

# Introduction to Management

University of Cassino and Southern Lazio  
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A.A. 2020/2021



Expertise

Stability

## Production

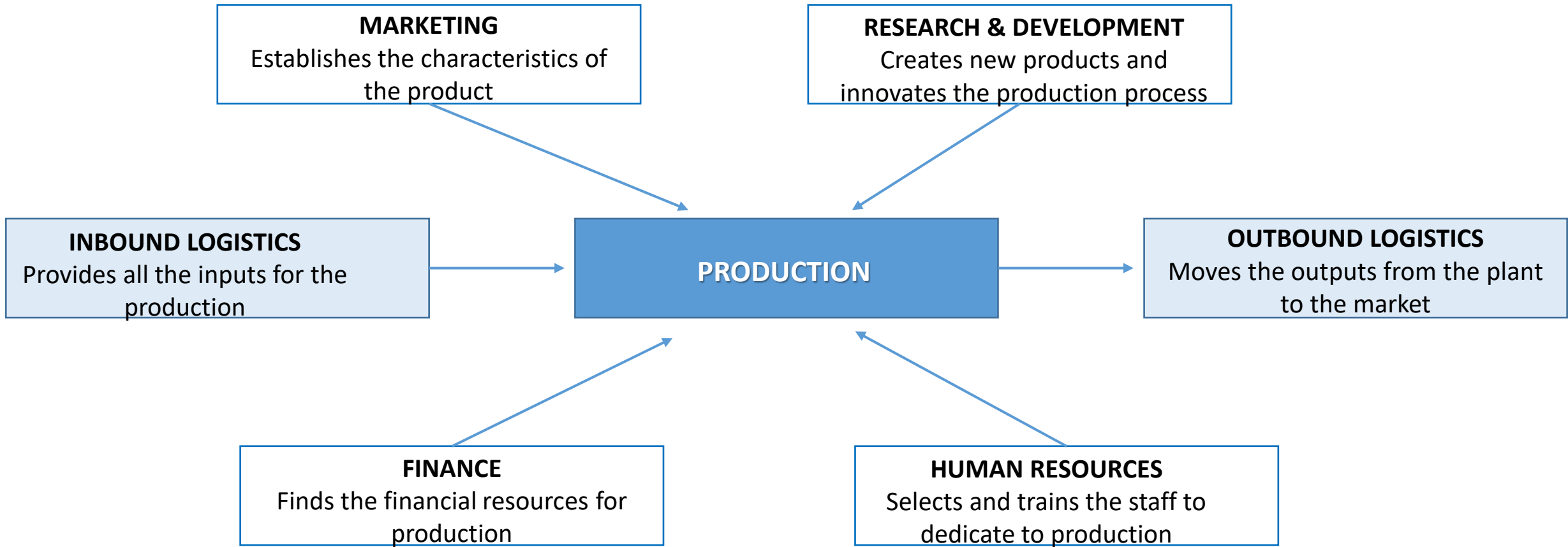


# Production Function

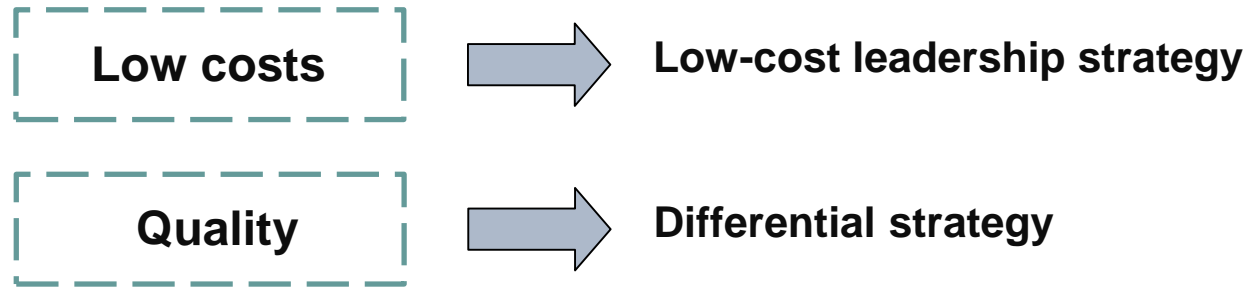
The Production Function concerns the process of transformation of assets, that is the set of operations by which the resources purchased (inputs) are turned into finished products (outputs) to be placed in the market

The Production Cycle is at the center of the Management process, as it is preceded by the procurement phase, followed by the distribution and sales phases and continuously related with marketing strategies, with the financial function, with the Human Resources management and with the Research and Development activities of the Company.

# Production Function



# Production and competitive strategy



**The production strategy must be centered on the priority aspects of the competitive strategy, to ensure the best contribution to the creation of competitive advantage**

# Curve of the Product Life Cycle



# Categories of new product adopters

**Innovators** are the first customers to try a new product. They are, by nature, risk takers and are excited by the possibilities of new ideas and new ways of doing things.

Innovators will often have some connection to the scientific discipline in which a new product is generated from and will tend to socialize with other innovators in their chosen product categories.

Innovators are comfortable with the risks that they take. They are aware that some products that they adopt will not deliver the benefits that are promised.

**Early adopters** are the second phase of product purchasers following innovators. They tend to be the most influential people within any market space and they will often have a degree of “thought leadership” for other potential adopters. They may be very active in social media and often create reviews and other materials around new products that they strongly like or dislike.

Early adopters will normally have a high social status (which in turn enables thought leadership), reasonable access to finances (beyond those of later adopters), high levels of education and a reasonable approach to risk. However, they do not take as many risks as innovators and tend to make more reasoned decisions. They will try to obtain more information than an innovator in this decision making process.

# Categories of new product adopters

**Majority customers** They buy the product when it begins to have mass market appeal. This class of adopter is risk averse and wants to be sure that their, often more limited, resources are spent wisely on products. They are however, generally, people with better than average social status and while not thought leaders in their own right – they will often be in contact with thought leaders and use their opinions when making the adoption decisions.

**Latecomers** are the last to arrive at the adoption of the product and their arrival is typically a sign that a product is entering decline. Latecomers value traditional methods of doing things and are highly averse to change and risk. Typically they will have low socio-economic status and rarely seek opinions outside of their own limited social set. However, in many cases, Latecomers are older people who are less familiar with technology than younger generations and in these cases they may still have a mid-level of socio-economic status.

# Production chain, final product and finished product

Production chain = It is the group of companies that participate in the transformation of a series of materials into final products, contributing to the creation of a good to be delivered to the consumers or to industrial users.



**Finished  
product**

It is the output of a company's processing cycle. It requires further transformations in order to be sold to the final market. For example, it could be a semi-component that another company will use to produce its final asset.

It does not require further processing to be destined for a particular use and be sold to the final consumer.

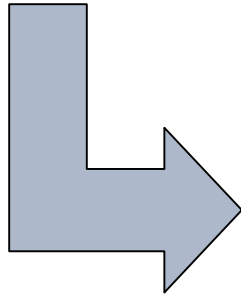


**Final product**



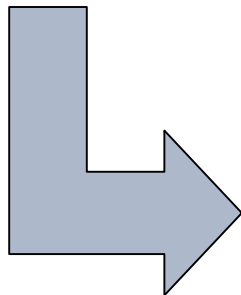
# Outsourcing e delocalization

## Outsourcing



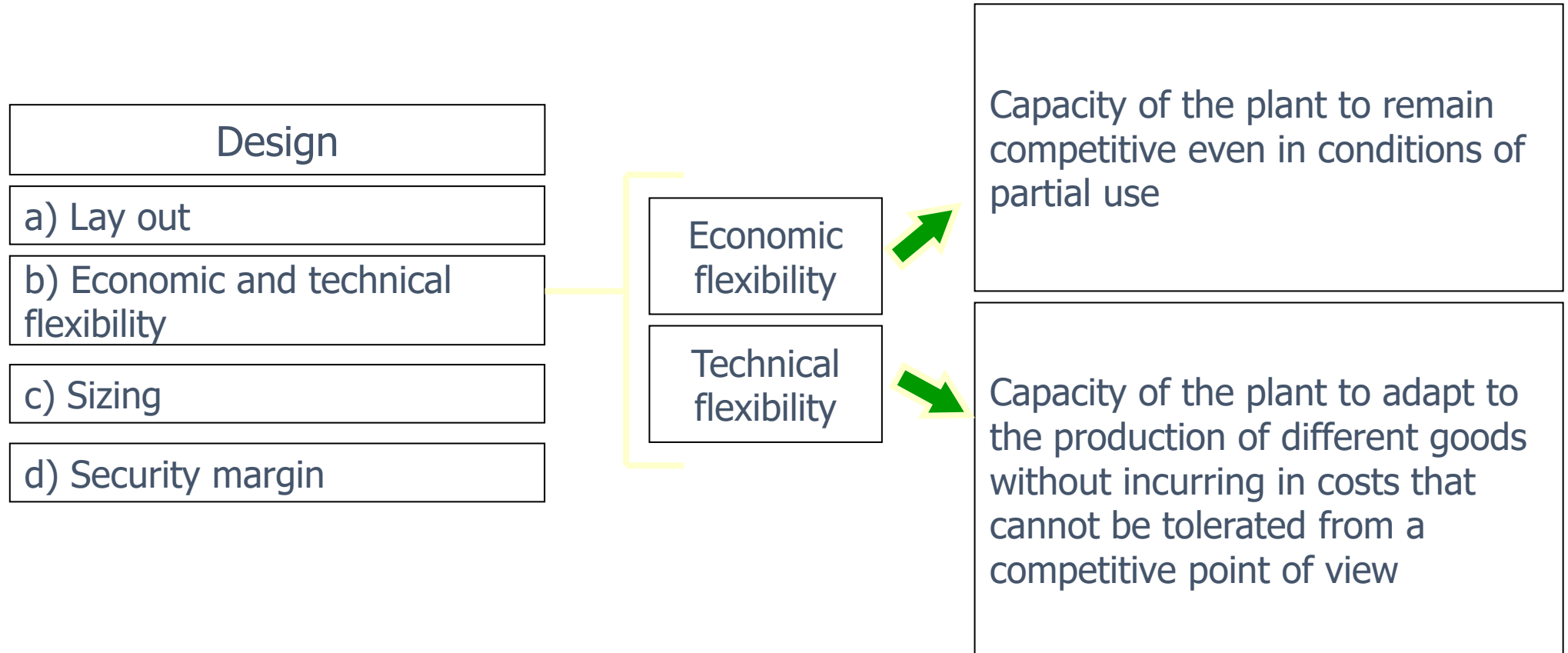
abbreviation of outside resourcing, indicates the process by which a company (outsourcee) entrusts an external supplier (outsourcer) with the operational management of one or more phases of the production process.

## Delocalization



delocalization of the production process or some phases of it in another country in order to save costs such as the labour costs.

# Production plant



# Lay-out

The layout is the arrangement of building structures, machinery, equipment and workstations inside the factory, in order to optimize the 4 M (Men, Materials, Machines, Money)

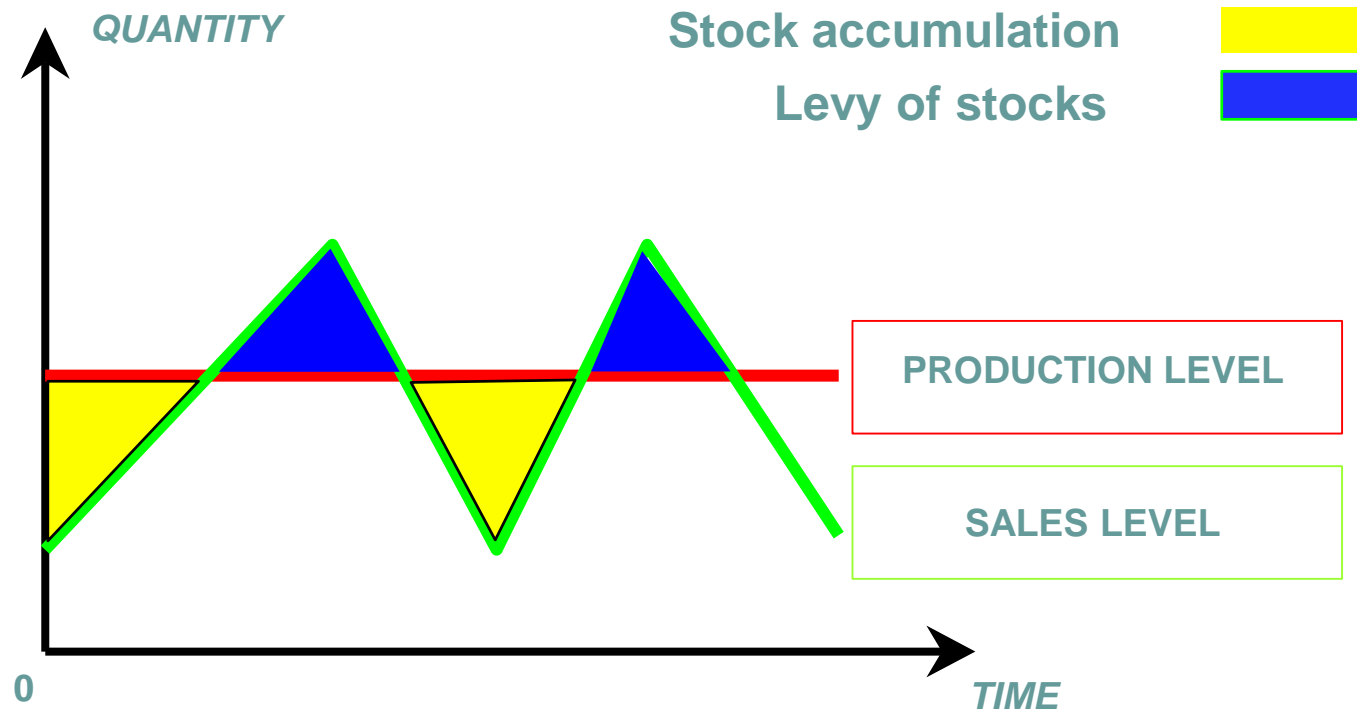
| Layout types       |        | Main features   |
|--------------------|--------|---|
| Functional         | -----> | <i>Machines grouped by production processes</i>         |
| By product         | -----> | <i>Machines grouped by processed products</i>           |
| At fixed locations | -----> | <i>Machines moved around the product</i>                |
| In cells           | -----> | <i>Machines grouped by groups of processed products</i> |

# Sizing of the plant

The main sizing choices are:

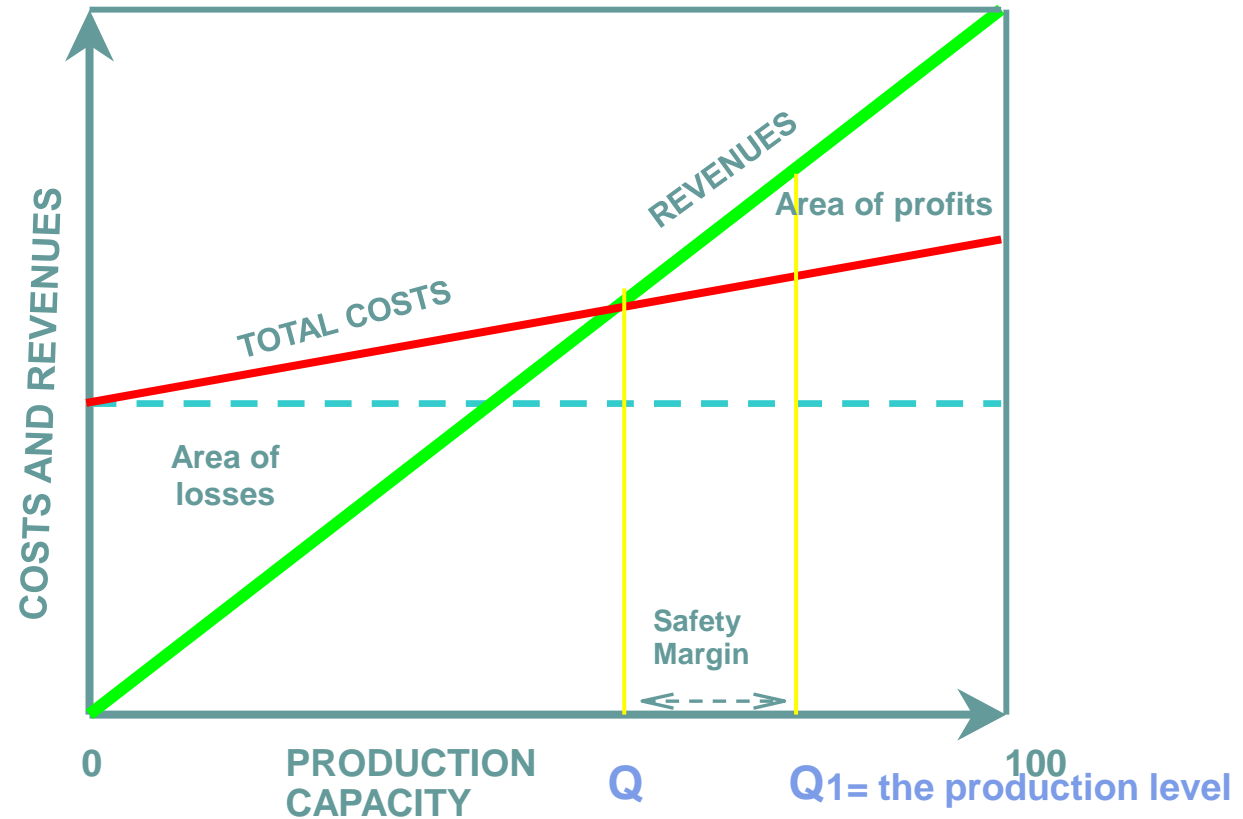
Determination of maximum production capacity

Determination of the optimal potential of the plant



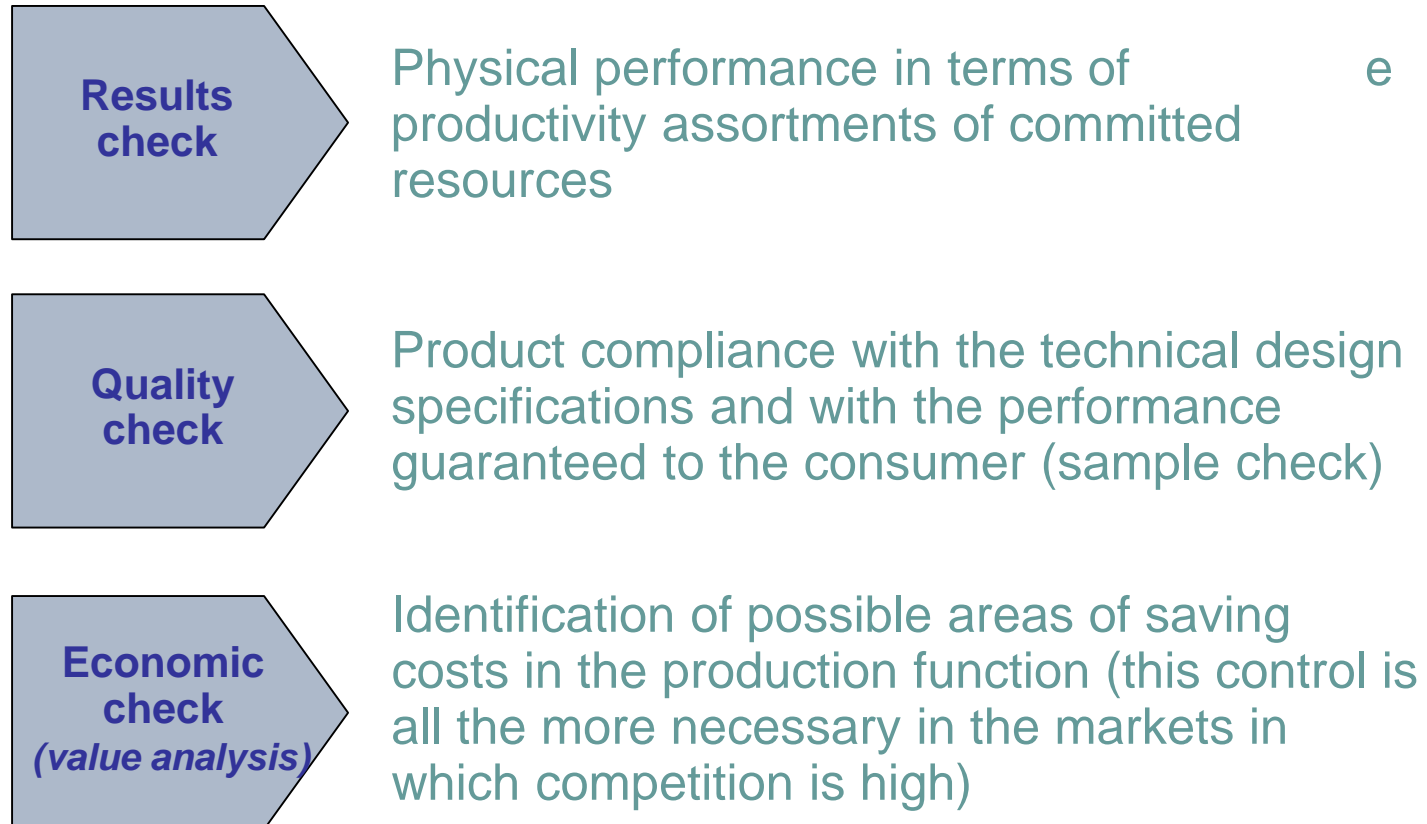
# Break-even point and safety margin

The problem of sizing the global production volume has economic implications linked to the riskiness of the investment and its cost (understood as the minimization of the unit cost of the product).



# Production efficiency control

The objective is to prevent anomalies in the cycle and in the products to avoid bearing unnecessary costs and to guarantee quality



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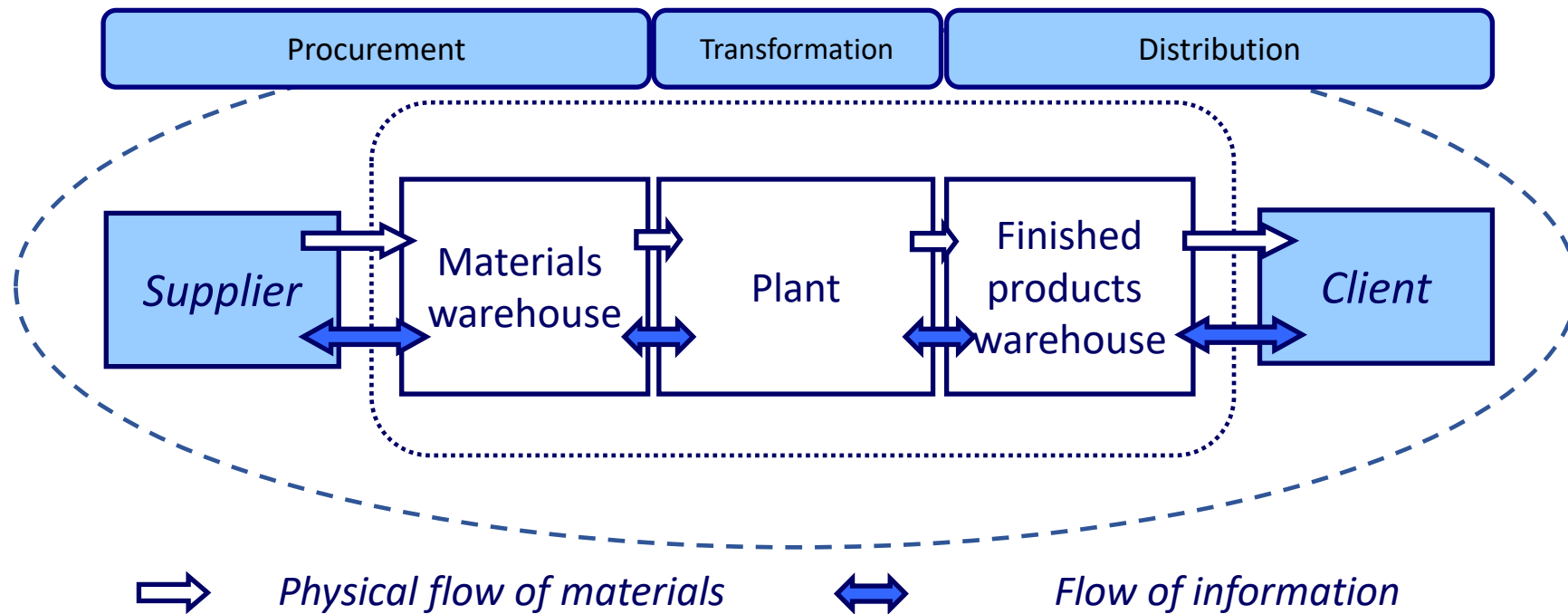
Stability

## Logistics



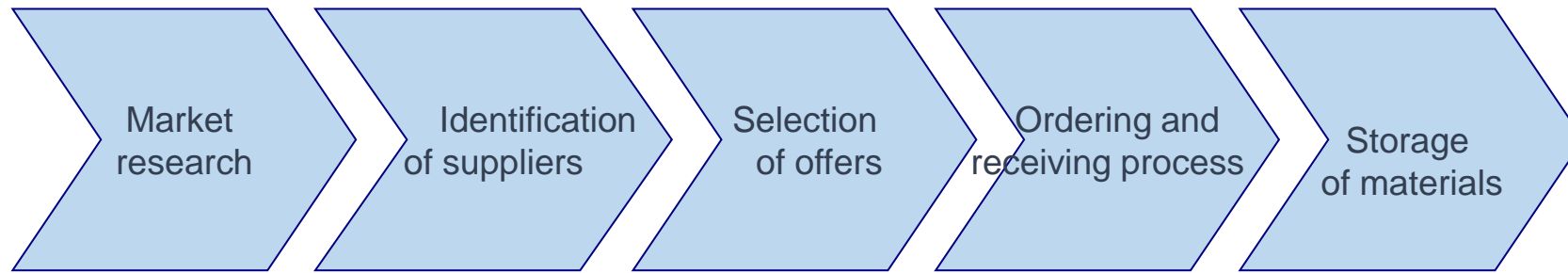
# The logistics function

Logistics is the system of connection between the supply of materials (inbound logistics), their transformation in products and the placement of the products produced on the market (outbound logistics).





# The procurement procedure



The implementation of the procurement function involves the definition of commercial policies towards:

different suppliers;

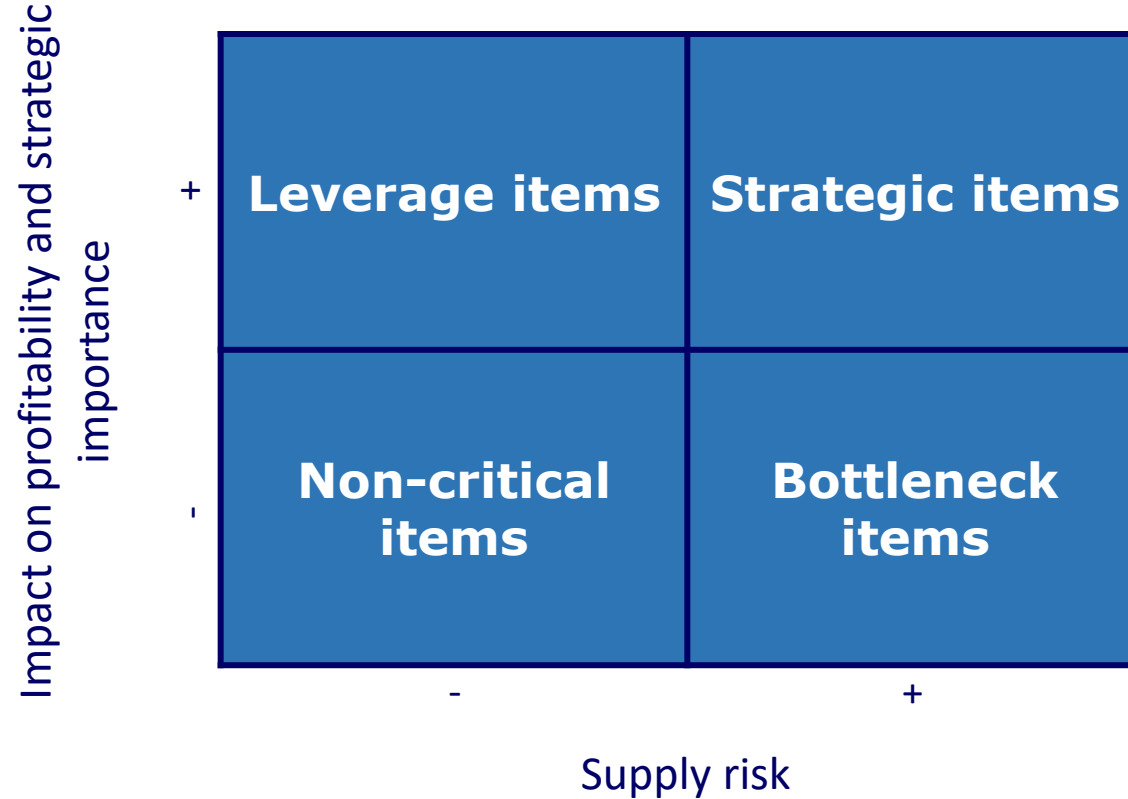
supply quantity and times;

terms of payment;

conditions of receipt of the purchased materials.

# The purchasing matrix (di Kraljic)

Types of contracts with suppliers



# The Kraljic matrix

## **Leverage items**

Where items have a high profitability, but a low risk factor, buyers possess the balance of power in the relationship and leverage this strength to obtain greater returns. Traditionally, procurement professionals have exploited this status to lower prices, but increasingly more advanced companies are looking to unlock the innovative potential of their suppliers.

The market dynamics of this relationship rest upon an abundance of highly commodified parts. Suppliers can be easily substituted as their offerings are much the same. The only limitation for buyers is perhaps over-playing their hand and forcing a low-profit margin vendor into insolvency.

# The Kraljic matrix

## **Strategic items**

Lastly, high supplier risk and high profit impact items cover strategic suppliers. These are critical to the business. These items only represent a handful of suppliers, but ensuring an effective and predictable supplier relationship is key to the future of the buying company.

Managing such suppliers requires a diverse array of skills and can subsume a significant proportion of executive time in sponsoring and directing the relationship. Unlike the non-critical items, each contract is unique and focuses upon the shared gains that equal partners enjoy in a collaborative relationship. Strategic partners should look to innovative both product and process innovation and in return they can expect long-term commitment from the buyer as well as proactive development.

# The Kraljic matrix

## **Non-critical items**

These items are low risk and have a low impact upon organizational profitability. The most commonly used example in this segment is office stationery. Although important for employees to perform their duties, pens and paper do not have a significant impact upon the business, nor does their absence represent a serious threat.

For buyers, stationery is a nuisance. It clogs up time with peripheral concerns. As such, the sourcing strategies deployed here focus on efficiency and reducing administrative burden. Techniques such as e-auctioning and catalogs are an excellent means to redirect responsibilities either directly to suppliers or to internal customers that are requisitioning the goods.

# The Kraljic matrix

## **Bottleneck items**

The flip side of leverage: risk is high, but profitability is low. Here, the strength is in the hands of the supplier. The market consists of few suppliers that can behave oligopolistically to force prices upward. Procurement Leaders found that these suppliers absorb more of buyers' time compared to any other segment. The supplier relationship is demanding, even though they have a limited impact upon company profitability. The market structure forces buyers to accept an unfavorable deal.

The main strategy rests upon damage limitation. Procurement must recognize that few opportunities will arise from this category. More creative buyers will seek to alter the terms of trade. Innovative internal activities can redevelop product requirements such that the material can be replaced with another and preferably sourced from a leverage supplier.

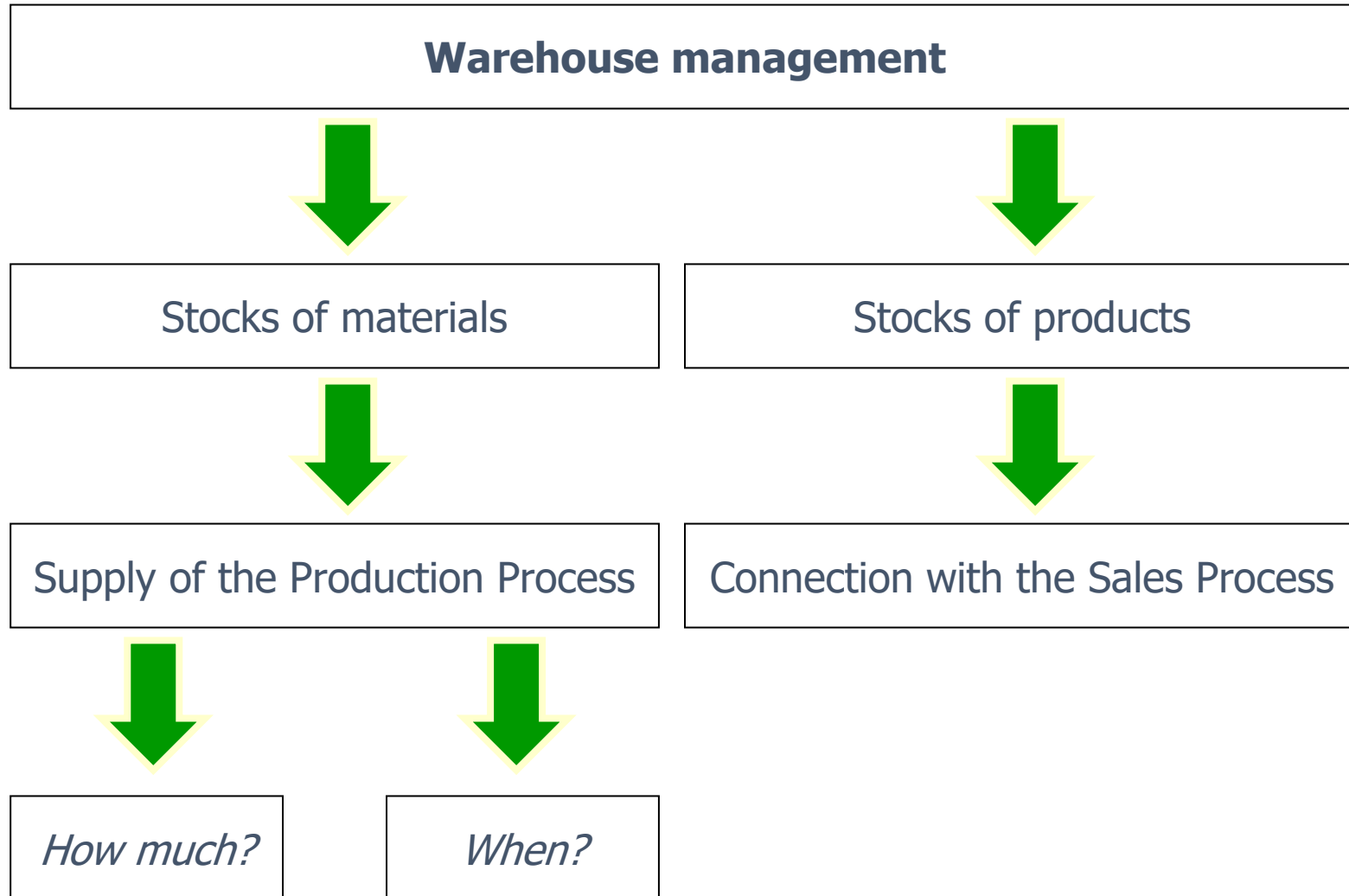
# Stock management

## Definition

The quantity of material present within the production system waiting to be subjected to a transformation or distribution process (that is the management of materials or products stocked in the warehouses).

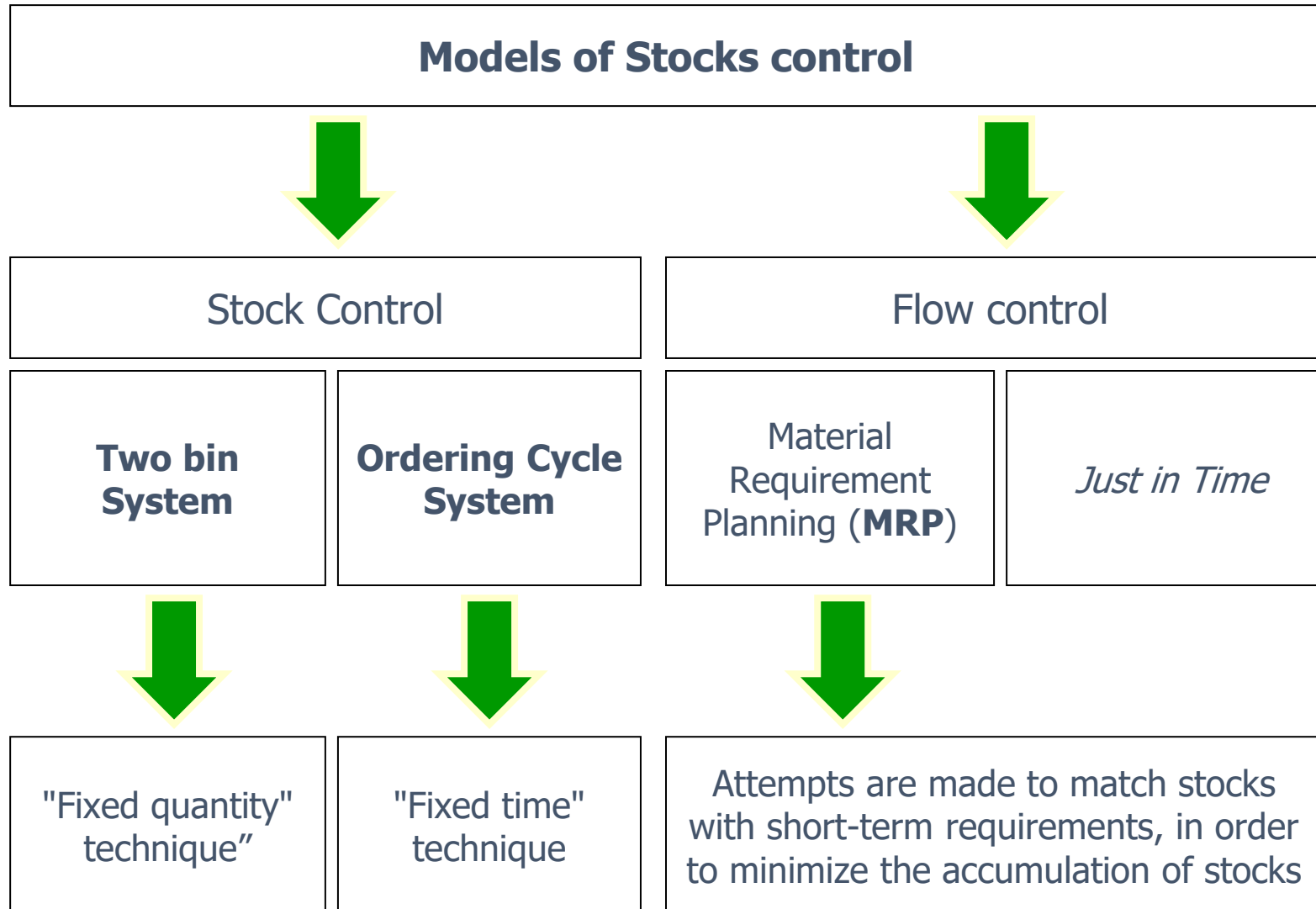
- Raw materials
- semi-finished products
- Finished products

# Warehouse management





# Stock management



# Stock management

Stocks control is concerned with two questions: when to replenish the store and by how much.

There are two main control systems.

**The two-bin system** (sometimes called the min-max system) involves the use of two bins, either physically or on paper. The first bin is intended for supplying current demand and the second for satisfying demand during the replenishment period. When the stock in the first bin is depleted, an order for a given quantity is generated.

**The order-cycle system**, or cyclical-review system, consists of ordering at fixed regular intervals.

# Stock management

## Characteristics of Stock Management Systems



### Two bin System



How much order is identified

It refers to a predetermined minimum level of reordering

Consequently the "When" is obtained



### Ordering Cycle System



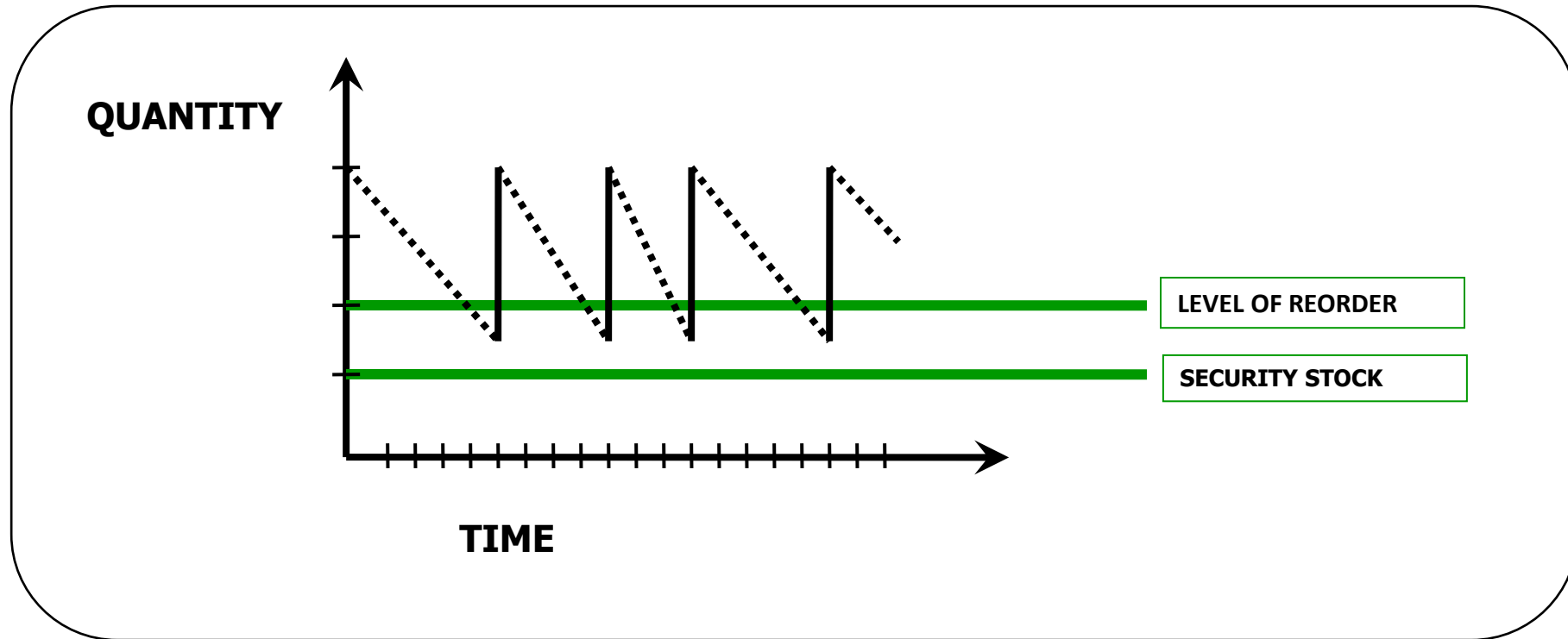
First the "When" order is determined

It is based on procurement at the end of each cycle

Consequently the "How much" is determined

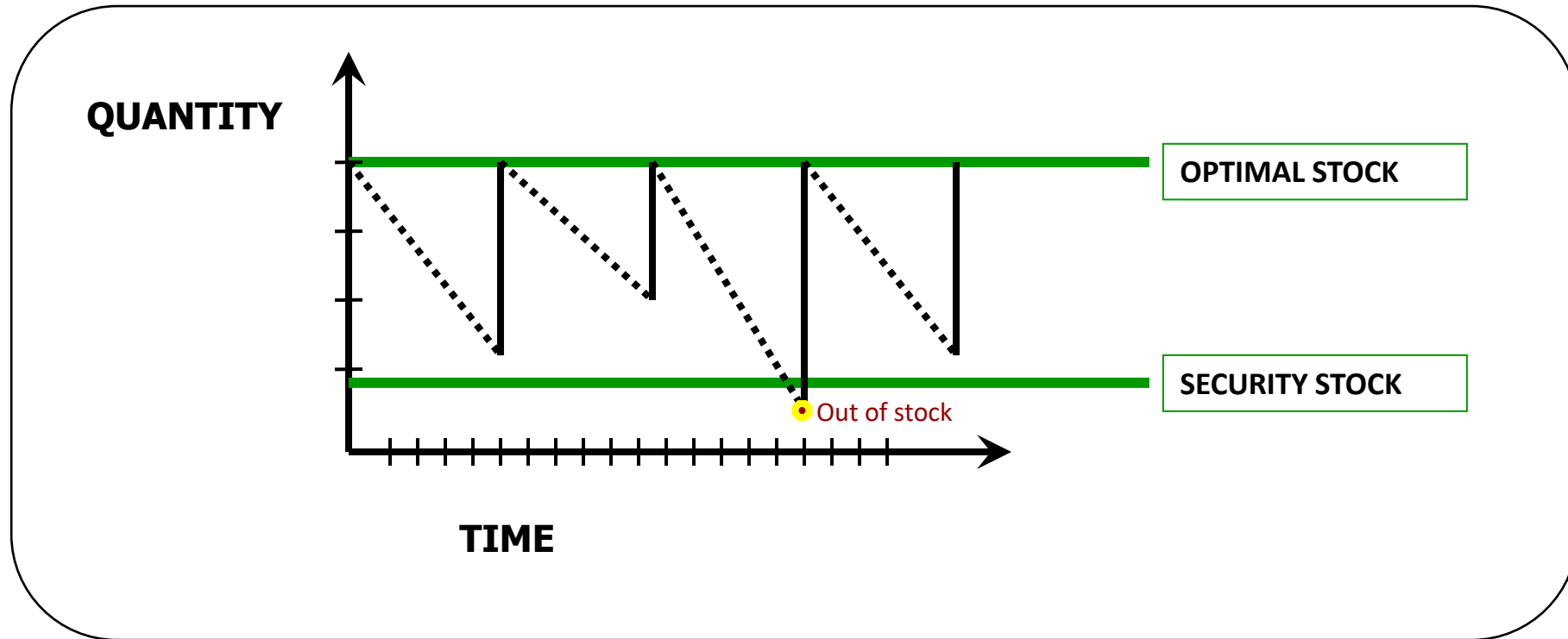
# Stock management

## Two bin System



# Stock management

## Ordering Cycle System



# Stock management

| Just in Time   |   |
|--|---|
| Aim  | Principle   |
| Minimization of stock levels of the production cycle to generate economic benefits (cost savings) and at the same time reduce the risk of immobilization (deterioration and obsolescence of stock materials) | We talk about the "zero stock" technique, which requires an optimal organization of the entire management cycle   |
| Limitation   | Requirements  |
| the risk of remaining without inputs and stopping production   | It demands the maximum punctuality and qualitative-quantitative correspondence of the materials that the company needs; this type of guarantee requires a high degree of supplier control (eg by establishing sub-supply relationships with them) |

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## Research & Development



# Research & Development function

The research and development (R&S) activity is defined as the set of creative works undertaken in a systematic way both to increase the set of knowledge and to use this knowledge for new applications

- **Basic research:** *experimental or theoretical work undertaken mainly to acquire new knowledge on the fundamentals of phenomena and facts susceptible to observation, not aimed at a specific application or use.*
- **Applied research:** *original work undertaken mainly to acquire knowledge and aimed at a practical and specific application or use.*
- **Experimental development:** *systematic work, based on existing knowledge, acquired through research and practical experience, conducted in order to complete, develop or improve materials, products and production processes, systems and services.*



# Research & Development function

## PURE OR BASIC RESEARCH PROJECTS

*... characterized by the high degree of technical uncertainty deriving from the low degree of knowledge initially available on the subject of the investigation.*

## APPLIED RESEARCH PROJECTS

*...in which efforts are conducted towards the formalization and consolidation of the knowledge acquired during the basic research phase, in order to assess the concrete possibilities of application at the level of innovative product or production process.*

## DEVELOPMENT PROJECTS

*...have as a priority the economic exploitation of the invention, with the consequent commitment by the company to the start-up of the new industrial transformation systems and / or the launch policies of the new or innovated product.*

# The sources of innovation financing

**Difficulty in finding  
financial resources**



*High amount of resources to be committed.*

*Profitability spread over time.*

*Difficulties in providing adequate guarantees to lenders.*

# Research & Development function

## Collaborations in R&S

Sometimes the development of a project requires activities complementary to those carried out by a company, without which it would be difficult to transform a core of technological knowledge into a marketable product.

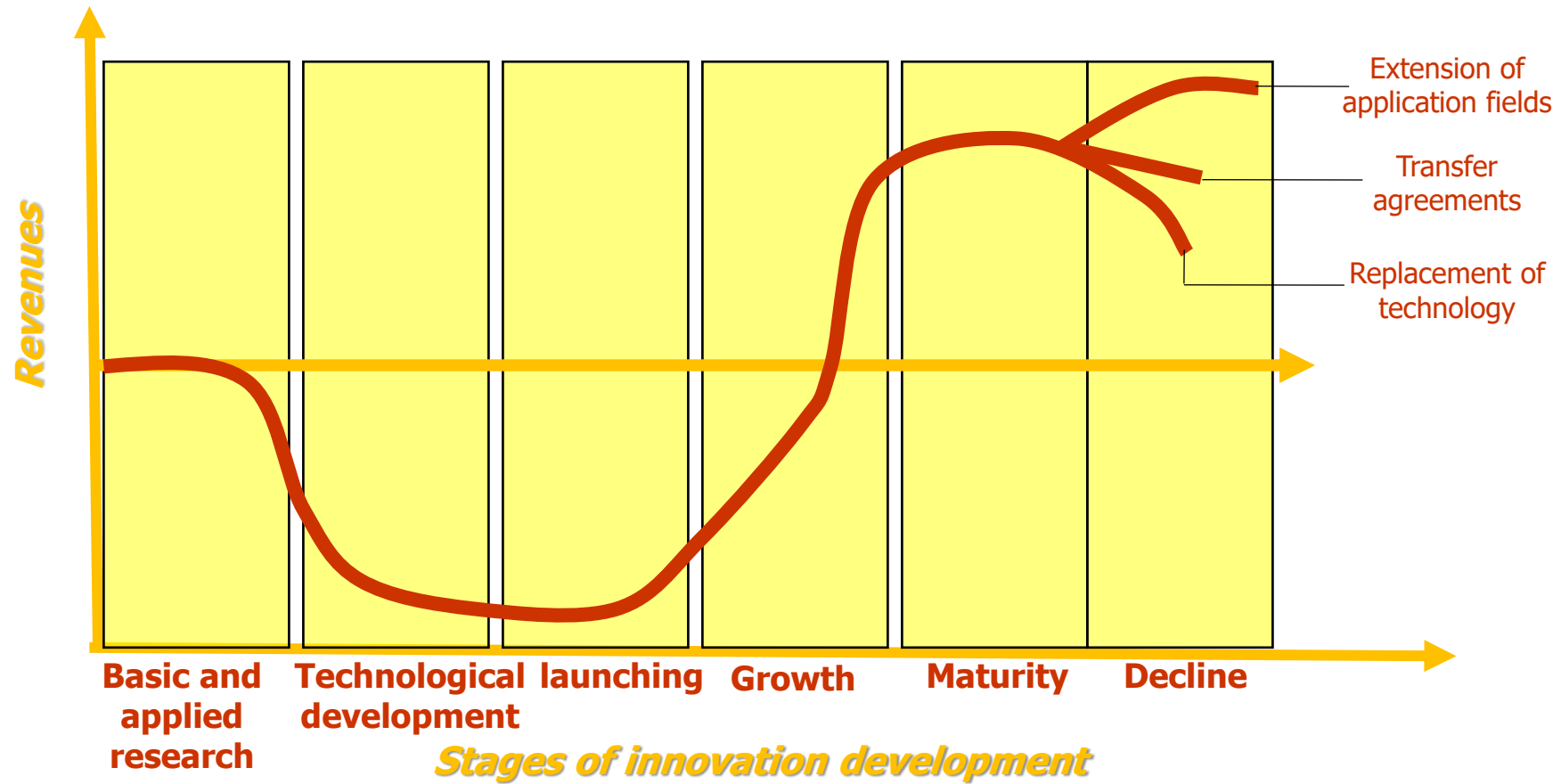
Many times companies therefore have to choose whether to carry out their innovative activities on their own or in collaboration with partners.

The collaboration could allow the company to reach more ambitious targets more quickly and with lower costs and risks.

Through collaboration with other companies, an organization has access to a wealth of knowledge and skills not possessed, which could cost time and money (in case of internal development).

However, collaboration strategies involve a sharing of control power and a sharing of profits, as well as having the risk of unfair and opportunistic behaviors by the partner.

# The economic-financial cycle of innovation



# Nike: Product development from concept to customer

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- Nike is the world's largest sports and fitness company, earning \$US14 billion in revenue. The company, with one of the world's most identifiable logos - the 'swoosh', is a leader in sports equipment research and development (R&D). Nike identified a gap in the sports shoe market - a shoe which mimics barefoot running in order to strengthen runners' feet and legs, giving them more power and speed while reducing the risk of injury. After extensive R&D, the shoe, Nike Free, was developed. Nike Free was given an initial, strictly controlled, limited 12 month release before being promoted to consumers worldwide. After reading this Case Study, students should be able to:
- Demonstrate and evaluate the stages involved in the product development, from conception of a product, through the research and development stage, to design, production, promotion and market release
- Understand what is meant by product or brand positioning and analyse market research methods
- Identify promotion strategies and their application as they apply to Nike Free and other Nike products.





Nike's 'swoosh' is one of the world's most identifiable logos and, in just 32 years, Nike has grown to be the industry's largest sports and fitness company. Revenue for Nike in financial year 2005 was \$US 13.7 billion.

Nike directly employs approximately 24,300 people and Nike's suppliers, shippers, retailers and service providers employ close to one million people on six continents.

Nike's mission is:

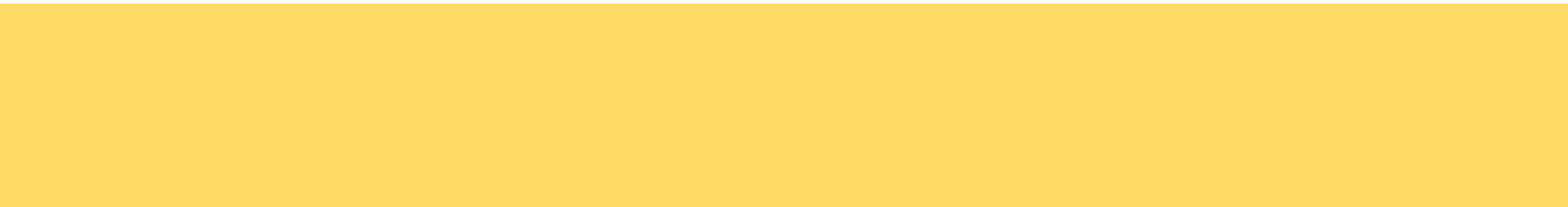
'To bring inspiration and innovation to every athlete in the world.'

According to Bill Bowerman, one of Nike's founders, "If you have a body, you are an athlete."

## Research and development

How does Nike develop its products and decide what does and doesn't make the cut when it comes to innovation? The Nike Sports Research Laboratory (NSRL) is located on the Nike campus in Portland, Oregon in the United States of America. The research and development (R&D) centre's role is to identify the physiological needs of athletes. The NSRL works directly with Nike's design teams and has established partnerships with major universities throughout Asia, Europe and North America.





To research and develop products, the scientists have an incredible array of measurement and analysis tools. Their data collection includes virtually every variety of muscle sensor, pressure platform, breath analyser, foot scanner and thermal imaging device. There are high-speed video cameras that capture soccer kick data at 1,000 frames per second and a scanner that produces, in just seconds, a perfect 3D digital image of your foot.

But it does not stop there! There are testing surfaces, such as a huge section of regulation basketball hardwood, artificial soccer turf, a 70-metre sprinters' track runway and endless field testing that takes place outdoors in various terrains.

The NSRL takes an idea, and researches and prepares a design brief. The brief is then passed over to the company's Innovation Kitchen - an incubator for new projects.





In the first phase of developing what was to become Nike Free, the 'cooks' in the Kitchen took the NSRL description of 'natural technology' and started asking what sort of shoe people might be looking for next. In the process of talking to athletes and coaches, the designers spoke to Vin Lananna, then the track coach at Stanford University, who told them about his unusual training method - having athletes run on grass without shoes. According to Lananna, the athletes were stronger, healthier and less injury-prone. This was a great idea but contrary to Nike's business - making and selling sports shoes.

However, the idea led to an extensive biomechanical research project to see exactly what happens when we run barefoot. Sports shoes provide a certain amount of control or cushioning based on the notion that they are needed to complement the natural action of the foot. Nike researchers wanted to know why Lananna's athletes, who ran barefoot in training, raced faster.

The researchers brought in 10 men and 10 women to run barefoot on grass to see exactly how the body reacts without shoes on. They were videotaped with high-speed cameras to capture their movements; they had reflective markers attached to their joints to allow easy calculation of joint angles during their stride, and wafer-thin pressure sensors attached to the bottoms of their feet to measure their impact with the ground. At the end of the experiment, Nike had the most comprehensive picture of the biomechanics of barefoot running ever developed.

The challenge was to translate that barefoot experience, which promotes good biomechanics for runners, into a shoe.





Researchers developed prototypes, using any materials which could closely copy the barefoot. Next came the challenge to build the shoe. A shoe is built on a model of the foot, called a last, allowing the upper and outersole to be built around it. Researchers had to develop a brand new version of the last in order to copy the way a bare foot operates. This resulted in the shoe's upper being designed in a mesh that has small holes in it, allowing the foot to be encased but feel free. There is no heel counter; instead the heel fits snugly in the shoe as the inner sole allows the foot to sit naturally in a neutral position. The key is the outersole which can move and flex independently with each section being sliced so that the foot is allowed to move as naturally as possible in the shoe. The shoes are meant to be used in tandem with other training and racing shoes. The goal is to use Nike Free to help strengthen the feet in addition to using more traditional, supportive running and training shoes.

## Testing the prototypes

### Independent testing



Before Nike Free was known to the athletic world or commercially released, Nike undertook extensive independent testing. The company used elite athletes as well as everyday runners and a few sports journalists, i.e. people who exercise and run regularly, to undertake product testing. In a six-month trial, 110 every-day runners used the shoe. One group, consisting of 30 men and 27 women, wore the Nike Free shoes for four 30-minute runs, four times a week. The control group - 30 men and 23 women - used their regular personal training shoes. Outside the four 30-minute runs a week, both groups continued their usual workout schedules. All participants were tested at the start of the six-month period on their abilities in a number of physical areas - shuttle runs, lateral running short sprints, and leg strength - and were tested again at the end of the six months. These tests measured qualities such as speed, development, coordination and optimal speed.



Researchers found some slight improvement in the control group, registering a little more speed and a little more coordination - but not enough to be statistically relevant. However, the test results from the group wearing the Nike Free shoes showed improvement in all the parameters measured, and improvements in speed, lateral movement, and coordination were significant - in the 10 to 20 percent range. That is a significant improvement considering the shoes were worn only two hours a week over a six-month period. An improvement of one percent in speed could mean a metre's difference in a 100-metre sprint - often the difference between first and fourth place.

In simple terms, Nike Free was acting not only as a running shoe, but as a training technique! Athletes in the test group using Nike Free were found to be stronger and more flexible. One of the researchers put it this way: "Nike Free is a gym for your feet."