had financial performances 200% better than average.

What is designed in a product or service?
All products and services can be considered as having three aspects:

- A **concept**: Which is the understanding of the nature , use and value of the service or product;
- A **package**: of 'component' products and services that provide those benefits defined in the concept (core products and services, supporting products and services);
- The **process**: which defines the way in which the component products and services will be created and delivered.

''The design activity is one of the most important operations processes''

The stages of design:

- Concept generation: A stage in the product and service design process that formalizes the underlying idea behind a product or service.
- Screening
- Evaluation and improvement
- Prototyping and final design

Concept generation:

- Ideas from customers
- Listening to customers
- Ideas from competitor activity
- Ideas from staff

Ideas from research and development

Concept screening
Design criteria:

- Feasibility (can we do it?): The ability of an operation to produce a process, product or service.
- Acceptability (do we want to do it?): The attractiveness to the operation of a process, product or service.
- Vulnerability (do we want to take the risk?): The risks taken by the operation in adopting a process, product or service.

Design funnel: A model that depicts the design process as the progressive reduction of design options from many alternatives down to the final design.
Balancing evaluation with creativity: The systematic process of evaluation is important but it must be balanced by the need for design creativity. Creativity is important in product/service design.

Preliminary design:

- *Specifying the components of the package:*
  - Component (or product) structure: Diagram that shows the constituent component parts of a product or service package and the order in which the component parts are brought together (often called components structure)
- *Reducing design complexity*

    - Standardization: The degree to which processes, products or services are prevented from varying over time.
    - Commonality: The degree to which a range of products or services incorporate identical components (also called parts commonality)
    - Modularization: The use of standardized sub-components of a product or service that can be put together in different ways to create a high degree of variety.
- *Defining the process to create the package*

Design evaluation and improvement:

- *Quality function deployment*: A technique used to ensure that the eventual design of a product or service actually meets the needs of its customers (sometimes called house of quality). With *whats*: customer requirements and *hows*: design characteristics
- *Value engineering*: An approach to cost reduction in product design that examines the purpose of a product or service, its basic functions and its secondary functions.
- *Taguchi methods*: A design technique that uses design combinations to test the robustness of a design.

Prototyping and final design:

- *Virtual prototype*: A computer-based model of a product, process or service that can be tested for its characteristics before the actual process, product or service is produced.
- *Computer-aided design*: A system that provides the computer-ability to create and modify product, service or process drawings.

The benefits of interactive design:

- *Interactive design*: The idea that the design of products and services on one hand, and the processes that create them on the other, should be integrated.
- *Interactive design can shorten time to market*
- Simultaneous development:
    - Sequential approach to design
    - Simultaneous or concurrent approach to design
    - Simultaneous (or concurrent) engineering: Overlapping these stages in the design process so that one stage in the design activity can start before the preceding stage is finished, the intention being to shorten time to market and save design cost (also called simultaneous engineering or concurrent engineering).
- Early conflict resolution: Characterizing the design activity as a whole series of decisions is a useful way of thinking about design.
- Project-based organization structures: (spreek allemaal voor zich)

Chapter 6: Supply network design

The supply network perspective:

A supply network perspective means setting an operation in the context of all the other operations with which it interacts, some of which are its suppliers and it customers.

- **Supply network**: The network of supplier and customer operations that have relationships with an operation.

    - Flexibility
    - Cost
- *Operations resource evaluation:*
    - Constraints
    - Capabilities
- *Financial evaluation:*
    - Time value of money (NPV)

Chapter 9: Job design and work organization

What is job design?

Job design: The way in which we structure the content and environment of individual staff member's jobs within the workplace and the interface with the technology or facilities that they use.

- What are the environmental conditions of the workplace?
- What technology is available and how will it be used?
- What tasks are to be allocated to each person in the operation?
- What is the best method of performing each job?
- How long will it take and how many people will be needed?
- How do we maintain commitment?

Designing environmental conditions – ergonomics:

Ergonomics: A branch of job design that is primarily concerned with the physiological aspects of job design, with how the human body fits with process facilities and the environment; can also be referred to as human factors, or human factors engineering.

- There must be a fit between people and the jobs they do.
- It is important to take a 'scientific' approach to job design.
- *Ergonomic environmental design*
    - **Occupational health and safety** legislation.
        - Working temperature
        - Illumination levels
        - Noise levels
        - Ergonomics in the office

Designing the human interface – ergonomic workplace design:

- **Repetitive strain injury (RSI):** Damage to the body because of repetition of activities.
- *Anthropometric aspects:*
    - **Anthropometric data:** Data that relates to peoples' size, shape and other physical abilities, used in the design of jobs and physical facilities

Designing task allocation – the division of labour:

Division of labour: An approach to job design that involves dividing a task down into relatively small parts, each of which is accomplished by a single person.

- Advantages:
    - It promotes faster learning

Master production schedule (MPS): The important schedule that forms the main input to material requirements planning, it contains a statement of the volume and timing of the end products to be made.

- *Expansion:*
  Manufacturing resource planning (MRP II): An expansion of material requirements planning to include greater integration with information in other parts of the organization and often greater sophistication in scheduling calculations.
- *Collaborative commerce:*
  Web-integrated ERP: Enterprise resource planning that is extended to include the ERP type systems of other organizations such as customers and suppliers.

Materials requirements planning (MRP):

Demand management:

- Customer orders
- Forecast demand
- Combining orders and forecasts

Master production schedule:

- Sources of information for the MPS
  - Known orders
  - Key capacity constraints
  - Inventory levels
  - Spares demand
  - Safety stock requirements
  - Exhibition/promotion requirements
  - R&D demand
  - Sister plant demand
  - Forecast demand
- Chase or level master production schedules
- **Available to promise (ATP)**

The bill of materials:

- Levels of assembly

The 'shape' of the component structure:

- **Component structure (product structure) shape:** Diagram that shows the constituent component parts of a product or service package and the order in which the component parts are brought together (often called components structure)
  - A-shape product structures: the business has only a limited product range to offer the customer.
  - T-shape product structures: Operations that have a small number of raw materials but which produce a very wide range of highly customized end products.
  - V-shape product structures: Similar to T-shape, but less standardization.
  - X-shape product structures: Some product designs consist of a small number of standard modules. These standard modules are represented by the cross of the X. They are combined with a customized selection of features and options, giving a wide range of finished products. Automotive manufacturers typically use this X-shape product structure. The same chassis assemblies, transmission assemblies, braking systems and engines are often used on a wide range of vehicles.