# CAPITOLO 1 WHAT IS STRATEGY?

Why we need to define “strategic management”? because we want to know how is any company successful, and what enables some firms to gain and sustain competitive advantage.

**Strategic management** is the integrative management field that combines analysis, formulation and implementation in the quest for competitive advantage.

**Strategy** is a set of goal-oriented actions a firm takes to gain and sustain superior performance relative to competitors.
New ventures compete for financial and human capital, existing companies compete for profitable growth etc etc.

A good strategy enables a firm to achieve superior performance and sustainable competitive advantage and it is based on a strategic management process that consists of three elements:

1. **Diagnosis** of the competitive challenge - element accomplished through **Analysis**;
2. **Guiding policy** to address the competitive challenge - element accomplished through strategy **Formulation**;
3. **A set of coherent actions** to implement the firm’s guiding policy - element accomplished through **Implementation**.

**Competitive advantage** is a superior performance relative to other competitors in the same industry, or relative to the industry average.

A firm that is able to outperform its competitors or the industry average over a prolonged period has a **sustainable competitive advantage**. If a firm underperforms its rivals or the industry average, it has a **competitive disadvantage**, while if two firms perform the same they have **competitive parity**.

To gain a competitive advantage, a firm needs to provide one of these two things:

- goods or services consumers value more highly than those of their competitors (*delivering superior value*)
- goods or services similar to the competitors’, but at lower cost (*offering similar value but at a lower cost*)

The rewards are profitability and market share.

Managers achieve these combinations of value and cost through **strategic positioning**, a procedure which require **trade-offs**.
The greater the difference between value creation and cost, the greater the firm’s economic contribution and the more likely it will gain competitive advantage. The key of successful strategy is to combine a set of activities to stake out an unique position within an industry.
A clear strategic profile allows retailers to focus on creating value for customers instead of destroying rivals.

Being everything to everybody will result in a lesser performance. Being just like your rivals but better, too.
Strategy is **not**:

- **Grandiose statements** - they provide little guidance
- **Failure to face a competitive challenge** - if the firm does not address a clear competitive challenge, employees can't know whether they are making progress
- **Operational effectiveness, competitive benchmarking or other tactical tools** - these elements may be necessary but they are not sufficient.

**Value creation** occurs when companies with a good strategy are able to provide products or services to consumers ad a price point that they can afford while keeping their costs in check, thus making a profit at the same time. Both parties benefit from this trade as each captures a part of the value created.
Strategic failure can be expensive.
Managerial actions can affect the economic well-being of large numbers of people around the globe.
Also, stakeholders can really affect and be affected by a firm's behavior and choices.
**Stakeholders** are organizations, groups and individuals that can affect or are affected by a firm's actions - they can be grouped whether they are internal or external to the firm.

- Internal:
    - Employees
    - Stockholders
    - Board members
- External:
    - Customers
    - Suppliers
    - Alliance partners
    - Creditors
    - Unions
    - Communities
    - Governments
    - Media

All stakeholders make specific contributions to a firm, which in turn gives different types of benefits to different types of stakeholders.
The firm is therefore embedded in a multifaceted exchange relationship with a number of diverse internal and external stakeholders.
**Stakeholder strategy** is an integrative approach to managing a diverse set of stakeholders effectively in order to gain and sustain competitive advantage.
Why does effective stakeholder management benefit firm performance?

1. Satisfied stakeholders are more cooperative
2. Increased trust lowers the costs for firms' business transactions
3. Greater organizational adaptability and flexibility
4. More predictable returns
5. Firms can build strong reputations that are rewarded in the market

## Framework: Stakeholder Impact Analysis

**Stakeholder impact analysis** provides a decision tool with which strategic leaders can recognize, prioritize and address the needs of different stakeholders.

In each step, there are three stakeholder attributes to keep in mind:

- Power - which a stakeholder has when it can get the company to do something it would otherwise not do;
- Legitimate claim - when the stakeholder's claim is legally valid or appropriate;
- Urgent claim - when the stakeholder's claim requires immediate attention and response.

The steps of SIA are 5:

1. Who are our stakeholders? (and which are the most powerful, which could sell stock, materially affect operations or other things);
2. What are our stakeholders' interests and claims? (reason about power, legitimacy, urgency; employees can become shareholders through ESOPs and have different claims than simple shareholders; shareholder activists buy equity stakes in a corporation to try to change the strategic direction);
3. What opportunities and threats do our stakeholders present?
4. What are our social responsibilities? Here we have 4 dimensions:
    a. Economic responsibilities (gain and sustain competitive advantage);
    b. Legal responsibilities (laws and regulations are society's codified ethics, define minimum acceptable standard);
    c. Ethical responsibilities (do what is right, just and fair);
    d. Philanthropic responsibilities (corporate citizenship);
5. How do we address our stakeholders' concerns?

## Framework: AFI

In order to craft and execute a strategy that enhances chances to achieve superior performance, we need three key tasks:

- **Analysis** of the external and internal environments:
    - What roles do strategic leaders play?
    - What process for creating strategy should strategic leaders put in place?
    - What effects do forces in the external environment have on the firm's potential to gain and sustain a competitive advantage?
    - What effects do internal resources, capabilities and core competencies have on the firm's potential to gain and sustain competitive advantage?
    - How does the firm make money?
    - How can one assess and measure competitive advantage?
    - What is the relationship between competitive advantage and firm performance?
- **Formulation** of an appropriate business and corporate strategy:

    - How should the firm compete: cost leadership, differentiation or value innovation?
    - Where should the firm compete in terms of industry, market and geography?
    - How and where should the firm compete - locally, regionally, nationally or internationally?
- **Implementation** of the formulated strategy through structure, culture, controls:
    - How should the firm organize to turn the formulated strategy into action?
    - What type of corporate governance is most effective?
    - How does the firm anchor strategic decisions in business ethics?

A good strategy is grounded in a process that defines a competitive challenge, provides a guiding policy and is implemented by coherent actions. Moreover, competition is everywhere.

This framework

1. Explains and predicts differences in firm performance;
2. Helps leaders formulate and implement a strategy that can result in superior performance.

# CAPITOLO 2 EXTERNAL ANALYSIS: INDUSTRY STRUCTURE, COMPETITIVE FORCES, STRATEGIC GROUPS

It is important to analyze the firm's **external environment**, which is to say the industry in which the firm operates, and the competitive forces that surround the firm from the outside.

By analyzing the factors in the firm's external environment, strategic leaders can mitigate threats and leverage opportunity.

First we have to consider the proximity of those factors.
All the factors in the firm's **general environment** are ones where we have little to no influence over, like socioeconomic factors, whilst the ones in the **task environment** are the ones where strategic leaders have some influence over, like structure of the industry.

## Framework: PESTEL

The **PESTEL** model provides a way to scan, monitor and evaluate the important external factors and trends that might impinge upon a firm, by grouping the factors in the **general environment** into six segments:

1. **Political**: they result from the processes and actions of government bodies that can influence the decisions and behavior of firms - companies here work through lobbying;
2. **Economic**:
    a. Growth rates: the measure of the change in the amount of goods and services produced by a nation's economy, whether business activity is expanding or contracting, whether demands are rising or not;
    b. Levels of employment: as the price of labor rises, firms have an incentive to invest more into equipment and AI, as more people search for employment wages fall;
    c. Interest rates: the amount that creditors are paid for use of their money and the amount that debtors pay for that use, adjusted for inflation, during periods of low real interest rates firms can easily borrow money to finance growth;
    d. Price stability: whether prices are stable, whether there is inflation (too much money chasing too little goods and services), or deflation, when demand drops so prices drop, and makes companies not invest in new production capacity or innovation;
    e. Currency exchange rates: how many dollars must be paid for oreign currency, critical variable for whoever sells or buys across national borders - if dollar increases, all usa products are more expensive, so less demand;
3. **Sociocultural**: these trends differ among groups, they can be cultural, demographic;
4. **Technological**: this captures the application of knowledge to create new processes and products;
5. **Ecological**: natural environment, global warming, sustainable economic growth;

6. **Legal**: official outcomes of political processes as manifested in laws, mandates, regulations and court decisions.

An **industry** is a group of incumbent firms facing more or less the same set of suppliers and buyers, and tend to offer the same products and services.
**Industry effect** describe the underlying economic structure of the industry, and attribute firm performance to the industry in which the firm competes. The structure of an industry is determined by elements common to all industries.
**Firm effects** attribute firm performance directly to the actions strategic leaders take.

Firm effects contribute up to 55% of the firm performance, whilst industry effects approximately 20%. Other effects contribute up to 25%.

**Industry analysis** is a method to both identify an industry's profit potential and derive implications for a firm's strategic position within an industry.
A **strategic position** is a firm's strategic profile based on the difference between Value V and Cost C - competitive advantage flows to the firm that is able to create as large a gap as possible between these two values.
**Economic value** of a firm is the difference between V - C. It can be created, but it must also be captured.

## Framework: Five Forces Model

In order to understand the profit potential of different industries and how to position firms inside them, Michael Porter developed the **five forces model**. It is a framework that identifies five forces that determine the profit potential of an industry and shape a firm's competitive strategy.

This model is based on two key insights, derived from combining theory from industrial organization economics and detailed case studies:

1. In this model competition is viewed more broadly, to also encompass the other forces in an industry - buyers, suppliers, potential new entry of other firms, threat of substitutes - competition must be defined more broadly to go beyond direct industry competitors;
2. Profit potential is a function of the five competitive forces that shape competition - any of the five forces on its own, if sufficiently strong, can extract industry profitability.

Strategy addresses the question on how to deal with competition.
Competition, in Porter's model, is defined as to include many forces, and each one of them can extract value from the industry.
In particular, **competition** describes the struggle among these forces to capture as much of the economic value created in an industry as possible.

The stronger the five forces, the lower the industry's profit potential, making the industry less attractive for competitors. The reverse is also true.

What are these five forces though?

1. **Threat of entry**: it describes the risk of potential competitors entering the industry and depresses industry profit potential in two ways:
    a. *By reducing the industry's overall profit potential*: the threat of additional capacity makes incumbent firms lower prices, which reduces profits for the whole industry;
    b. *By increasing spending among incumbent firms*: this happens in order to satisfy existing customers, and rises costs, hereby reducing the profit potential;

    Of course, the more profitable an industry, the more attractive it is to enter: however, there may be a lot of entry barriers, mechanisms advantageous for incumbent firms but obstacles for new entries:
    c. *Economies of scale*: firms with larger outputs can spread fixed costs over more units, employ technology more efficiently, benefit from a very specialized division of labor, and demand better terms from their suppliers - new entrants cannot handle this scale from the beginning;
    d. *Network effects*: the value of a product or service rises for an individual user with the number of total users;
    e. *Customer switching costs*: all the costs a firm must sustain to switch from a supplier to another - they are onetime sunk costs which can be significant;
    f. *Capital requirements*: this describes the "price of entry" ticket into a new industry - how much money do i need to enter this industry and which investors are willing and able to help me? This is very frequent in economies of scale, for example to set up particular kinds of plants with special equipment, run a production process and cover start-up losses;
    g. *Advantage independent of size*:
        i. Brand loyalty;
        ii. Preferential access to resources;
        iii. Favorable location;
        iv. Cumulative learning and experience;
    h. *Government policy*: the threat of entry is high when restrictive government policies do not exist, it's low when the local government restricts or regulates strictly an industry (for example, China);
    i. *Credible threat of retaliation*: how will incumbent firms react?
2. **Power of suppliers**: this captures all the pressures that industry suppliers can exert on an industry's profit potential - this force can reduce a firm's ability to obtain superior performance in two ways:
    a. Powerful suppliers can raise the cost of production by demanding higher prices for their inputs, or reducing its quality;
    b. Powerful suppliers may reduce the industry's profit potential by capturing part of the economic value created.

    To compete effectively, companies need many inputs into the production process. The relative bargaining power of suppliers is high when:
    c. The supplier's industry is more concentrated than the industry it sells to;
    d. Suppliers do not depend heavily on the industry for a large portion of their revenues;
    e. Incumbent firms face significant costs when switching suppliers;
    f. Suppliers offers differentiated products;

    g. There are no readily available substitutes for the supplier's input;
    h. Suppliers can credibly threaten to forward-integrate into the industry;
3. **Power of buyers**: buyers are the customers of an industry, and they can put pressure on the producer's margins by demanding lower prices or higher product quality. Buyers can be individual consumers or large institutions, which have more significant buyer power. The power of buyers is high when
    a. There are a few buyers and each of them purchases a large quantity relative to the total size of the firm's output;
    b. The industry's product is undifferentiated or standardized;
    c. Buyers face low to no switching costs;
    d. Buyers can credibly threaten to backward-integrate into the industry.

   Powerful buyers have the ability to extract a significant amount of the value created in the industry, leaving little to nothing to producers, especially when:
    e. The buyer's purchase represents a significant fraction of its cost structure or procurement budget;
    f. Buyers earn low profits, or are strapped for cash;
    g. The quality (cost) of the buyers' products and services is not affected much by the cost of their inputs.

   One thing to remember is that the relative strength of the five forces are context dependent.
4. **Threat of substitutes**: substitutes meet the same basic customer needs as the industry's product, but in a different way - they are products outside of the industry. This threat is high when:
    a. The substitute offers an attractive price-performance tradeoff;
    b. The buyer switching costs are low, or the substitute offers a higher value proposition.
5. **Rivalry among existing competitors**: this describes the intensity with which companies within the same industry - it can range from gentle to cut-throat, and all the other four forces exert pressure upon this rivalry: the stronger the forces, the stronger the expected competitive intensity, which in turn limits the industry's profit potential. Price competition ultimately erodes industry profitability. Non price competition makes prices rise, but does not necessarily mean that the final industry profitability falls, if this competition brings innovation which brings willingness to pay for it by the customers. The intensity of rivalry among existing competitors is determined by:
    a. Competitive industry structure;
    b. Industry growth;
    c. Strategic commitments;
    d. Exit barriers.

**Competitive industry structure** refers to all the elements and features common to all industries, including the number and size of its competitors, the firms' degree of pricing power, the type of product or service offered, and the height of entry barriers.

The four main competitive industry structures are:
1. Perfect competition;
2. Monopolistic competition;
3. Oligopoly;

4. Monopoly.

| | Number and size of competitors | Degree of pricing power of a firm | Type of product or service | Height of entry barriers | Other aspects |
|---|---|---|---|---|---|
| Perfect competition | Many small firms, similar in size and resources. | Little to no ability to raise prices | Commodity products, more or less identical, customers choose based on price | Little to no entry barriers | Low profitability and difficulty in keeping a competitive advantage |
| Monopolistic competition | Many firms | Some ability to raise prices for a relatively unique product | Differentiated product, similar but by no means identical | Some entry barriers | When a firm can differentiate, it carves a niche in the market |
| Oligopoly | A few large firms, interdependent (the actions of one firm influence the others) so they have an incentive to cooperate | Some degree of pricing power, like monopolistic competition | Differentiated product | High entry barriers | This type of industry is often analyzed through game theory. Higher profitability |
| Monopoly | Only one industry | High pricing power | Unique product | Very high entry barriers | Very high profits, the one firm is the industry. |

**Industry growth** directly affects the intensity of rivalry among competitors.
In periods of high growth consumer demand rises and rivals are focused on satisfying that demand instead of stealing the existing one from one another. In contrast, during slow or negative industry growth competition becomes fierce because rivals can only gain at the expense of others. This can lead to price cuts, frequent releases of products with minor innovations, intense promotional campaigns. Price cutting based rivalry is destructive to profitability, even of the entire industry.

**Strategic commitments** are firm actions that are costly, long term and difficult to reverse. If firms make strategic commitments to compete in an industry, rivalry becomes more intense because there is more at stake.

**Exit barriers** are obstacles that determine how easily a firm can exit an industry, they comprise both economic and social factors, they might include fixed costs, contractual

obligations, emotional attachment to certain geographical locations, ripple effects through the supply chain.
An industry with low exit barriers is more inviting, and this reduces competitive pressure.

The five forces model can be enhanced by taking into account the **availability of complements**.
A **complement** is a product, service or competency that adds value to the original product offering when the two are used in tandem. A company is a **complementor** to your company if customers value your product or service more when they are able to combine it with the other company's product or service - this can be accomplished by a single firm or more firms working together. This is a process called **co-opetition**, which is cooperation between competitors to achieve a strategic objective. An example is Samsung and Google.

The more profitable an industry is, the more attractive it becomes to competitors.
To increase the probability of successful entry, the strategic leaders need to answer the following questions:

1. Who are the players? Identify the direct competitors and the stakeholders;
2. When to enter? Timing of entry concerns the stage of the industry life cycle in which to enter (Introduction, growth, shakeout, maturity, decline);
3. How to enter? Since the most attractive industries are the hardest to enter, this question is crucial and might have different answers, such as:
    a. Leverage existing assets: that is, think about a new combination of already possessed resources and capabilities;
    b. Reconfigure value chains;
    c. Establish a niche, then use that to grow further;
4. What type of entry? This concerns the product market, value chain activity, geography and type of business model;
5. Where to enter? Product positioning, pricing strategy, potential partners…

The five forces model, although useful, only grabs an instant of a moving entity and cannot determine the changing speed of an industry. Therefore, it is important to consider **industry dynamics**.
Firms tend to change the industry structure towards a more consolidated version, through horizontal merges and acquisitions. Incumbents have an incentive to lower the number of competitors, and fewer larger competitors mitigate the threats of supplier and buyer power. In contrast, consolidated industries tend to fragment, especially when there are external shocks to an industry such as deregulation, new legislation, technological advancement or globalization.
Another phenomenon is industry convergence, a process whereby formerly unrelated industries begin to satisfy the same customer need. This is frequently brought by technology. Finally, the convergence of different technology can lead to the emergence of entirely new industries.

## Framework: Strategic Groups

Within the same industry, firms occupy places within **strategic groups**, which are sets of companies that pursue a similar strategy within a specific industry in the quest of competitive advantage. The number of different business strategies pursued between an industry determines the number of strategic groups.

The strategic group model is a framework that explains differences in firm performance within the same industry by clustering different firms into groups based on a few key strategic dimensions.

How do we map this?

1. Identify the most important strategic dimensions - these are strategic commitments based on managerial actions that are costly and difficult to reverse;
2. Choose two key dimensions which expose important differences between the groups;
3. Graph the firms in the strategic groups, indicating each firm's market share by the size of the bubble with which it is represented.

Additional insights:

1. Competitive rivalry is strongest between firms that are within the same strategic group;
2. The external environment affects strategic groups differently;
3. The five competitive forces affect strategic groups differently;
4. Some strategic groups are more profitable than others.

Mobility barriers are industry-specific factors that separate one strategic group from another. These are the strategic commitments.

What are the implications for a strategic leader?
A thorough analysis of the external environment of a firm is crucial to the beginning of the strategic management process.
The initial step is to apply a PESTEL analysis.
Then, the industry must be analyzed by applying the five forces model.
This must be done in these steps:

- Define the relevant industry;
- Identify the key players in each of the five forces and attempt to group them into different categories;
- Determine the underlying drivers of each force;
- Assess the overall industry structure.

The final step is to draw a strategic group map, to explain performance differences within the same industry.

These three models are static, so this analysis must be repeated from time to time to gain a knowledge of the underlying dynamics.
Also, these models do not allow strategic leaders to understand why there are performance differences among firms in the same industries; in order to do this we must look inside the firm to study resources, capabilities and core competencies.

# CAPITOLO 3 COMPETITIVE ADVANTAGE, FIRM PERFORMANCE AND BUSINESS MODELS

To explain differences in firm performance and to derive strategic implications we must understand how to measure and assess competitive advantage. It is interesting to see not only who has it, but how and why.

Three frameworks to assess firm performance:

- Accounting profitability;
- Shareholder value creation;
- Economic value creation.

Two integrative frameworks, combining quantitative data with qualitative assessments:

- Balanced scorecard;
- Triple bottom line.

In order to understand who has the competitive advantage, how, why they have it, how it can be measured, what strategic implications we can derive from this and how to understand it in the context of the whole industry, we need a multidimensional perspective.
Three standard performance dimensions are:

- Accounting profitability;
- Shareholder value;
- Economic value.

## Framework: Accounting Profitability

Accounting profitability makes us use financial data and ratios derived from publicly available accounting data such as income statements and balance sheets. This makes us able to conduct direct performance comparisons, by using ratios such as:

- ROIC, or return on invested capital = net profits/invested capital (shareholders' equity and interest bearing debt) - this means how much a company returns from an investment);
- ROE or return on equity;
- ROA or return on assets;
- ROR or return on revenue = net profits / revenue
    - cost of goods sold / revenue ( this means how efficiently a company can produce a good)
    - research and development / revenue (this means how much of each dollar earned from sales is invested to conduct research);
    - selling, general and administrative / revenue (how much of each dollar earned from sales is invested in these expenses - how much is a firm invested in marketing and sales);
- working capital turnover = revenue /invested capital (measure of how effectively capital is used to generate revenue)
    - working capital / revenue (how much of its working capital the firm has tied up in operations);

    - plant, property and equipment / revenue;
    - long term assets / revenue;

Accounting data has some limitations, namely:

- This data is historical, thus backward looking;
- This data does not consider off-balance sheet items , like pension obligations or operating leases in the retail industry;
- Accounting data focuses mainly on tangible assets, which are no longer the most important - not everything that counts can be counted, not everything that can be counted counts (innovation, customer experience etc are not counted in a balance sheet).

## Framework: Shareholder Value Creation

Shareholders are the legal owners of public companies. From their perspective, the measure of competitive advantage that matters the most is the return on their risk capital, that is, the money they provide in return for an equity share. They cannot recover that money if the company goes bankrupt.
Investors are primarily interested in a company's total return to shareholders, that is the return on risk capital including stock price appreciation plus dividends received over a specific period. This is an external and forward looking metric.
Efficient market hypothesis is the idea that all available information about a firm's past, current state and expected future performance is embedded in the market price of the firm's stock.
Market capitalization is a firm metric that captures the total dollar market value of a company's total outstanding shares at any given point in time.

All public companies must report total return to shareholders annually as well as benchmarks, usually one comparison to the industry average and another to a broader market index that is relevant for more diversified firms. These benchmarks allow us to assess competitive advantage.

Effective strategies to grow the business can increase the firm's profitability, and thus its stock price - which increases if the firm's rate of growth exceeds investors' expectations. Investors expect a firm to grow at a certain rate, and adjust their expectations over time.

This approach has some limitations, namely:

- Stock prices can be highly volatile, making it difficult to assess performance, especially in the short term;
- Macroeconomic factors have an impact on stock prices;
- Stock prices frequently reflect an irrational psychological mood of investors.

# Framework: Economic Value Creation

We already learned about economic value.
Reservation price is the maximum price a customer is willing to pay for a product or a service, based on the total perceived consumer benefits.
It's important to consider this factor when a customer is making a decision on buying something.
If two firms make the same product and have the same production costs, the competitive advantage goes to the one firm whose product has a higher reservation price: that's because that product will have greater total perceived consumer benefits. This advantage is based thus on superior differentiation of a product, which leads to greater economic value creation.
This is not the only way to achieve a greater economic value creation: it can also result from a cost advantage over rivals - that is, if the reservation price is the same but one firm has less costs than another.
This is valid if we make the assumption that products are priced at the maximum that a consumer might be willing to pay - this is not often the case. Most of the time, the economic value created is shared between the producer and the consumer.

How do we calculate competitive advantage? How do we explain total perceived customer benefits and economic value created?
Value is the dollar amount V that a consumer attaches to a good or service - also called reservation price.
The difference between the price charged P and the cost to produce C is the producer surplus, or simply profit.
The difference between what a customer was willing to pay and what they paid, V - P, is the customer surplus.
Economic value creation therefore equals consumer surplus plus firm profit, that is to say:
(V - P) + (P - C) = V - C
The strategic objective is to maximize that difference.

The economic value creation framework shows that strategy is about

1. Creating economic value;
2. Capturing as much of it as possible.

Competitive advantage goes to the firm that achieves the largest economic value created.
This is because a large difference between V and C gives the firm two distinct pricing options:

1. It can charge higher prices to reflect the high value, and thus increasing profitability;
2. It can charge the same price as competitors and gain market share.

This has direct implications for firm financial performance. Revenues are a function of the value created for consumers and the price of the good or service.

Profit = Total Revenues - Total Costs
Total Revenues = Price * Quantity Sold
Total Costs = Fixed Costs + Variable Costs

Variable costs change with the level of consumer demand.
We should not only rely on historical costs but take opportunity costs into account as well, which are the value of the best forgone alternative use of resources employed.

This approach, of course, has some limitations, such as:

- Determining the V is not always a simple task;
- The value of a good in the eyes of consumers is not an unique value but changes based on the consumer's characteristics;
- To measure the competitive advantage at a firm level, we must estimate the economic value created for all products and services offered by the firm.

## Framework: Balanced Scorecard

The balanced scorecard is a framework to help managers achieve their strategic objectives more effectively. It is a strategy implementation tool that harnesses multiple internal and external performance metrics in order to balance financial and strategic goals.

There are four main questions that this framework requires us to answer:

- How do customers view us? Consumers decide a reservation price for a product or service based on how they view it: managers track their perception to find areas to improve;
- How do we create value? The answer focuses on the business processes and structures that allow one firm to create economic value. One useful metric is percentage of revenues obtained from new product introductions, another might be to stipulate that a certain percentage of new products must originate from outside the firm's boundaries;
- What core competencies do we need? This question focuses managers internally to identify the core competencies needed to achieve their objectives ant the accompanying business processes that support, hone and leverage those competencies.
- How do shareholders view us? Some of these measures rely on accounting data and understanding this view of value creation leads managers to a more future oriented evaluation.

This method leads strategic leaders to:

- Communicate and link the strategic vision to responsible parties within the organization;
- Translate the vision into measurable operational goals;
- Design and plant business processes;
- Implement feedback and organizational learning to modify and adapt strategic goals when indicated.

The balanced scorecard can accommodate both short and long term performance metrics, allows to assess past performance, identify areas for improvement and position the company for future growth. It completes the common financial metrics with other aspects regarding internal processes, customer satisfactions, innovation.

It has to be noted that it is a tool for strategy implementation, not formulation; it also provides limited guidance on which metrics to choose. It is as good as the managers who use it, and a failure to achieve competitive advantage means strategic failure and not framework failure. It tracks the chosen metrics but does not give insight on how to put the metrics back on track.

## Framework: Triple Bottom Line

The triple bottom line is a combination of three main dimensions that, if taken into account, will lead to a sustainable strategy. These three dimensions are:

- Profits (economic dimension);
- People (social dimension);
- Planet (ecological dimension).

The sustainable strategy is at the intersection, and it is a strategy along these three dimensions that can be pursued overtime without detrimental effects to the planet or the people. porco dio il greenwashing

This is related to stakeholder theory and takes on a more holistic approach.

## Framework: Why, What, Who, How of Business Model Framework

A business model stipulates how the firm conducts its business with its buyers, suppliers and partners in order to make money.
Business model innovation is very important, less costly than process or product innovation, and often overlooked but can unlock much value.

To come up with an effective business model, a firm's leaders must transform their strategy of how to compete into a blueprint of actions and initiatives that support the overarching goals. Next, managers implement this blueprint through structures, processes, culture, procedures.
The main questions are four:

1. Why? Why does the business model create value? (revenue + cost models)
2. What? What activities need to be performed to create and deliver the offerings to customers?
3. Who? Who are the main stakeholders performing the activities?
4. How? How are the offerings to the customer created?

Popular business models:

- Razor-razor-blades: initial product sold at loss or given away, company makes money on replacement parts needed;
- Subscription: users pay access for a product whether they use it or not;
- Pay as you go: users pay only for what they use;
- Freemium: basic features are free, premium features or add ons are not;

- Ultra low cost: basic service is provided at a low cost, extra items sold as a premium;
- Wholesale: you sell to retailers at a fixed price, retailers profit from the difference;
- Agency: the producer relies on an agent or retailer to sell the product at a predetermined percentage commission;
- Bundling: this sells products or services for which demand is negatively correlated at a discount.

Business models evolve dynamically, and we can see many permutations:

- Combination: models can be combined (telecom companies combine razor blade and subscription);
- Evolution: one model can be seen as an evolution to another model (freemium is an evolution of razor blade);
- Disruption (agency, with amazon, disrupted wholesale in publishing);
- Response to disruption (in the above example, publishers looked for another model);
- Legal conflicts: the rapid development of business models can lead producers to breach existing rules of commerce.

Implications for strategic leaders:

1. No best strategy exists, only better ones;
2. Competitive advantage is best measured by criteria that reflect overall business unit performance and not specific departments' performance;
3. Both quantitative and qualitative performance dimensions matter;
4. Business model is critical to achieving a competitive advantage.

# CAPITOLO 4 MARKET SEGMENTATION, TARGETING AND POSITIONING

To implement the marketing concept and satisfy customer needs successfully, different product and service offerings must be made to the diverse customer groups that typically comprise a market.
The technique used by marketers to get to grips with the diverse nature of markets is called market segmentation, and it is defined as “the identification of individuals or organizations with similar characteristics that have significant implications for the determination of marketing strategy”.
Market segmentation involves the division of a market in diverse submarkets with common features, to identify customers that can be then served effectively.

Why is it important to segment the markets?

- To enhance profits;
- To enhance opportunities for growth, examine growth opportunities and expand product lines;
- To get an opportunity of segment dominance, figure out the segments in which competition might be most effective;
- To improve customer retention;
- To have a more effective targeting of communication.

## How to segment consumer markets

Segmenting customer markets; it can be done in three main ways.

- Behavioral (since the purpose is to identify behaviors of customers):
    - Benefits sought: understanding of why people buy in a market (convenience, status, performance);
    - Purchase occasion (self buy, gift, special occasions);
    - Purchase behavior of customer (brand loyal, brand switching, innovators);
    - Usage (heavy, light);
    - Media behavior (do they use social networks? do they watch tv?);
- Psychographic (used when researchers believe that purchasing behavior is influenced by personality or lifestyle of customers):
    - Lifestyle: this as in activities, interests, opinions (trendsetters, sophisticated, conservatives);
    - Personality (conscientious, agreeable, extrovert);
- Profiles (to describe the people who exhibit certain behaviors and differences in three main categories: demographic, socio economical, geographic);
    - Age;
    - Gender;
    - Life cycle (young single, young couple, young parents, middle aged, retired);
    - Social class (upper middle, middle, skilled working);
    - Terminal education age;
    - Income;

    - Geographic (North vs south, urban, rural, country);
    - Geodemographic (combination of geographic and demographic variables, which make us able to segment households in groups according to a number of factors) - ACORN targeting classification

## How to segment organizational markets

These markets have a smaller number of buyers.
Some criteria are:

- Organizational size: market segmentation might be by size of buying organization (greater firms might want discounts based on quantity, decision cycles are quicker in smaller firms);
- Industry sector - different industries might have unique requirements from products;
- Geographic location, there might be regional variation on buying needs and procedures;
- Choice criteria - one group of buyers value prices, one group values performance, another might be service oriented;
- Purchasing organization, whether it is centralized or decentralized. Centralized purchasing is associated with purchasing specialists who become experts in buying a range of products, and their opportunity to demand lower prices is higher.

## Criteria for successful segmentation

1. Effective: the customers in the segment must have homogeneous needs;
2. Measurable: it must be possible to identify customers in the proposed segment;
3. Accessible: it must be clear which promotional campaign works for the segment;
4. Actionable: company must have the resources to work into that segment;
5. Profitable: large enough to be profitable to serve.

Target marketing refers to the choice of specific segments to serve, and is a key element in marketing strategy. An organization needs to evaluate the segments to decide which ones to serve using the five criteria.

Undifferentiated marketing is the absence of segmentation, it occurs when market analysis reveals no differences in characteristics that have implications for a marketing strategy, or it is not profitable to exploit this aspect. It is sometimes the default strategy, and is easier for managers. It is often considered flawed but can be feasible, in a sophisticated way, in mature markets.

Differentiated marketing is a very popular strategy that consists in developing specific marketing mixes to appeal to all or some segments when market segments reveal potential targets. It enables firms to achieve economies of scale and spread costs over a wide range of potential customer groups. Risks: create confusion in the marketplace, spreading organization’s resources too thinly.

Focused marketing is when a company develops a single marketing mix aimed at one target (niche) market. Particularly appropriate for small companies with limited resources who can serve a niche which other bigger firms would not find profitable. Challenge is to evolve targeting strategy efficiently as the market grows.

Customized marketing is used when the requirements of individual customers are unique in the market and their purchasing power is sufficient to make viable the design of a discrete marketing mix. It is also found within organizational markets. It is often associated with close relationships between suppliers and customers. Advances in technology are continuing to facilitate developments in customized marketing in consumer markets. This is reflective of the contemporary way of thinking about marketing as a value co creation process based on close relationships between organizations and customers.

Personalization is an approach where brands deliver messages, products, experiences and services on a one to one basis by leveraging data and technology to meet, or anticipate, an individual customer's needs.
While customized marketing involves a co creation, personalization may lead to new products with elements decided by customers. A key element is technology.

Positioning is the act of designing the company's offering so that it occupies a meaningful and distinct position in the target customer's mind. The firm wants to link their product to the solutions that consumers seek and ensure that, when they think about those needs, the brand is one of the first that come to mind.
it is important because we live in an over communicated society, but it is difficult.

## How to develop a positioning strategy

Three variables are crucial:

- Customers: what attributes matter to them?
- Competitors: what do we do differently from them? What is our differential advantage?
- Company: it must look at building position based on its unique attributes.

Once the overall positioning strategy is agreed, next step is to develop a positioning statement, to be evaluated using these criteria:

- Clarity: idea must be perfectly clear in terms of target market and differential advantage;
- Consistency: a consistent message is required to break through the noise;
- Credibility: the selected differential advantage must be credible in the minds of the customers;
- Competitiveness: the chosen differential advantage should offer something of value to the customer that no one other gives them.

## Perceptual map

Useful tool to determine the position of a brand is the perceptual map - it is a visual representation of consumer perceptions of a brand and its competitors, using attributes as dimensions that are important to consumers.

Key steps to make one:

1. Identify a set of competing brands;
2. Identify the important attributes that consumers use when choosing a brand;
3. Conduct quantitative market research where consumers score each brand on all key attributes;
4. Plot brands on a two dimensional map.

Repositioning involves changing the target market, the differential advantage or both.

| | | Product | |
|---|---|---|---|
| | | same | different |
| Target market | same | image repositioning: the image of the product changes | Product repositioning, by adding new features or modifying it |
| | different | intangible repositioning: the product is aimed at a different segment | Tangible repositioning: everything changes, maybe there's a move up or down market |

# CAPITOLO 5 VALUE THROUGH PRODUCTS AND BRANDS

The essence of marketing is the delivery of value to some customer group. Products and brands are the embodiment of that value proposition.

One of the most effective ways to think about products is in terms of their mix of tangible and intangible components. Some items are high on tangible components and the company's marketing of these products places a great deal of emphasis on these tangible elements. Those at the intangible end of the spectrum are usually referred to as services.
It is important to remember that almost all value offerings combine elements of both tangible and intangible components.

Brands fulfill the function of distinguishing the offering of one company from those of others in a competitive environment.
Branding has become an ever more important aspect of marketing, and this is due to the fact that the technical differences between products are becoming fewer and fewer.

## Nature of the product

To understand the nature of the product offering it has been customary to think in terms of the different levels of product, which are:

1. Core product: the core benefit that the product satisfies - products will quickly decline if the core benefit can be met in other ways more effectively. Core differentiation arises when there are significant technological breakthroughs, and also occurs due to shifts in strategic thinking;
2. Actual product: it is the actual product that the customer purchases and has some characteristics such as styling, features, quality, packaging etc… actual differentiation occurs when organizations aim to compete on the basis of elements of the product such as its quality, its design, its features or its packaging.
    a. Quality is a key aspect, uniform standards are important, low quality can damage reputation;
    b. Many firms are known for their product design, easier to improve than quality;
    c. Packaging involves all decisions on the kind of container or wrapper used for the product, it is much more important now and poses ethical issues;
3. Augmented product: an additional bundle of benefits that are added to a product, such as installation, guarantees, delivery, additional services, brand values. Augmented differentiation is where most differentiations take place but these advantages are often short lived.

The benefits of branding to an organization:

- Company value: the concept of brand equity is used to measure the strength of the brand in the marketplace and high brand value generates tangible value for the firm in terms of increased sales and profits;

- Consumer preference and loyalty: strong brand names can have positive effects on consumer perception and preferences, and this turns into brand loyalty where a satisfied customer purchases the same brand repeatedly;
- Barrier to competition: the impact of strong perception about top brands means it is difficult for new brands to compete;
- High profits: strong brands are rarely the cheapest, since superior brand equity means that consumers receive added value over their less powerful rivals;
- Base for brand extensions: a strong brand provides a foundation for leveraging positive perceptions and goodwill from the core brand to brand extensions.

The benefits of branding to consumers:
- Communicate features and benefits;
- Reduce the risk in purchasing;
- Simplify the purchase decision;
- Provide symbolic value.

## Building Brands

Building brands involves making decisions about the brand name and how the brand is developed and positioned in the marketplace.

For naming brands there are three main strategies:
- Family brand name: it is used for all products. The use of the name in advertising helps all products, but all products can be also damaged if one of the brands receives unfavorable publicity or is unsuccessful;
- Individual brand name: this may be necessary when each brand requires a different identity;
- Combined brand name: both family and individual, capitalizing on the reputation of the company while allowing identification and diversification to a certain degree.

Much careful thought should be given to the choice of brand names since names convey images.
It should:
- Evoke positive associations;
- Be easy to pronounce and remember;
- Suggest product benefits;
- Be distinctive;
- Use numerals when emphasizing tech;
- Not infringe an existing registered brand name.

Brand names can be categorized as:
- Descriptive - General Motors;
- Evocative - Nike;
- Invented - Kodak;
- Lexical - Whatsapp;
- Acronym - ENI;
- Geographical: Cantine Lunae;

- Founder: Versace.

Developing brands is difficult, but an established brand tends to endure for a very long time. There are many demands on people's attention: generating awareness, communicating brand values, building customer loyalty. It takes many years, usually.

The anatomy of brand positioning is built on six elements:

1. Domain - the target market;
2. Heritage - the background, the culture of the brand;
3. Value - the core values and characteristics;
4. Assets - what makes the brand distinctive from other brands;
5. Personality - the character of the brand described as people, animals, objects;
6. Reflection - how it relates to self identity.

## Managing Brands

One of the first questions is whether or not to extend or stretch the brand.
Brand extension is the use of an established brand name on a new brand within the same broad market.
Brand stretching is when an established brand name is used for brands in unrelated markets.

Another question is whether or not the same brand can be marketed the same way across geographic boundaries: global branding strategies help reducing brand costs and generate global uniformity for brands.
Some multinationals narrow their portfolio of brands to market across international borders.
Other companies rename local brands.
Other multinationals acquire local companies and do not focus on global leaders
Another popular strategy is co branding:

- Product based: it involves the linking of two or more existing brands from different companies to form a product in which both brand names are visible to customer. Advantages are the fact that a co branding alliance can capture multiple sources of brand equity, and create a positioning for a particular target market. There are two ways to do this;
    - Parallel: two independent brands join forces to form a combined brand;
    - Ingredient: a specific supplier of a component is chosen;
- Communications based: it involves the linking of two or more existing brands from different companies or business units for the purpose of joint communications. For example a brand can recommend another, or sponsor another.

## Managing product and brand portfolios: BCG matrix

Some companies have a large portfolio of products and brands.

A product line is a group of products that are closely related in terms of functions and benefits they provide.

The depth of the product line is the number of variants offered within the product line.

A product mix is the total set of brands or products marketed in a company, it is the sum of the product lines offered.

The width of the product mix can be gauged by the number of product lines in the organization.

The process of managing groups of brands and product lines is called portfolio planning.

The Boston Consulting Group's matrix helps decide which products to invest in by positioning each product line in a graph.

The y axis is Market growth rate (annual growth rate of the market in which the product line operate and x axis is relative market share (the market share of each product relative to its largest competitor).

<table>
<tr><td rowspan="2">Market growth rate</td><td>higher</td><td>Stars: market leaders in high growth markets, they are successful and the prospect for further growth are good. Resources should be invested, competitive challenges should be repelled, these are the future's cash cows.</td><td>Problem children: these are cash drains, they have low profitability and require investment. Management has to choose whether to increase investment (build) to attempt to turn it into a star, or withdraw support either by harvesting (raising the price while lowering marketing expenditure) or divesting (dropping it or selling it), or find a niche market where dominance can be achieved.</td></tr>
<tr><td>lower</td><td>Cash cows: high profitability and low investment, these must be defended. Hold sales and market share, use the excess cash to fund stars or problem children, and R&D.</td><td>Dogs: weak products that compete in low growth markets. If a small cash flow exists there can be a niche maybe? In most cases, harvest or divest.</td></tr>
<tr><td></td><td></td><td>higher</td><td>lower</td></tr>
<tr><td></td><td></td><td colspan="2">Relative market share</td></tr>
</table>

Strengths of this approach:

- Simplicity

Problems of this approach:

- Matrix based on cash flow but perhaps profitability is a better criterion;
- It can lead to unhealthy preoccupation on market share;
- Market definition can be tricky;

- Ignores interdependencies between products;
- Oversimplified because it treats market growth rate as a proxy for market attractiveness and market share as an indicator of competitive strength.

Different products should have different roles in the product portfolio.

## Product life cycle

Product life cycle is a tool for conceptualizing the changes that may take place during the life of a product.

PLC shows that nothing lasts forever, companies must not fall in love with a product and accept that they might need to drop them, and also emphasizes the need to review marketing objectives and strategies as products age.

4 stages:

1. Introduction: low sales growth, losses may incur, product might terminate at this stage;
2. Growth: faster sales, profit growth, rapid market acceptance and repeat purchasing, profit may begin to decline at the end of this phase because of new competitors;
3. Maturity: sales peak and stabilize as saturation occurs hastening competitive shake-out, careful strategic decisions are important, brands are in the best position to resist pressure on profit margins and the need for brand building is felt most acutely;
4. Decline: sales and profits fall.

| | Introduction | Growth | Maturity | Decline |
|---|---|---|---|---|
| Strategic marketing objective | Build | Build | Hold | Harvest/manage for cash |
| Strategic focus | Expand market | Penetration | Protect share | Productivity |
| Brand objective | Product awareness, trials | Brand preference | Brand loyalty | Brand exploitation |
| Products | Basic | Differentiated | Differentiated | Rationalized |
| Promotion | Creating awareness | Creating awareness/ trial repeat purchase | Maintaining awareness/ repeat purchase | Cut/eliminated |
| Price | High | Lower | Lowest | Rising |
| Distribution | Patchy | Wider | Intensive | Selective |

A key ethical consideration is the speed at which many products move through this cycle.

Still, not all products follow this cycle - some products “rise like a rocket and fall like a stone”. The duration of the phases is unpredictable, and it is been argued that the PLC is an EFFECT of marketing and not a CAUSE. So, PLC is but an useful aid.

## New product development - the seven stages:

There are four main kinds of new products:

- Product replacements: 45% of new product launches, include revisions and improvements of existing products, repositioning and cost reductions;
- Additions to existing lines: 25% of new product launches, new products added to existing product lines to add depth to them;
- New product lines: 20% of new product launches, they represent a move into a new market for a firm, to widen the mix;
- New to the world products: 10% of new product launches, create entirely new markets, has highest risks but possibly highest returns.

It is a risky, expensive and time consuming activity.

It has seven stages:

1. Idea generation: the source can be internal to the company, brainstorming or financial incentives can be involved. It might also be external, by examining competitors’ products or listening to distributors’ feedbacks, or even customers. Keeping in close contact with customers who are innovators and market leaders in their own marketplaces is likely to be a source for new ideas;
2. Screening: once the new product ideas has been developed, they need to be screened in order to evaluate their commercial value, with more or less systematic approaches;
3. Concept testing: once an idea has been framed worthy of further investigation, it can be framed into a specific concept for testing with potential customers, to allow them to enter the new product development process at an early stage;
4. Business analysis: estimates of sales, costs and profits will be made based on the results of the concept test, as well as on considerable managerial judgment - a marketing analysis will be undertaken, to identify the target market, size and projected product acceptance over years. Break even analysis might also be used to establish if the project is feasible;
5. Product development: this is the stage where the product is actually developed, it is necessary to integrate the skills of designers, employees, production, engineers, finance, marketing - a key marketing factor in many industries is the ability to cut time to market by reducing the length of the product development stage: both to stay at pace with technological innovation, and for competitive advantage. Product testing focuses on the functional aspects of a product.
6. Market testing: this takes measurements of customer acceptance by forcing customers to put their money where their mouth is, by launching the product in a limited way and seeing the consumer response. There are two ways:
    a. Simulated market test: set up a realistic market simulation in which a sample of consumers choose to buy goods from a range to see what they do;

    b. Test marketing: when a new product is launched in one or a few geographical areas chosen to be representative of its intended market, it is a more realistic test;
7. Commercialization: it is the final stage, where you launch the product in the marketplace, and an effective commercialization strategy relies on marketing management making clear choices on target market and the development of a marketing strategy that provides a differential advantage.

Firms launching products initially aim to target innovators and early adopters.
In summary, bringing out new products and services is the key to long term corporate success but it is a risky activity; a systematic approach is likely to improve the chances of success.

# CAPITOLO 6 VALUE THROUGH SERVICES, RELATIONSHIPS AND EXPERIENCES

Almost all goods contain both tangible and intangible elements. The high importance of services means that it is a key area of study.
The concept of service dominant logic was proposed to try and shift the focus of research from the production of goods to the trading of services.

Initial premises:

- Service is the fundamental basis of exchange;
- The service basis of exchange is not always apparent as it is masked by goods, money, institutions etc;
- Goods are a distribution mechanism for service provision;
- Resources such as knowledge and skills are the primary source of competitive advantage;
- All economies are service economies;
- The customer is always a co creator of value;
- The enterprise cannot deliver value but only offer value propositions;
- A service centered view is inherently customer oriented and relational;
- All social and economic actors are resource integrators;
- Value is always uniquely determined by the beneficiary.

## Four key propositions of services

From these premises, four key propositions have emerged.

1. **Intangibility**: services can be thought of as deeds, performances or efforts, there might thus be a difficulty in evaluation before purchase. Services have experience properties and sometimes credence properties. In order to show proof of service quality, tangible clues might be used. Customers do not own the service, they just experience it, and this brings lower capital costs and spreading of payment charges;
2. **Inseparability**: services have simultaneous production and consumption. Service providers are extremely important, such as is the training of all the staff involved. Also, customers sometimes experience the service together, and share feedback between them, which can work both ways. The enjoyment of the service might also be influenced by other customers;
3. **Variability**: standardization of service is very difficult, quality is more difficult to check and evaluation systems must be developed, such as using reliable equipment when needed;
4. **Perishability**: consumption cannot be stored for the future, so supply and demand must be carefully matched. Catering for peak demand is also a challenge, which can be solved with part time staff during peak periods or through multi skilling of employees. Participation by consumers may be encouraged and smoothed through differential pricing. Another solution is a reservation system.

Opportunities for adding value are provided by the service components.

Managing services enterprises involves some special challenges.
Four key issues:

1. Physical evidence: tangible evidence, or servicescape, is a clue to the likely quality of the service. Everything about colors, windows, ambiance of the location;
2. People: the term service encounter is used to describe the interaction between customers and staff - the outcome of these interactions might determine the success of a company. This has given rise to the idea of the service profit chain, whereby having a happy workforce leads to having happy customers and ultimately superior profitability. Internal marketing is the selection, training and motivating of staff members to provide customer satisfaction;
3. Process: this refers to the mechanisms, procedures and flow of activities by which a service is acquired. Some parts of the process are visible to the customer, some are not. All the decisions regarding processes require trade offs between service quality and service productivity. There are ways to increase productivity without compromising quality, for example involving customers in some processes or adding temporary additional staff. The service process will also be significantly influenced by the service provider's attitude towards technology and advancement - technology can enhance productivity, but often at the cost of the relationship with the customer;
4. Service branding: branding is of crucial importance because of the prevalent intangible nature of the service. Strength of brand equity is important, and to represent and market it correctly, use tangible cues or word of mouth.

## Service quality

Managing service quality is important. A key to providing service quality is the understanding and meeting of customers expectations, and to do so requires a clear picture of the criteria used to form these expectations.

Five core dimensions:

- Reliability - is the service consistent and dependable?
- Assurance - can customers trust the service company and staff?
- Responsiveness - how quickly does staff respond to customers?
- Empathy - is the service staff friendly and polite?
- Tangibles - how well managed is the tangible evidence of the service?

Service quality problems mainly emerge from four gaps:

1. Gap between what customers expect from a service provider, versus what senior management thinks that customers expect. Close it with effective research;
2. Gap between senior management perceptions and the service level criteria that they set for the organization. Close it by ensuring that customer service goals are an important part of the organization's targets for the planning period;
3. Gap between the service level targets set by the organization and the actual level of service that is delivered by front line staff. Close it with good internal marketing practices;

4. Gap between what firms tell their customers to expect and what they actually deliver. To not open this, do not over promise.

Service recovery strategies should be designed to solve problems and regain the customer's trust.
The first step is to set up a tracking system to identify system failures.
Secondly, staff should be trained in handling these situations.
Finally, this kind of strategy should encourage learning from mistakes to do better in the future.

## Relationship marketing

Relationship marketing is the idea that customers may value having a close relationship with a service provider. Having a relationship is advantageous for customers because of trust, and to firms because customer retention is simpler.
Not all service encounters, though, have potential for a long term relationship.
There should be:

- An ongoing desire for the customer to use the service;
- A choice of providers made by the customer:
- Alternatives from which to choose.

There are six benefits for firms:

1. Increased purchases;
2. Lower costs;
3. Lifetime value of customers;
4. Sustainable competitive advantage;
5. Word of mouth;
6. Employees' job satisfaction.

The net result is high profits.
Loyal customers generate more revenues for more years and the costs of maintaining existing customers are lower than the costs of acquiring new ones.

There are also benefits for the customers:

- reduce risk and stress involved in making choices;
- higher quality service, sometimes even customized;
- customers can reap social and status benefits.

There are three levels of bonding of the two parties:

1. financial incentives, like discounts or loyalty points;
2. socialization, personalized treatment, customization;
3. structural bonds who tie service providers and customers through the providing of solutions that are designed into the service delivery system.

## Customer Relationship Management

Customer Relationship Management (CRM) are systems where a single database is created from customer information to inform all staff who deal with customers, to have a single point of view of each client.
All interactions get recorded in the system - there might be problems of incompatibility between different automated systems which manage different aspects of marketing activity.
One of the benefits of this system is that it is based on the knowledge of the customer's previous history and known preferences, as well as anagraphics and other elements of the customer.
Good CRM systems throw up all sorts of unusual patterns in consumer behavior, and allow organizations to conduct analysis on their customers.

Not all customers are equal, businesses are frequently subject to the Pareto principle, so sometimes customers get labeled on their level of activity.
CRM makes us able to answer three questions:

- Customer retention: what proportion of customers stay with the firm? Are they the customers we want to retain?
- Customer defection: what proportion of customers leave the firm? Are they the customers we want to leave?
- Customer acquisition: what proportion of new customers are arriving as a result of the marketing activities?

## Customer Loyalty Ladder

Customer loyalty is one of the main focuses of relationship marketing strategies. It has been suggested that a potential loyalty ladder exists, and this helps organizations reflect on the different types of loyalty that may exist, and the difference between loyalty and inertia.
The ladder has six steps:

- Prospect;
- Customer;
- Client;
- Supporter;
- Advocate;
- Partner.

Customer brand engagement is the level of a customer's cognitive, emotional and behavioral investment in specific brand interactions. It has a positive effect on a firm's performance, and it is higher in B2B firms and in services.
Also, associations between a small increase in customer retention and a large increase in profitability have been identified. It is, though, the nature of loyalty and not the time of contact with a firm, that matters.

## User experiences

The creation of user experiences is another avenue for organizations to deliver value to customers. Through experiential marketing, organizations recognize the important role of emotions in consumer decision making.
There are five types of experiences:

- Sensory experiences;
- Affective experiences;
- Creative cognitive experiences;
- Physical experiences, behavior and lifestyle;
- Social identity experiences.

This kind of marketing has also become very popular within retail trade as stores and locations seek to find new ways to appeal to potential customers.
Customers who participate in these activities might become brand advocates.

## Marketing for non profits

Marketing is also important in non profit organizations, which still have to make money to survive even though their primary goal is non economic. Many non profits operate in the service sector.
Non profits need to show how their work benefits society.

Characteristics of non profit marketing are:

- they need not only to meet their current needs, but to educate the customers in terms of new ideas and issues, cultural developments and social awareness (social marketing);
- Multiple publics: most non profits serve different groups or publics. There's donors and clients, and both must be satisfied;
- Measurement of success and conflicting objectives: non profits have many objectives, not only profitability, so they have to balance every one of them to see whether they are succeeding or not;
- Public scrutiny: since non profits rely on public funding and donations, they must be especially careful not to become involved in public scandals.

Target marketing, differentiation and tactical marketing are relevant to non profits too.

Target marketing requires for the non profit to segment their target public first into donors and clients, then, within each group, in segments of individuals, which will then be targets for persuasive communication and development of services. Every charity needs not only to promote itself, but to gain publicity for its cause.
These tactics are very used by political parties as well: potential voters are segmented in order to optimize resources during electoral campaigns. By keeping in touch with public opinion, political parties have the information to differentiate themselves from their competitors on issues that are important to voters.

The pricing of services does not follow the same rules as for firms, and most services have short distribution systems, so the procedure to deliver the service with the convenience that customers require must be very careful.

Many non profit use promotion to further their needs, by using direct mail, mailing lists, publicity opportunities, sponsorships and public relations.

# CAPITOLO 7 DISTRIBUTION: DELIVERING CUSTOMER VALUE

Products need to be available in adequate quantities, in convenient locations and at times when customers want to buy them.
Producers need to consider the requirements of channel intermediaries, those organizations that facilitate the distribution of products to customers, as well as the needs of the ultimate customers.
Establishing a supply chain that is efficient and meets customers' needs is vital, this supply chain is called channel of distribution and is the means by which products are moved from the producer to the ultimate consumer.
An important aspect of marketing strategy is choosing the most effective channel of distribution.
Disintermediation is the process of reducing or eliminating intermediaries in the supply chain.

## Alternative channels

There are different alternative consumer channels:

- Producer to consumer: it cuts out distributors' profit margins;
- Producer to retailer to consumer: retailers provide the basic service of enabling consumers to view a wide assortment of products under one roof, higher reach of customers for producer;
- Producer to wholesaler to retailer to consumer: this makes economic sense for small retailers, large retailers can cut the cost of wholesalers;
- Producer to agent to wholesaler to retailer to consumer: long channel, used by companies entering foreign markets.

Business to business channels have as well different alternatives:

- Producer to business consumer: common practice for expensive goods, co created products and personalized solutions;
- Producer to agent to business consumer: an agent may sell a range of goods from several suppliers, attractive to spread selling costs and for companies without sales operations, but little control over the agent;
- Producer to distributor to business consumer: for less expensive, more frequently bought B2B products;
- Producer to agent to distributor to business consumer: distributor if the consumer prefers it, the agent for cost reasons.

Service channels might or might not require an agent, when the provider is distant or it is not economical for the provider to establish their own local sales team.

## Channel strategy decisions

The design of the distribution channel is an important strategic decision that needs to be integrated with other marketing decisions.
Channel strategy decisions involve the selection of the most effective distribution channel, the most appropriate level of distribution intensity and the degree of channel integration.

Channel selection:

- Market factors: buyer behavior is an important factor, such as the geographical concentration and location of customers;
- Producer factors: producers may lack the financial and managerial resources to take on channel operations. The level of control desired in channel operations is also a factor, as well as the decision on whether to push the product through the channel (which requires investing heavily in trade support) or market heavily to the end consumer;
- Product factors: is the product large? is it perishable?
- Competitive factors: an innovative approach to distribution may be required if competitors control traditional channels of distribution.

Distribution intensity:

- Intensive distribution uses all available outlets and aims to provide saturation coverage of the market;
- Selective distribution gives the opportunity to select only the best outlets and having to train distributor staff on fewer outlets - and, if selling and distribution are direct, reducing costs;
- Exclusive distribution is an extreme form of selective distribution in which only one wholesaler, retailer or B2B distributor is used in a particular geographic area.

Channel integration:

- Conventional marketing channels leave the producer with little to no control over intermediaries because of their independence - when a manufacturer dominates a market, it may exercise power over them which may result in an administered vertical marketing system. Retailers, though, have exerted significant control there, by developing their own retailer brands, which has had a lot of penetration in undifferentiated product categories;
- Franchising is a legal contract in which a producer and a channel intermediary agree each member's rights and obligations. There are still conflicts even though it gives a degree of producer control.
  It might be chosen because of:
    - overcoming resource constraints where cost of distribution is shared with the franchisee;
    - overcoming producer distributor management problems because producers may value the notion of the owner manager who has a vested interest in the success of the business;
    - accessing local knowledge of the franchisee.

    Franchising occurs at 4 levels of the distribution chain:
    - Manufacturer and retailer;
    - Manufacturer and wholesaler;
    - Wholesaler and retailer;

    - Retailer and retailer.
- Channel ownership establishes a corporate vertical marketing system and gives the producer total control over distributor activities. Acquisition, though, has high prices.

## Channel management

Channel management is an ongoing activity:

- Selection of channel members involves first the identification of potential channel members and second the development of selection criteria;
- Motivation: channel members, onche chose, must be motivated to act as distributors - their needs and problems must be understood;
- Training requirements of channel members depends on their internal competencies: training can help provide the necessary knowledge and help build a spirit of partnership;
- Evaluation of channel members provides the information necessary to decide which channel members to retain - the scope and frequency of evaluation maybe limited where power lies with the channel member;
- Managing conflict because of difference in goals, because sometimes resellers add additional product lines or producers use multiple distribution channels:
    - sales targets can be mutually agreed;
    - staff may need training in conflict handling;
    - when conflict arises between different distribution channels producers can try to partition markets;
    - when poor performance is the problem, improve performance;
    - finally there's purchase of the other part or coercion.

## Retailing

Retailing is conducted primarily in stores such as supermarkets and department stores. Large retailers have enormous power and extract "guarantee of margins" from manufacturers. One manufacturer is played against another and own label brands are used to extract more profit.

Major retail stores types:

- Supermarkets, large self service stores with convenient locations, wide product ranges and competitive prices;
- Department stores are where related product lines are sold in separate departments, they usually have a variety of leading manufacturer brands which are allocated significant store space (tipo la rinascente o la coin);
- Convenience stores offer customer a close location and long opening hours, but have higher prices;
- Specialty stores specialize on one type of product, usually focus on high quality as well as providing good service;

- Discount houses sell products at low prices, high turnover, bulk buying, small profits from each item;
    - Factory outlet stores are a kind of discount house with a wide range of manufacturer owned retail shops that carry out of season stock or unsold products from department stores ad a heavy discount;

Online retailing has grown in importance and can have three forms:

- Pure online retailing scenarios;
- Products can be ordered online and distributed through the use of local distributors;
- Online store of a physical retailer.

Online stores:

- Are open 24/7;
- Offer a much wider product range;
- Unlimited carrying capacity;
- Can potentially offer almost any niche product a consumer may be looking for;
- The cost of doing business is relatively lower;
- Have access to a global market.

Multi channel retailing refers to a combination of channels which includes physical stores, direct distribution, online stores etc. Multi channel customer management has been defined as “the design, deployment, coordination and evaluation of channels to enhance customer value through effective customer acquisition, retention and development.”

Omni channel management has been defined as the “synergetic management of the numerous available channels and customer touchpoints, in such a way that the customer experience across channels and the performance of channels is optimized”.

There are some challenges that relate to retailing:

- Retail positioning involves the choice of target market and differential advantage; targeting allows retailers to tailor their marketing mix to the needs of their chosen customer segment, differentiation provides a reason for a consumer to choose a retailer. Innovation in retailing can only come from novelty in the process offered to the shopper, or from novelty in the product or product assortment offered.
- Store location - regional coverage, the choice of towns and cities to target, and the spots in cities and towns. The choice of a spot may depend on traffic, parking, access for delivery vehicles, the presence of competition, planning restrictions and whether there is an opportunity to form new retailing centers with other outlets;
- Product assortment - both in breadth and depth, and own branding;
- Price - some retail have price as a differential advantage, and this requires vigilant cost control and massive buying power: supermarket chains are pressurizing suppliers to provide consistently low prices instead of temporary promotions;
- Store atmosphere - created by combination of design, color and layout, both exterior and interior. Lights and scents are important too, and everything together can create an identity for a retailer and attract customers. Multi sensory marketing describes the approach adopted by retailers to appeal to as many senses as possible. The rise of experiential marketing has placed a significant focus on store atmospherics.

## Physical distribution decisions

Physical distribution decisions focus on the efficient movement of goods from producers to intermediaries and customers. Physical distribution is defined as a set of activities concerned with the physical flows of materials, components and finished goods from producer to channel intermediaries and consumers.
Distribution aims to provide intermediaries and customers with the right products in the right quantities in the right locations at the right time.
Physical distribution activities have been the subject of managerial attention for some time because of the potential for cost savings and improving customer service levels - cost savings can be achieved by reducing inventory levels, using cheaper transport, shipping in bulk.
Tradeoffs between customer satisfaction and cost reduction are often necessary, and there might be trade offs between elements of the distribution themselves.

The key elements of the physical distribution system are:

- Customer service: it is essential to set customer service standards, if they are high costs rise, but they might be used as a criterion of choice for customers and suppliers;
- Order processing: this relates to how the orders are handled, and a reduction of the time requires an analysis of the components that make up the order processing time;
- Inventory control: a balance has to be found between the need to have products in stock to meet customer demand and the costs incurred in holding large inventories. Small, frequent orders raise order processing costs but reduce inventory carrying costs; large, infrequent orders raise inventory costs but lower order processing costs.
- Warehousing: this involves all the activities required in the storing of goods between the time they are produced and the time they are transported to the customer - breaking bulk, making up products assortments, storage, loading. Warehousing strategy involves the determination of the location and number of warehouses or distribution centers to be used;
- Transportation: which means are used?
    - Railways are efficient and eco friendly but less flexible;
    - Road is flexible but creates traffic and pollution;
    - Air is fast but costs;
    - Water is slow but economic;
    - Pipelines low maintenance;
- Materials handling involves the activities related to movement of products in plants and warehouses and transportation depots. Automation reduces the level of error and speeds up the processes.
    - Unit handling achieves efficiency by combining packages on pallets;
    - Containerization involves the combination of large quantities of goods in a single container.

## Personal selling and direct distribution

Personal selling and direct distribution is a common practice in B2B and service industries, even though companies are reducing the size of sales forces in the face of greater buyer concentration, moves towards centralized buying and the cost of maintaining sales forces. Three main types of salespeople:

- order takers respond to already committed customers;
- order creators persuade and do not close sales;
- order getters persuade the customer to make a direct purchase.

There are a number of enabling activities carried out by salespeople:

- Increase sales, obviously;
- prospecting, which involves searching for and calling on potential customers;
- maintaining customer records;
- providing services to customers, like giving advice;
- handling complaints, relationship management and self management.

Trust is an important part of relationship development and is achieved through a high frequency of contact, ensuring promises are kept and reacting quickly to problems.

Seven phases of the selling process:

1. Preparation - the preparation carried out prior to a sales visit;
2. The opening - creating a favorable initial impression;
3. Need and problem identification - identifying needs and problems of each customer;
4. Presentation and demonstration - it should focus on consumer benefits rather than product features;
5. Dealing with objections - handle both substantive and emotional aspects, employ the agree and counter technique;
6. Closing the sale - the salesperson must take initiative;
7. Follow up - to show that the salesperson cares about the customer.

Sales management is a challenging activity, the two main aspects are:

1. Designing the force:
    a. Determine sales force size: this can be done through the workload approach, by calculating total annual calls required divided by average per salesperson;
    b. Organizing the sales force: there are three main ways:
        i. Geographical;
        ii. Product;
        iii. Customer based, so divided by market segments - one growing form is key account management, where there are a key account sales force comprising senior salespeople who develop close personal relationship with the key customers and are skilled in the art of negotiation;
2. Managing the sales force: the main elements are:
    a. Setting specific salesperson objectives - usually in terms of sales quotas, but oftentimes in profit targets;
    b. Recruitment and selection;
    c. Training - which should include product knowledge and skills development;
    d. Sales force motivation and compensation - motivation can be achieved by managers if they know what each salesperson values and strives for, and

recognizing that rewards can be financial or non financial (nonfinancial like praise, financial like salary + commissions);

e. Sales force evaluation - it gathers the info required to check whether targets are met or not, and identifies individual strengths and weaknesses to better enhance training. It's important to have both quantitative and qualitative criteria.

# CAPITOLO 8 INTEGRATED MARKETING COMMUNICATIONS: OFFLINE COMMUNICATIONS TECHNIQUES

What kinds of messages should we create, and how can we communicate them?
The range of techniques available to the marketer is known as “promotional mix”.
The following five considerations have a major impact on choice and mix of promotional tools a company will use:

1. Resource availability and cost of promotional tools;
2. Market size and concentration;
3. Customer information needs;
4. Product characteristics;
5. Distribution push versus consumers pull strategies;

If several different communications tools are being used, it is important that they are consistent with and complement one another. This is what is meant by the concept of Integrated Marketing Communications (IMC).

The source encodes a message by translating the idea into a symbol. The message is transmitted through the media selected for their ability to reach the target audience. “Noise” may prevent transmission, and marketers must make the message cut through the noise (the amount of information with which the customers are bombarded every day).
In order to do this, communicators must understand their target before encoding messages.

If several different media are selected, the messages and the selection must be consistent and coordinated.

## Stages of marketing communications strategies

Marketing communications must be planned carefully, and there are various stages.

1. Looking at the firm’s marketing strategy;
2. Looking at the positioning strategy;
3. Looking at the target audience.
    a. Quantifiable objectives must be selected
    b. Messages must be created
    c. Promotional mix must be selected
    d. Promotional budget as well
4. Execute IMC strategy;
5. Evaluate IMC strategy.

## Advertising

Advertising is a very big business, and there is no single all-embracing theory on how it works: it's likely to have different roles depending on the nature of the product and the degree of involvement of the customer.

Defining advertising objectives is a much important task. Advertising can have a number of communication objectives:

- Create awareness of a brand or a solution to a company's problem;
- Stimulate trial;
- Help position products in the minds of consumers;
- Correction of misconceptions;
- Reminding customers of sales and offers;
- Providing support to the company's sales force.

## Advertising budget

The amount that is spent on advertising governs the achievement of communication objectives.
Four methods of setting advertising budget:

1. Percentage of sales (amount allocated to advertising is based on current or expected revenue - weak and ignores market opportunities;
2. Competitive parity (match the competitors' expenditures, weak);
3. Affordability (what can the firm afford - must be taken into account but not used as a sole criterion bc ignores communication objectives);
4. Objective and task method (adv budget depends on communication objectives and the cost of the tasks required to achieve them).

## Advertising message

The advertising message translates an organization's basic value proposition into an advertising platform - that is, the words, symbols and illustrations that are attractive and meaningful to the target audience. Choice of media is important, message must be succinct, most people who read a press ad only read the title, television messages can use different creative treatments:

- lifestyle
- humour
- shock
- testimonials
- sexual imagery
- comparative advertising.

Television advertising is often used to build a brand personality, which is the message the advertisement seeks to convey. People use brand personality in different ways, like self expression, reassurance, a communicator of the brand's function and an indicator of trustworthiness. Sometimes brands act as badges.

## Media selection decision

The media selection decision has become extremely important, both choice of media class (tv vs press) and of media vehicle (canale 5 vs rai 2). A combination may be chosen.
Each medium possesses its own set of creative qualities and limitations.

- Television can be used to show the product in action, nowadays the public is fragmented, it plays a significant role in brand building;
- Press is useful for providing factual information and people can reread the advertisement in a second moment;
- Posters are good for succinct messages, some posters are also technological;
- Radio useful for communicating factual information;
- Cinema benefits from color and sound.

Media class decision is defined as well by different factors, such as:

- advertising budget;
- relative cost per opportunity to see;
- competitors' activities;
- views of the retail trade.

Media vehicle decisions do have a creative component but the most important factor is the cost per thousand calculation.

## Evaluating effectiveness

Evaluating effectiveness is a procedure that can be done:

- Before campaign execution, through pre testing, usually done with a focus group - it does not always work though;
- During campaign execution;
- After campaign execution, through post testing: the things evalued are
    - image and attitude change;
    - actual sales;
    - usage;
    - cash flow;
    - shareholder value;
    - return on investment.

## Organizing for campaign development

Organizing for campaign development: there are four options open to an advertiser.

1. small companies may develop the advertising in cooperation with people from the media;
2. the advertising function may be conducted in house by creating an advertising department staffed with copy writers, media buyers and production personnel;

3. use of an advertising agency, the larger ones offer a full service and have a lot of experience;
4. use an in house team for some functions, and a specialist agency for others.

How do you pay agencies? the traditional system was by commission through media owners. Large advertisers have the power to demand some of this commission in the form of a rebate.
Another way is by fee: for smaller clients, commission alone may not be sufficient to cover agency cost - also, fees remove a source of agency bias towards media that pay commission.
A third way is payment by results.

## Sales promotions

Sales promotions are incentives to consumers or the trade that are designed to stimulate purchase, if sales require a shock this technique is very used and is correlated with brand loyalty, consumer attitude and switching costs for consumers.
It might be used to increase short term sales to reduce inventories or meet budgets prior to the end of the financial year.
Some key reasons why it is popular:

- increased impulse purchasing;
- the rising cost of advertising;
- shortening time horizons, life cycle of products is shortened;
- competitor activities;
- easy measurability.

## Consumer promotion techniques

Consumer promotion techniques:

- Money off promotions: provide direct value to the customer and an unambiguous incentive to purchase, but can be done by competitors and devalue brand image;
- Bonus packs: give added value by giving consumers extra quantity, if it is done with two different products it is called a multi - buy. This is used to protect market share and can generate range trial;
- Premiums: any merchandise offered at low to no cost as an incentive to purchase a brand, it can be done in three ways:
    - free in pack;
    - free in the mail;
    - self liquidating offers, where consumers are asked to pay a sum of money to cover the costs of the merchandise;
- Free samples;
- Coupons;
- Prize promotions:
    - competitions;

    - draws;
    - games;
- Loyalty cards.

## Trade promotion techniques

Trade promotion techniques:

- Price discounts;
- Competitions: providing prizes for a distributor's sales force in return for achieving sales targets for their products;
- Allowances: a sum of money in return for retailers providing promotional facilities in store;
- Free goods: offer more merchandise at the same price.

## Testing a promotion

Testing the promotion involves:

- Group discussions (testing ideas on groups of potential targets);
- Hall tests (bringing a sample of customers to a room where alternative promotions are tested);
- Experimentation (for example, two groups of stores are selected and alternative promotions run in each).

## Public relations

Public relations is the concern of handling stakeholders.
Public relation activities include:

- Publicity: it is the communication of information about a product/organization by the placing of news about it in the media without paying for the time or space directly, the three key tasks of a publicity department are:
    - responding to requests for information from the media;
    - supplying media with information;
    - stimulating the media to carry the information and viewpoint of the organization;

  Publicity itself has three important characteristics:
    - The message must have credibility, because it must appear independent;
    - No direct media costs since space or time does not have to be bought;
    - No control over publication, there is no guarantee that the news item will be judged worthy;
- Corporate advertising
- Seminars
- Publications
- Lobbying

- Charitable donations

PR can foster reputation, promote products, raise awareness, deal with issues and opportunities, overcome misconceptions.
Three main reasons for the growth in PR:

- recognition by marketing teams of the power and value of PR;
- increased advertising costs leading to an exploration of alternative routes;
- improved understanding of PR's role.

## Sponsorship

Sponsorship is a business relationship between a provider of funds, resources or services and an individual, event or organization which offers in return some rights and association that may be used for commercial advantage.
Sponsorship can be very expensive, and a sponsorship agreement is not enough for brand equity building or sales augmentation - sponsors need to truly leverage activities to promote their quality and motivate fans to engage with their brand to see results.
Five principal objectives of sponsorship:

1. Gaining publicity in the news media;
2. Creating entertainment opportunity for customers and the trade, like sponsorships of music, arts and sports;
3. Fostering favorable brand and company associations;
4. Improving community relations by sponsoring schools and community programs;
5. Creating promotional opportunities by creating merchandise with the company logo.

Sponsorship has experienced growth over the last years because of media fragmentation, restrictive government policies and escalating costs of media advertising.
This brought to the phenomenon of ambush marketing, when a company tries to associate itself with an event without paying. This is legal as long as you don't use the event symbols but event organizers are still trying to prevent this.

The selection of an event or individual to sponsor requires consideration to be given to the firm's communication objectives, target market, promotional opportunities, costs involved, risks associated. Many brand still don't have a decision making process.

## Direct Marketing

Direct marketing is the term used to describe the distribution of products, information and promotional benefits to target consumers through interactive communication in a way that allows response to be measured.
It usually requires an immediate response, thus the effectiveness can be assessed quantitatively.
DM can be used to build direct relationships with the customers.
It covers a wide array of methods:

- Direct mail
- Telemarketing
- Direct response advertising (coupon response or “phone now”)
- Catalogue marketing
- Inserts in magazines
- Door to door leafleting.

The significant growth in direct marketing has been explained by 5 factors:

1. Growing fragmentation of media and markets makes traditional mass advertising less effective;
2. Developments in technology and softwares that generate personalized letters have made the work easier;
3. Increased supply of mailing lists - list brokers act as intermediaries in the supply of lists from list owners;
4. Sophisticated techniques as geodemographic analysis;
5. The high cost of other techniques.

How to manage a direct marketing campaign:

1. Identify marketing strategy;
2. Identify and understand the target audience;
3. Identify the marketing objectives, which are usually short term and against which performance can be measured:
    a. acquire customers;
    b. retain customers;
    c. improve sales;
    d. create awareness;
4. Choose the media to be used;
5. Make creative decisions;
6. Execute campaign:
    a. in house
    b. through agency;
7. Evaluate campaign:
    a. response rate
    b. total sales
    c. sales rate
    d. enquiry rate
    e. cost per contact, enquiry or rate
    f. repeat purchase rate.

Different media that can be used:

- Direct mail: it is very economic but the quality of the mailing list has to be taken into account;
- Telemarketing: integrated telephony systems allow for callers to be identified, predictive dialling enables multiple out of bound calls to be made from a call center and calls are only delivered when the customer answers. It is very versatile and has advantages like:
    - lower costs per contact than a face to face visit;
    - less time consuming;

    - technology makes it easier;
    - advantage of two way communications.
- Direct response advertising is designed to elicit a direct response, like when a freephone number is included or a coupon response mechanism is used - also live shopping programmes or infomercials;
- Catalogue marketing can be a convenient way to select products away from crowded shops and to remote locations. Catalogues are expensive to produce but can be found online most of the cases;
- Exhibitions bring buyers, sellers and competitors together in a commercial setting and give the opportunity to:
    - identifying prospects and determining their needs;
    - building relationships;
    - providing product demonstration;
    - making sales;
    - gathering competitive intelligence;
    - fostering the image of the company;
- Product placement is the deliberate placing of products and logos in television, music, series, and videogames, usually in return for money; it has grown because of
    - media fragmentation
    - positive associations
    - many consumers do not realize the product placement
    - repetition of the media means that the placement is seen many times
    - certain segments can be targeted better
    - merchandising opportunities can be generated

  There are also risks involved: audiences can become annoyed and the brand might not have total control on how the brand is portrayed;
- Ambient advertising is advertising carried on outdoor media that is not billboards and bus signs;
- Guerrilla marketing is the delivery of advertising messages through unexpected means, good for limited budgets but has critiques.

# CAPITOLO 9 INTEGRATED MARKETING COMMUNICATIONS: ONLINE COMMUNICATIONS TECHNIQUES

Online interaction has grown very importantly in the past few years, and the digital environment has changed the interactions between businesses and consumers (also B2B and C2C); this has forced marketers to reassess how they allocate their marketing budgets.

## 5S Framework for online communications

The 5S framework to demonstrate the overall goals of online communications:

1. Sell: a new online channel allows marketers to reach customers that could not previously be reached offline;
2. Serve: add value, give better service, even discounts;
3. Speak: create dialogue with customers;
4. Save: save money  by limiting printing and storing costs;
5. Sizzle: extend the brand online through enhancing online experience using interactivity.

Four core objectives:

1. Awareness: online communications help customers become aware of products and services, but getting heard in this crowded space is not obvious;
2. Engagement: it is a central aspect of much digital marketing communications, but it is a challenge;
3. Conversion: online communication techniques might be useful in closing a sale by targeted advertising and retargeting (the customer, after seeing something once, sees it more later);
4. Retention: online communications may be used to assist with retaining customers through interacting with them post purchase or helping to assist with customer service issues.

## Consumer decision journey

It is also useful to think about the objectives of online communications in the context of the consumer journey and omni channel marketing - the consumer decision process is no longer linear and the number of potential touchpoints between customers and organizations has changed greatly.
The consumer decision journey goes as follows:

1. Zero moment of truth: all the online research activities that take place before a brand is selected;
2. First moment of truth: consumer selects brand in the store;

3. Purchase decision;
4. Second moment of truth: consumer uses product for the first time;
5. Initial consideration set;
6. go back to square 1.

## Online presence and web design

The design of an online presence has to be directed by two key elements:
1. Business objectives derived from current situation analysis
2. Target audience requirements.

Interactivity, topics and content style must be tailored to suit the target audience of the website, as well as intended access device: responsive web design here is useful.
Metrics to measure website effectiveness are
1. Bounce rate (percentage of visitors who navigate away after only seeing one page)
2. Dwelling (time spent on page)

Basic elements of effective web design:
- Presentation: users are goal oriented and want the website to be intuitive, graphical elements must not be the main element;
- Usability - how easily can the user complete their task online? there are three main goals:
    - Effectiveness: accuracy and completeness with which specified users can achieve specific goals;
    - Efficiency: the resources expended in relation to the accuracy and completeness of the goals achieved;
    - Satisfaction: the comfort and acceptability of the work system for the users.
- Navigation: users must find their way around the site;
- Testing;
- Reviews and maintenance;
- Content and copywriting: people don't read on the web. BEST strategy for creating content for online media:
    - Behavioral: is there a purpose in the content? What actions do you want to trigger in customers?
    - Essential: don't publish filler content;
    - Strategic: online content must support your overall business objectives;
    - Targeted: do not use the same content across different platforms.

Search engine optimization industry is comprised of businesses that assist other businesses to design their web presence in a way that maximizes their chances of scoring highly in the search rankings.
Google's algorithm has undergone constant revision and refinement in order to provide relevant search results for their users who have entered a search query.
1. Panda, 2011, focused on website content downgrading websites with spammy, plagiarized or keyword stuffed content;
2. Penguin, 2012, targeted manipulative links tactics;

3. Hummingbird, 2013, matched searcher intent by understanding the meaning behind queries;
4. Pigeon, 2014, uses location and distance for ranking;
5. Mobile, 2015, gave a ranking boost to websites optimized for mobile devices;
6. RankBrain, 2015, takes account of bounce rates and uses machine learning;
7. Possum, 2016, further improves results based on location;
8. Fred, 2017, penalized websites set up to generate advertising and affiliate revenue, such as blogs.

## SEO

SEO is the range of tools used to ensure that a page ranks up on the results. A number of practices that helped:

- Keywords: each page must be optimized for relevant keywords, and choices must be made;
- Content: content on the page must be good quality;
- Links: the quality and relevance of a site can also be reflected in the number and quality of other sites linking to it;
- Localization: registering with google places is a free and effective way of boosting SEO;
- Design features: websites need to be designed so that they are easy to crawl, so they need to be clear and simple and reduce their dependence on JS, Flash etc.

## Content marketing

Online marketing communications are in bound, that is, they are designed to attract an audience to visit a website.
Content marketing is a strategic marketing approach focused on creating valuable, relevant and consistent content to attract and retain a clearly defined audiens, and ultimately to drive profitable customer action.
With the advent of internet, content marketing has exploded because

- content is a key variable in search rankings;
- the two way nature of internet communication means that users can interact with content;
- the cost of distribution of online content is almost zero;
- the consumer's appetite for content has increased.

Content marketing must be carefully planned and there are a lot of things to take care of:

- Strategy and objectives: careful thought to brand positioning and strategy, in order to assess the effectiveness of the campaign objectives must be clearly defined beforehand, and a good knowledge of the target audience will help clarify objectives;
- Content type: news stories, blog content, ebooks, infographics, images and videos… content must have credibility, shareability, usefulness, it should be interesting, fun, relevant, different, on brand - it depends on the objectives of the content;

- Distribution platforms: either social sites or earned media (bloggers, influencers etc), timing is also very important;
- Assessment of effectiveness: metrics such as reach and engagement levels might be used.

Content marketing is playing a growing role in the integrated marketing communications mix, due to the recognition of the importance of storytelling in marketing.
The creation of content has similarities with what newspapers do, and this might mean employing journalists and responding quickly to stories that the brand's audience might care about: this is real time marketing, where speed is essential.
One of the biggest challenges is consumer engagement, since a lot of content is made everyday: there is also a distinction between active and passive engagement, and negative vs positive.

## Online advertising

Online advertising is the main activity of many websites that we use everyday.
Search engine advertising might be used to drive traffic to a website, also it is highly targeted, search ads are flexible and measurable. Pay per click saves a lot of money.

Search advertising campaigns may comprise all or a part of an integrated marketing communications campaign, and it requires planning. Key stages:

1. Target audience;
2. Objectives (drive traffic to website, or promote an offer);
3. Keywords (difference between short, generic, expensive ones, or long, cheaper but less traffic ones);
4. Budgets (decisions on overall budget size, limits, max amount per click, max expenditure total or per campaign);
5. Advertising copy (130 characters comprising headline with keywords, body copy of the advert and destination url, all of which is subjected to a quality score by google);
6. A/B testing (trial of difference combinations of url, keywords and copy);
7. Measuring effectiveness through:
    a. click through rate, percentage of users that clicked on ad;
    b. cost per click, average amount paid per click;
    c. ad position, average position of the ad in rankings;
    d. conversion rate, ratio of orders or leads to the number of clicks).

Display advertising refers to the placement of ads on webpages, and it can be of three ways:

- Banner advertising;
- pop up advertising;
- Rich media advertising (like youtube ads).

Programmatic advertising is an automated system for the buying and selling of online display adverts. Players are advertisers, websites that carry adverts, ad brokers, demand side platforms (who allow buyers to buy from many platforms on a single interface) and ad exchanges.

Real Time Bidding: when an user clicks on a web link, while the page loads this impression is auctioned to a potential advertiser through an automated system, the bid who whins gets displayed.

Social advertising refers to ads placed on social media platforms - potential for targeting niche audiences, even on mobile.

Native advertising is paid advertising that matches the form, feel and function of the content of the media in which it appears, it attempts to fit seamlessly into its surrounding content.

The advent of the smartphone has given rise to two new forms of marketing:

1. Proximity marketing: the use of wireless devices to distribute marketing messages to specific locations;
2. Mobile applications: marketers have used apps in innovative ways to interact with customers and boost revenues. Branded mobile apps have become increasingly popular, especially if they are free.

Email marketing is the act of sending a commercial message to a group of people via email. This requires:

1. the purchase of email lists,or the forming of a mailing list through the provision of content in the website where access requires an email address;
2. setting of campaign objectives and targeting of the audience: distinctions have been drawn between out bound and in bound email marketing, do you want to create awareness and achieve conversion, or achieve customer retention?
3. the creation and delivery of content - design is crucial in order to catch the consumer's attention and to communicate the important aspects of the message, and the most critical element is the subject line;
4. the assessment of effectiveness, which can be done through
    a. bounce rate (emails who bounce because address is no longer valid or email is caught through a filter)
    b. open rate (percentage of opened emails)
    c. click through rate (percentage of recipients who clicked on email content)
    d. conversion rate (percentage of emails leading to a sale)
    e. unsubscribe rate (rate of people who unsubscribe to the mailing list)

However, consumers find unsolicited emails more intrusive and irritating than postal direct mail.
Permission marketing is the practice of only sending commercial messages to consenting users.

it is important to identify metrics that are a source of vital data for overall campaign performance. Analytics software may analyze a company's online presence overall and produce reports on metrics.
There are three kinds of metrics:

1. Activity metrics, or input metrics, who measure how much input the company has into the social media activity;
2. Interaction metrics, or response metrics, who measure how the target audience engages with the social media content;

3. Performance metrics, or output metrics, who measure outcomes or activity, such as financial, satisfaction etc.

Here is a quick list of main metrics used online:

- Bounce rate
- Conversion rate
- Average session duration
- Ad clicks
- Cost per click
- Click through rate
- Cost per conversion
- Return on investment
- Page views per session
- Average search depth
- Time on page
- Dimension
- Metrics

# CAPITOLO 10 AGGREGATE PLANNING AND MASTER SCHEDULING

Long term decisions establish the capacity constraints within which intermediate planning must function, and relate to:

- product and service selection;
- facility size and location;
- equipment decisions;
- layout of facilities;

Intermediate decisions relate to:

- general levels of employment;
- output;
- inventories;

Short term decisions relate to:

- Scheduling jobs;
- scheduling workers;
- equipment.

| | | | |
|---|---|---|---|
| Corporate strategies and policies | Economic, competitive and political conditions | Aggregate demand forecasts | |
| Business plan | | | establishes guidelines for the organization's operations and capacity strategies, coordinating the intermediate plans of various organization functions |
| Aggregate plan | | | made by all areas together, establishes operations capacity, it is the starting point for scheduling and production control systems, it is also an important input to strategic decisions |
| Master schedule | | | sets schedules for specific products |

## Aggregate planning

Aggregate planning is a big picture approach to planning, where instead of focusing on one single product, more products are considered together, or even a whole product line, in order to provide a more accurate forecast.
It is often convenient to think of capacity in terms of labor hours, machine hours or output rates.
Why aggregate planning?

- It takes time to plan;
- If an organization locks in on a product, it loses flexibility to respond to the market;
- Related to the budgeting process and synchronizes flow through the supply chain.

How to deal with variation: using rolling forecasts which are updated with time, maintain a certain amount of flexibility and excess capacity, and hire temporary workers.

Aggregate planning begins with a forecast of aggregate demand for the intermediate range, followed by a general plan to meet demands by setting output, employment and finished good inventory levels (or service capacity).

Quantity and timing of expected demand are important. Problems that may arise are
- difference from total expected demand and total capacity;
- difference within the time period;

## Inputs to aggregate planning

Inputs to aggregate planning are:
- Resources
    - workforce - production rates
    - facilities and equipment
- Demand forecast
- Policies on workforce changes
- Subcontracting
- Overtime
- Inventory levels and changes
- Back orders
- Costs
    - Inventory carrying costs
    - back orders
    - hiring / firing
    - overtime
    - inventory changes
    - subcontracting

## Outputs of aggregate planning

Outputs to aggregate planning are:
- Total cost of a plan
- projected levels of
    - inventory
    - output
    - employment
    - subcontracting

    - backordering

## Demand and supply options

Demand and supply options:

- demand strategies alter demand so it matches capacity
- capacity strategies alter capacity so it matches demand
- Mixed strategies do both

Demand options:

- Pricing: pricing differentials shift demand during periods of time;
- Promotion: it might shift demand so it conforms more closely to capacity, but there is risk of bringing in demand at the wrong time;
- Back orders: orders are taken in one period and deliveries promised for a later period, it depends on how willing customers are to wait;
- New demand: firm that experience different demands in different moments for their good or service might develop a complementary demand for a complementary product that makes use of the same processes.

Supply options:

- Hire and lay off workers: ability to lay off constrained by unions, laws and minimum workers needed, ability to add workers constrained by cost of work and other resources needed to support workers, another consideration is the skill of workers, hiring costs include having to teach workers to bring them up to speed;
- Overtime and slack time;
- Part time workers, or independent contractors: it depends on the nature of the work;
- Inventories allow firms to stock up goods when demand is lower, this is more viable for manufacturing of non perishable goods;
- Subcontracting: temporary capacity but with less control, or outsourcing.

Basic strategies to meet uneven demand:

- maintain a level workforce (level capacity)
- maintain a steady output rate (level capacity) by subcontracting, backlogging, use of inventories;
- match demand period by period (chase demand) inventories can be kept lower, but when forecast and reality differ, morale can suffer
- use a combination of decision variables, more flexibility but can lead to an erratic approach.

When choosing a strategy, factors such as company policy, flexibility and costs are important, because they may pose constraints. It is important to align plans with strategy. As a rule, aggregate planners seek to match supply and demand within the constraints imposed on them by policies or agreements at minimum cost.

## General procedure for aggregate planning

A general procedure for aggregate planning consists of the following steps:

1. Determine demand for each period;
2. Determine capacities for each period;
3. Identify pertinent company or departmental policies;
4. Determine unit costs for regular time, overtime, subcontracting, holding inventories, back orders, layoffs etc;
5. Develop alternative plans and compute the cost for each;
6. If satisfactory plans emerge select the one that best satisfies objectives, otherwise return to step 5.

In order to calculate effectively, spreadsheets can be used: one alternative to calculate costs and demands for periods is linear programming, the other is using simulation models. Spreadsheets are easier to use but sometimes do not show the optimal solution; linear programming is computerized but linear assumptions may not be valid; simulations can be tested under a variety of conditions.

## Aggregate planning in services

Aggregate planning in services might be used by

- Hospitals
- Airlines
- Restaurants
- Transport
- Recreation
- Finance

There are some particular aspects:

- Demand for services is usually difficult to predict, some services may be needed while others just wanted;
- Capacity availability can be difficult to predict, because the variety of tasks required of servers can be great and difficult to establish measures of capacity;
- Labor flexibility can be an advantage;
- Services cannot be inventoried.

Yield management is an approach that seeks to maximize revenue by using a strategy of variable pricing; prices are set relative to capacity availability.

## Master Production Schedule

Disaggregating the aggregate plan means breaking down the aggregate plan into specific product requirements in order to determine labor requirements, materials and inventory requirements. The result of disaggregation is the Master Production Schedule showing quantity and timing of specific end items for a scheduled horizon.

The master schedule interfaces with marketing, capacity planning, production planning, and distribution planning, and provides senior management with the opportunity to see whether the business objectives can be reached.

The capacities used for master scheduling are based on decisions made during aggregate planning, since there is a time lapse between aggregated planning and master schedule the outputs might be slightly different and more updated.

Duties of the master scheduler:

1. Evaluating the impact of new orders
2. Providing delivery dates for orders
3. Dealing with problems:
    a. evaluating impact of production delays or late deliveries of goods;
    b. revising the master schedule when needed;
    c. bringing instances of insufficient capacity to the attention of production and marketing personnel so they can participate in resolving conflicts.

A master schedule indicates quantity and timing for a product, but not production.

## Inputs and outputs

Inputs of a master schedule:

- Beginning inventory
- Forecast
- Customer orders: quantities already committed to customers;
- Any hiring or firing restrictions, limits in inventory etc.

Outputs of a master schedule:

- Projected inventory of finished goods
- Master production schedule
- Uncommitted inventory, or available to promise inventory.

Once a tentative master schedule has been developed, it must be validated: Rough Cut Capacity Planning involves testing the feasibility of a proposed master schedule relative to available capacities, to assure that no obvious capacity constraints exist.

## Time fences

A key component of master scheduling is the use of time fences to facilitate order promising and the entry of orders. Time fences are points in time that separate phases of a master schedule planning horizon into:

- Frozen: near term phase, so soon that delivery of another order would be impossible or very costly, the length of this phase is a function of the total time needed to produce a product;
- Slushy: order entry here necessitates trade offs but is less costly and more feasible;
- Liquid: new orders and cancellations can be entered with ease.

## Master scheduling process

How does master scheduling actually work:

1. Begin with a preliminary calculation of projected on hand inventory, this reveals when new inventory will be needed = inventory from previous week - current week's requirements (which are the largest between customer orders and forecast);
2. Repeat for each week until projected on hand inventory becomes negative;
3. When it becomes negative, it means that inventory requires replenishment, this means planned production;
4. Everytime projected inventory becomes negative add inventory (MPS);
5. it is now possible to determine how much inventory is uncommitted and hence available to promise:
    a. look ahead procedure: sum booked customers orders every week until there is a MPS.

# CAPITOLO 11 MRP AND ERP

Materials requirements planning is a methodology used for assembled products that translates master schedule requirements for end items into time phased requirements for subassemblies, components and raw materials.

## MRP inputs

MRP inputs:

- The master schedule - it is important that it covers the stacked, or cumulative lead time necessary to produce the items, that is, the sum of the lead times that sequential phases of a process require, from ordering of parts or raw materials to completion of final assembly;
- Bill of Raw Materials contains a listing of all the assemblies, subassemblies, parts, part costs and raw materials needed to produce one unit of a finished product, through a product structure tree, which is a visual depiction of the requirements in a bill of materials, where all components are listed by levels. When a component is present in many levels, low level coding is used so that all occurrences of the component appear at the lowest level;
- Inventory records which refer to stored information on the status of each item by time period, called time buckets.

## MRP processing

MRP processing takes the end requirements specified by the master schedule and explodes them into time phased requirements for assemblies, parts and raw materials using the BOM offset by lead times. It combines the time phasing and “explosion” into a sequence of spreadsheet sections:

- Item
- Gross requirements (total expected demand for an item or raw material during each time period);
- Scheduled receipts (open orders scheduled to arrive from vendors or elsewhere in the pipeline by the beginning of the period);
- Projected on hand (the expected amount of inventory that will be on hand at the beginning of each time period - scheduled receipts plus available inventory from last period);
- Net requirements (the actual amount needed in each time period);
- Planned order receipts (the quantity expected to be received by the beginning of the period in which it is shown, under lot for lot ordering, this quantity will equal net requirements and under lot size ordering may exceed it, any excess is added in available inventory for the next time period) - determines timing of receipt of quantities;

- Planned order releases: it indicates a planned amount to order in each time period, equals planned order receipts offset by lead time - determines timing and sizing of orders.

The quantities generated by exploding the BOM are gross requirements.

Project inventory on hand for current period = planned receipts for previous period - net requirements for previous period + scheduled receipts for current period

Net requirements for current period = Gross requirements for current period - projected on hand inventory for current period.

Pegging is the process of browsing the tree in reverse, identifying the parent items that generated a given set of material requirements for an item, to see which products will be affected by delays of a part.

## MRP updates

2 systems to update MRP:

1. Regenerative system, updates records periodically, batch, has lags;
2. Net change system, updates records constantly, high updating costs.

## MRP outputs

MRP outputs are classified as

1. Primary reports, which are the main ones:
    a. Planned orders, a schedule indicating the amount and timing of future orders;
    b. Order releases, authorizing the execution of planned orders;
    c. Changes to planned orders, including revision of due dates or quantities and cancellations;
2. Secondary reports, mainly optional ones:
    a. Performance control reports which evaluate system operation, aid managers by measuring deviations from plans, missed deliveries and stockouts, and providing information that can be used to assess cost performance;
    b. Planning reports which are useful in forecasting future inventory requirements, include purchase commitments and other similar data;
    c. Exception reports call attention to major discrepancies such as late and overdue orders, excessive scrap rates, reporting errors and requirements for nonexistent parts.

Theoretically, inventory systems with dependent demand should not require safety stock below the end item level because the manager can project precise usage quantities. However there may be exceptions:

- Bottleneck process

- One with varying scrap rates
- Late orders
- Longer assembly or fabrication time.

Safety time is another important concept, and it is used to schedule orders for arrival or completion sufficiently ahead of time.
It is important in general to make sure that lead times are accurate: early arrivals increase on-hand inventory and carrying costs, late arrivals can delay following operations.

## Lot sizing

Lot sizing is an important issue in inventory management.
Goal of inventory management: minimize the sum of ordering cost and holding cost.
Grouping orders is ok if the additional cost incurred leads to savings in setup or ordering cost, but there are some problems:

- combining period demands into a single order has a cascading effect down the product tree
- The uneven period demand and relative short planning horizon require a continual recalculation and updating of lot sizes.

In independent demand items, managers often use economic order sizes and production quantities. For dependent demand systems there is a wide variety of plans:

- Lot for lot ordering: the order or run size is set equal to the demand for that period.
    - order size obvious
    - virtually eliminates holding costs for parts carried over to other periods
    - it involves many different order sizes and thus cannot take advantage of economies of fixed order size
    - it requires a new setup for each run of production
- Economic order quantity model:
    - leads to minimum cost if usage is uniform
    - mismatch in supply and demand results in leftover inventories
- Fixed period ordering:
    - provides coverage for predetermined number of periods
    - span is sometimes arbitrary, sometimes thought after a review of historical demand patterns.

MRP in services might have applications when material goods are a part of the service.

Benefits of MRP:

- Enables managers to determine quantities of every component
- Enables managers to know when to release orders for each component
- Enables managers to be alerted when items need attention
- low levels of in process inventories
- ability to keep track of material requirements
- ability to evaluate capacity requirements generated by a master schedule
- means of allocating production time
- ability to easily determine inventory usage by backflashing, the procedure in which an end item’s BOM is exploded to determine the quantities of each component used to

make the item, eliminating the need to collect detailed usage information on the production floor.

Who uses MRP:

- production planners
- production managers
- plant foremen
- purchasing managers
- customer service representatives who supply users with projected delivery dates
- inventory managers

Requirements of MRP:

- Computer and software
- Master schedules
- BOMs
- Inventory records
- Integrity of file data
- accuracy

MRP II evolved from MRP, expanding the scope of materials planning to include capacity requirements planning, and to involve other functional areas of the organization such as marketing and finance in the planning process.
The process begins with an aggregation of demand from all sources - production, marketing and finance work toward developing a master schedule, to increase likelihood of developing a plan that works and with which everyone can live.
Once everyone's resources have been decided, the master production schedule can be firmed up.

Closed Loop MRP includes feedback loops - if a proposed plan is not feasible it must be revised. Original MRP did not have the capability to assess the feasibility of a proposed plan.

## Capacity requirements planning

Capacity requirements planning is the process of determining short range capacity requirements.
Inputs:

- planned order releases for MRP
- current shop load
- routing information
- job times

Outputs:

- load reports for each work center: they are reports that compare known and expected future capacity requirements with projected capacity availability.

A firm generates a master schedule initially in terms of what is needed; consequently it is often necessary to run a proposed master schedule through MRP to obtain a clearer picture of actual requirements, which can be compared to available capacity and materials.
Stability is important in short term production plans - without it, changes in order quantity or timing can render material requirements plans almost useless, and a reaction to change can be greater than the change itself. To minimize these problems, many firms establish a series of time intervals called time fences during which changes can be made to orders.

The capacity planning process begins with a proposed master production schedule.
It is tested for feasibility and possibly adjusted.
The proposed schedule is processed using MRP to ascertain the material requirements.
These are then translated into resource requirements, often in the form of a series of load reports for each department or work center.

If there are overloads, they can be solved by shifting orders to adjacent periods or increasing capacity.

DRP, distribution resource planning, is a method used for planning orders in a supply chain.
It extends MRP concepts enabling a planner to compute time phased inventory requirements, the goal is to achieve a balance of supply and demand through the supply chain.

## ERP

ERP, or Enterprise Resource Planning, is a computerized system designed to connect all parts of a business organization as well as key portions of its supply chain to a single database for the purpose of information sharing.
It provides a system to capture and make data available in real time to decision makers, and provides a set of tools for planning and monitoring.
Key connections are:

- Accounting, finance - general ledger, accounts payable, income statements, balance sheets;
- Marketing - supports lead generation, target marketing, direct mail, sales;
- HR - database of employee information;
- Purchasing - facilitates vendor selection, price negotiation, purchasing decisions, bill payment;
- Production planning - integrates info on forecasts, orders, production capacity, on hand inventory, BOMs, schedules, production lead times;
- Inventory management - identifies requirements, availability, replenishment rules, tracking;
- Distribution - third party shippers, shipping and delivery schedules, delivery tracking;
- Sales - information on orders, invoices, order tracking, shipping;
- Supply chain management - facilitates supplier and customer management, supply chain visibility, event management;
- Customer relationship management - contact information, buyer behavior, shipping preferences, contracts, payment terms, credit history.

How can ERP improve a company's business performance?
it automates the task, everyone can see what's going on at the same time, and tests accountability, responsibility and communication.

How long will an ERP project take?
the way of doing business changes so it can take up to years.

What will ERP fix in a business?
It will integrate financial data, standardize manufacturing processes and HR information.

Will the ERP fit the ways i do business?
sometimes not, then either you change your way of doing business or you change the ERP, and both are difficult.

What does it really cost?
it is very expensive.

When will i get payback from ERP?
Most companies save money, a couple millions per year, but ERP is mainly a way to optimize internal processes.

Hidden costs of ERP:

- Training;
- Integration and testing;
- Data conversion;
- Data analysis;
- Consultants;
- Replacing your best and brightest: all consulting companies will try to steal your best employees;
- Implementation teams can never stop: ERP requires work even after it is installed and the best people to work on it is the ones who helped implement it;
- Waiting for ROI: returns arrive after some time that ERP runs;
- "post ERP depression": everything looks different, drop in performance.

Common errors of ERP users:

- not doing careful requirements gathering
- not including end users from all departments in the decision making process
- not properly budgeting for technology staff
- not weighing the pros and cons of on premises vs cloud based ERP (first requires IT, secondo  proper internet connectivity)
- not including an industry specific solution in the decision making process
- being dazzled by features
- implementing the system all at once
- ignoring change management
- not investing in and supporting the implementation team
- not regularly communicating information across departments
- not having a maintenance plan.

# CAPITOLO 12 JIT AND LEAN OPERATIONS

Lean operations were developed by Toyota, its focus is on the elimination of all waste from every aspect in the process. Waste is everything that does not add value to the product or service. Companies that use lean operations have achieved a level of quality that enables them to function with small batch sizes and tight schedules.

## CHARACTERISTICS, PRINCIPLES, BENEFITS, RISKS OF LEAN

Characteristics of lean systems:

- Waste reduction
- Continuous improvement
- Use of teams, cross functional, especially for process improvement
- Work cells
- Visual controls
- High quality
- Minimal inventory
- Output tied to demand
- Quick changeovers
- Small lot sizes
- Lean culture embraced by whole organization

Five principles:

1. Identify customer values
2. Focus on processes that create value
3. Eliminate waste to create flow
4. Produce only according to customer demand
5. Strive for perfection.

Benefits:

- Reduced waste
- Lower costs due to reduced waste and lower inventories
- Increased quality motivated by customer focus and need for high quality processes
- Reduced cycle time
- Increased flexibility due to quick changeovers and small lot sizes
- Increased productivity due to elimination of non value added processes

Risks:

- Increased stress on workers due to increased responsibilities
- Fewer resources available if problems occur
- Supply chain disruptions can halt operation due to minimal inventory

Toyota approach:

- Muda - waste and inefficiency
- Kanban - a manual system that signals the need for parts or materials:
    - a kanban card is fixed to each container
    - when a worker needs the container places the kanban on a board
    - the stock person picks up the kanban and replenishes stock with another container
    - demands for parts trigger a replenishment and parts are supplied as usage dictates, and if the system seems too tight kanban are added whilst if inventory is building up kanbans are removed;
    - Kanban is simple and manual, whilst MRP is more concerned with complex planning and scheduling and is computerized, both systems are usually used in the same facility, kanban works best at a shop floor level but workflow must be uniform;
- Heijunka: workload leveling
- Kaizen - continuous improvement, the kaizen philosophy to eliminate waste:
    - waste is the enemy and in order to eliminate it you might have to get your hands dirty;
    - improvement should be done gradually and continuously;
    - everyone should be involved
    - kaizen is built on a cheap strategy and does not require machinery or consultants
    - it can be applied anywhere
    - it is supported by a visual system
    - it focuses attention where value is created
    - it is process oriented
    - it stresses that the main effort of improvement should come from new thinking and a new work style
    - the essence is to learn while doing
- Jidoka - quality at the source. a machine automatically stops when it detects a bad part, a worker then stops the line.

## STRUCTURE OF A LEAN SYSTEM

| | |
|---|---|
| A balanced, rapid flow which achieves a system that matches supply with demand. | Ultimate goal |
| Eliminate disruptions (which might be caused by poor quality, equipment breakdowns, changes to the schedule, late deliveries)<br><br>Make the system flexible and able to deal with uncertainty and different products<br><br>Eliminate waste, which can be of 8 types:<br>● excess inventory<br>● overproduction<br>● waiting time<br>● unnecessary transporting<br>● processing waste | supportin g goals |

| | | | | |
|---|---|---|---|---|
| ● inefficient work methods<br>● product defects<br>● underused people | | | | |
| Product design<br>1. standard parts mean that workers have fewer parts to deal with;<br>2. modular design is an evolution of standard parts;<br>3. highly capable production systems with quality built in, production ceases when problems occur<br>4. Concurrent engineering, a work methodology which emphasizes the parallelization of tasks | Process design<br>1. Small lot sizes in process inventory is less, inspection and rework costs are less, there is also a higher flexibility in scheduling, increased ease of balancing operations and increased visibility of problems;<br>2. Setup time reduction, workers are often trained to do their own setups. Single Minute Exchange of Die: changeover activities categorized as internal or external, internal can only be done with non running machine while external can be done while machine is running thus they do not affect changeover time. After doing this, convert as many internal as external and then streamline the internal;<br>3. Manufacturing cells, which contain all the tools and are specialized and efficient, reduced change over times;<br>4. Quality improvement through autonomation (automatic detection of defects during production);<br>5. Production flexibility by reducing downtime due to changeovers, using preventive maintenance, cross train workers so they can help with bottlenecks, use many small units of capacity, use offline buffers, reserve capacity for important customers;<br>6. A balanced system - time needed for each workstation must be less or equal to the cycle time and this is done by distributing work evenly. Cycle time is set as takt time and it is the cycle time needed in a production system to match the pace of production to the demand | Personnel and organizational elements<br>1. Workers as assets, well trained and motivated workers are the heart of a lean system;<br>2. Cross trained workers add to system flexibility;<br>3. Continuous improvement - workers must receive a lot of inter disciplinary training, and problem solving is crucial in lean systems, problems that occur in production must be dealt with quickly and get signaled with the andon lights; there are teams of managers and workers that work daily on problems, but workers are more stressed;<br>4. Cost accounting: lean systems allocate overhead not on working hours but on activity based costing, that is allocation of overhead to specific jobs based on their percentage of activities by first identifying traceable costs and assign those | manufacturing planning and control<br>1. Level loading: lean systems place a strong emphasis on achieving stable level daily mix schedules, and the master production schedule is developed to provide level capacity loading. Mixed model sequencing begins with daily production requirements of each product - which sequence to use? choose the most convenient from time and cost - how many cycles? it depends on the production quantities - how many units of the model to produce in each cycle? dividing each model's daily production by the # of cycles, but sometimes it is necessary to analyze trade offs between furnace lot size and level production;<br>2. Pull systems: a workstation pulls output from the precedent when it is needed, work moves on in response to demand, each station produces just enough for the next one, doesn't work good if large variations in volume;<br>3. Visual systems: two types of kanban, production which signals the need to produce parts, and conveyance, to deliver;<br>4. Limited work in progress to lower carrying costs, increase flexibility and aid scheduling. According to little's law, WIP = Cycle time * Arrival rate. CONWIP = when a job exits the system, a new job can enter.<br>5. Close vendor relationships, vendors should provide frequent | building blocks |

| | | | | |
|---|---|---|---|---|
| | rate, it is obtained by determining the net time available per shift, times the number of shifts, divided by demand;<br>7. Little inventory storage - if a machine breaks down you must fix it and not rely on inventory which is a waste and makes problems seem less serious;<br>8. Fail safe methods, this refers to building safeguards into a process to reduce or eliminate the potential for errors during a process; | to activities, then assign overheads to specific jobs based on their activities;<br>5. Leadership must not be order giving, but leading and facilitating. | small deliveries of high quality goods, be certified and buyers have a small list of trusted sellers organized in tiers;<br>6. Reduced transaction processing: there are 4 types of transactions, logistical, balancing, quality and change; since suppliers deliver goods directly to the production floor and vendors are certified for quality, also bar coding usage, transactions are reduced;<br>7. Preventive maintenance and housekeeping, proactive approaches to reducing breakdowns of machinery through preventive replacement and lubrication, adjustment, cleaning, inspection, keeping the workspace clean:<br>a. Sort (keep what needed)<br>b. Straighten (put everything in place)<br>c. Sweep (clean)<br>d. Standardize (use std instructions)<br>e. Self discipline | |

## Value stream mapping

Value stream mapping is a visual tool to systematically examine the flow of materials and information involved in bringing a product or service to a consumer, it is a sketch of the entire process from incoming goods to shipment and delivery. It shows all processes in the value stream. The main objective is to increase value to the customer

Tips for developing an effective mapping of a value stream:

1. Map the value stream in person
2. begin with a quick walkthrough of the system from beginning to end
3. do a more thorough walkthrough following the actual pathway to collect current information
4. record elements such as cycle times, scrap rates, amount of inventory, downtimes, number of operators, distance between processes, transfer times.
5. value improvement for a product follows these steps:
    a. specify value from the standpoint of the end customer
    b. identify all steps in the value stream and create a visual map;

    c. eliminate everything that does not create value or improve flow
    d. use next customer in the process demand to pull from each preceding process as needed to control the flow
    e. repeat this process as long as waste exists in the system
6. Now, data analysis can uncover improvement opportunities by asking questions such as:
    a. where are the bottlenecks?
    b. where are errors?
    c. which processes have the most variation?
    d. where does waste occur? for example, office waste might include:
        i. excess inventory
        ii. overprocessing
        iii. waiting times
        iv. unnecessary transportation
        v. processing waste
        vi. inefficient work methods
        vii. mistakes
        viii. underused people

## Process improvement using 5W2H

Process improvement using 5W2H:

- What is being done?
- Why is it necessary?
- Where is it being done? Where should it be done?
- When is it being done? When should it be done?
- Who is doing it? Who should be doing it?
- How is it being done? How should it be done?
- How much does it cost? How much could it cost? How much should it cost?

## Transitioning to a lean system

1. make sure top management is committed and involved in the process
2. study operations carefully and decide which parts will need the most effort to convert;
3. obtain support and cooperation of workers, prepare training programs, make sure that they are fully informed and reassure them that their jobs are secure;
4. begin by trying to reduce setup times while maintaining the current system, enlist the aid of workers to identify bottlenecks and poor quality
5. gradually convert operations beginning at the end of the process and working backward - at each stage make sure the conversion has been relatively successful and do not begin to reduce inventories until major problems have been resolved

6. convert suppliers to JIT and be prepared to work closely with them, narrow the list giving preference to the ones with long term positive track records, use local if response time is important.
7. be prepared to encounter obstacles such as:
    a. management may not be totally committed
    b. workers may not be cooperative because of increased stress
    c. managers may not be cooperative because of the shift of responsibility
    d. changing the culture of the organization may be difficult
    e. suppliers may resist because:
        i. buyers may not be willing to commit the resources necessary to help them adapt
        ii. uneasy about long term commitments
        iii. frequent, small deliveries might be difficult
        iv. the burden of quality control shifts to the suppliers
        v. frequent engineering changes may result from continuing lean improvements by the buyer.

Lean is best used for repetitive operations under fairly stable demand, and requires a cooperative spirit.

Lean in services can lead to these benefits:

- eliminate disruptions
- make the system flexible - train workers
- reduce setup times and processing times
- eliminate waste
- minimize work in process
- simplify the process

# CAPITOLO 13 MANAGEMENT OF QUALITY

Quality is the ability of a product or service to consistently meet or exceed customer expectations. Since every customer has different expectations, quality is customer dependent.

## Dimensions of quality

| nine dimensions for products | nine dimensions for services |
|---|---|
| 1. Performance<br>2. Aesthetics<br>3. Special features<br>4. Conformance<br>5. Reliability<br>6. Durability<br>7. Perceived quality<br>8. Serviceability | 1. Convenience<br>2. Reliability<br>3. Responsiveness<br>4. Time<br>5. Assurance<br>6. Courtesy<br>7. Tangibles<br>8. Consistency<br>9. Expectations |

| | |
|---|---|
| 9. Consistency | |

Information on customer wants can sometimes be difficult to pin down, have different priorities and change over time. Service quality is instantly judged, and error prevention must be designed into systems.

## SERVQUAL

SERVQUAL is an instrument designed to obtain feedback on an organization's ability to provide quality service to its customers.

| | | |
|---|---|---|
| it focuses on:<br>● tangibles<br>● reliability<br>● responsiveness<br>● assurance<br>● empathy | the results of this service quality audit help managers identify service strengths and weaknesses , GAPS are of interest | Gaps may be between<br>● actual customer expectation vs management perception<br>● management perception of customer expectation and service quality specifications<br>● service actually delivered vs what is communicated<br>● customer's expectations of the service provided vs their perception of the service delivered |

The degree to which a product or service has successfully satisfied its intended purpose has 4 primary determinants:

1. Design - the design phase is the starting point for the level of quality eventually achieved, quality of design refers to the intention of designers to include or exclude certain features in a product or service. Designers might determine consumer wants from information provided by marketing, and must work closely with representatives of operations to ascertain that designs can be produced. A poor design can result in difficulties in production or service;
2. Quality of conformance to design refers to the degree to which goods and services conform to the intent of the designers, this might be a factor of equipment, skills of workers, monitoring process to assess conformance, taking of corrective actions;
3. Ease of use and instructions are important, customers must be informed in how to use the product correctly, directions must be clearly visible and easily understood;
4. Service after delivery is important since sometimes products and services are not what they should be.

Certain areas of an organization have key responsibilities:

- Top management must guide, set examples and motivate everyone else;
- Design is where quality begins;
- Procurement must obtain quality products and services;
- Production/operations must ensure that processes yield things that conform to design specifications;
- Quality assurance must gather and analyze data and work with ops to solve problems;

- Packaging and shipping must not break things and label everything;
- Marketing and sales must determine customer needs and report problems with products or services to the company;
- Customer service is the first to learn of problems, must communicate with everyone else.

Consequences of poor quality:
- Loss of business, people talk and not always refer problems but stop buying, thus market share decreases;
- Liability from damages and injuries resulting from faulty design or poor workmanship and costs can be substantial and even for malfunctioning in foreseeable uses;
- Productivity - poor quality adverses productivity and can lead to defective output;
- Costs to remedy a problem.

Quality costs:
- Appraisal costs are related to measuring, evaluating and auditing goods and services;
- Prevention costs are related to reducing the potential for quality problems;
- Internal failure costs are related to defective products or services before they are delivered to customers
- External failure costs are related to delivering substandard products or services, and are typically greater than internal failure costs.

Supply chain is crucial to quality, outsourcing means less costs but also lower quality because of less regulations and less inspections.

## Total Quality management

Total quality management refers to a quest for quality in an organization. There are three key philosophies:
1. continuous improvement
2. involvement of everyone
3. goal of customer satisfaction

The approach works as follows:
1. Find out what the customer wants, both internal and external
2. Design a product that will meet the wants of customers
3. Design processes that facilitate doing the job right the first time, strive to make the process mistake proof, incorporate design elements that prevent incorrect procedures (fail safing)
4. Keep track of results and use them to guide oìimprovement in the system
5. Extend these concepts throughout the supply chain
6. Top management must be involved and committed.

Other elements of TQM:

- Continuous improvement - philosophy that seeks to make neverending improvements to the process of converting input in output, japanese kaizen
- Competitive benchmarking - identifying best competitors and comparing to them
- Employee empowerment - giving workers the responsibility for improvements and the authority to make changes to accomplish them provides them strong motivation
- Team approach - advantage of group synergy and involvement effects;
- Decisions based on facts
- Knowledge of tools
- Supplier quality
- Champion - a TQM champion's job is to promote the value and importance of TQM principles
- Quality at the source is the philosophy of making each worker responsible for the quality of his work
- Suppliers are partners in the process.

Obstacles:

- Lack of a companywide definition of quality;
- Lack of a strategic plan for change;
- Lack of a customer focus;
- Poor intra organizational communication;
- Lack of employee empowerment;
- View of quality as a quick fix
- Emphasis on short term financial results
- Inordinate presence of internal politics
- Lack of strong motivation
- Lack of time to devote to quality initiatives
- Lack of leadership.

Critiques of this approach:

- Overzealous advocates might pursue TQM when something other is a priority
- programs may not be linked to the strategies of the organization in a meaningful way
- quality related decisions may not be tied to market performance
- failure to carefully plan a program before embarking can lead to false starts, employee confusion and meaningless results
- organizations sometimes pursue continuous improvement when dramatic improvement is needed
- quality efforts may not be tied to results

Problem solving is an important aspect of TQM and should follow a standard approach.

## Plan do study act cycle

Plan do study act cycle is a framework for problem solving and improvement activities. Four basic steps.

| | |
|---|---|
| 1: Plan. Begin by studying the current process. Document that process, and then collect data on the process or problem. Then analyze the data and develop a plan for improvement. | ● Define problem<br>● Develop performance measures and collect data<br>● Analyze the problem<br>● Determine possible causes |
| 2: Do. Implement the plan, document any changes made and collect data. | ● Implement solution |
| 3: Study. Evaluate the data collection during the do phase and check how closely the results match the original goals of the plan phase. | ● Evaluate solution<br>● Ensure performance |
| 4: Act. If the results are successful, standardize the new method and communicate it to all people associated with the project, also implement training. | ● Continuous improvement |

Process improvement is a systematic approach to improving processes and follows three phases:

1. Map the process
    a. collect information about
        i. inputs and outputs
        ii. people involved
        iii. decisions made
        iv. measures of time, costs, space used, waste, employee turnover, employee morale, accidents, working conditions, revenues, profits, quality, customer satisfaction
    b. Prepare a flowchart that describes the process
2. Analyze the process
    a. Ask these questions
        i. is the flow logical?
        ii. Are any steps missing?
        iii. Are there any duplications?
    b. Ask these questions about each step of the process:
        i. could it be eliminated?
        ii. does it add to the value?
        iii. does waste occur?
        iv. could the time be shortened?
        v. could costs be reduced?
        vi. could some steps be combined?
3. Redesign the process.

## Six Sigma

Six Sigma is a business process for improving quality, reducing costs and increasing customer satisfaction.

Statistically it means to have no more than 3.4 defects per million opportunities in any process, product or service.
it has both management and technical components; top management must formulate and communicate the company's overall objectives and lead the program for a successful deployment.
Other key players are program champions, which identify and rank potential projects, help select and evaluate candidates and serve as advocates for the programs.
It is based on these principles:

- Reduction in variation is an important goal
- The methodology is data driven; it requires data validation
- Outputs are determined by inputs
- Only a critical few inputs have a significant impact on outputs

DMAIC is a formalized problem solving process of Six Sigma, and it is composed of 5 steps that can be applied to any process.

- Define: Set the context and objectives for improvement
- Measure: Determine the baseline performance and capability of the process
- Analyze: Use data and tools to understand the cause-and-effect relationships of the process
- Improve: Develop the modifications that lead to a validated improvement of the process
- Control: Establish plans and procedures to ensure that improvements are sustained

## Tools and methods

Quality tools:

- Flowcharts
- Check sheets
- Histograms
- Pareto analysis
- Scatter diagrams
- Control charts
- Cause and effect diagrams

Methods for generating ideas:

- Brainstorming, for generating a free flow of ideas
- Quality circles for improving processes and products - sometimes they evolve into continuous improvement teams which have more power
- Benchmarking which is the process of measuring performance against the best by
    - finding a process that needs improvements
    - find out which organization excels in the process
    - contact the benchmark organization, visit it, study the activity
    - analyze the data
    - improve the process

Quality is a strategic imperative for organizations

Customers are very concerned with the quality of goods and services they receive
Quality is a never-ending journey
It is important that most organizational members understand and buy into this idea
Customer satisfaction ≠ customer loyalty
Quality needs to be incorporated throughout the entire supply chain, not just the organization itself

# CAPITOLO 14 MANAGERIAL ACCOUNTING AND COST CONCEPTS

Management has different needs:
Financial accounting is concerned with reporting financial information to external parties, such as stockholders, creditors, and regulators.
**Managerial accounting** is concerned with providing information to managers within an organization so that they can formulate plans, control operations, and make decisions.

Cost classification serves the purpose of
1.Assigning costs to cost objects
2.Accounting for costs in manufacturing companies
3.Preparing financial statements
4.Predicting cost behavior in response to changes in activity
5.Making decisions

A direct cost can be traced back to one specific cost object.
An indirect cost cannot be traced back to one specific cost object, or it is not economically viable to do so.

Manufacturing costs can be divided in three categories:

- Direct materials, which are raw materials that become an integral part of the finished product and whose costs can be traced to the final product;
- Direct labor, which is the cost of labor relative to production and easily traced to individual units of product;
- Manufacturing overhead, which comprises all other manufacturing costs, such as indirect materials and indirect labors, depreciations of equipment and taxes.

Conversion cost is the sum of direct labor and manufacturing overhead, while prime cost is the sum of direct materials and direct labor.
Non manufacturing costs are comprised by, for example, selling costs and administrative costs.

Product costs include all costs that are involved in acquiring or making a product.
product costs can be transferred:
•When direct materials are used in production, their costs are transferred from Raw Materials to Work in Process.
•Direct labor and manufacturing overhead costs are added to Work in Process to convert direct materials into finished goods.
•Once units of product are completed, their costs are transferred from Work in Process to Finished Goods.
•When a manufacturer sells its finished goods to customers, the costs are transferred from Finished Goods to Cost of Goods Sold.

Product costs include direct materials, direct labor, and manufacturing overhead. They stay in the inventory (balance sheet) and in the cost of good sold (income statement).
Period costs include all selling costs and administrative costs. They stay in the income statement between the expenses.

Cost behavior refers to how a cost will react to changes in the level of activity.
The most common classifications are:
•Variable costs - they are constant per unit
•Fixed costs - can be spread on more units, can be committed or discretionary
•Mixed costs.

We assume for simplicity that costs are linear by selecting a limited scope of time.
The relevant range of activity for a fixed cost is the range of activity over which the graph of the cost is flat.

Differential costs (or incremental costs) are the difference in cost between any two alternatives.
A difference in revenue between two alternatives is called differential revenue.
Both are always relevant to decisions.
Differential costs can be either fixed or variable.

Sunk costs have already been incurred and cannot be changed now or in the future.
These costs should be ignored when making decisions.

Opportunity costs: the potential benefit that is given up when one alternative is selected over another.

The contribution income statement format is used as an internal planning and decision-making tool.

# SLIDE PACCO PROCESS FLOW AND LAYOUT

There are different process types, defined by volume and variety of items they process.
Process types go by different names depending on whether they produce products or services.

We select a manufacturing process by asking the following questions:

- What are the physical requirements of the company's product?
- How similar to one another are the products the company makes?
- What are the company's production volumes?
- Where in the value chain does customization take place, if at all?

## Types of manufacturing process

Types of manufacturing process:

1. Continuous flow:
    - large production values
    - high level of automation
    - basic material passed along, converted as it moves
    - usually cannot be broken into discrete units
    - usually very fixed high costs and inflexible
    - difficult and expensive to start and stop the process
2. Production line
    - high volume production of standard items with identical or highly similar designs
    - process arranged by product flow
    - often paced
    - highly efficient but not too flexible
    - resources are arranged sequentially
3. Batch
    - items are moved through the different manufacturing steps in groups or batches
    - moderate volumes, multiple products, higher volumes and lower variety than for job shop
    - sequence of steps is not as tightly linked as production line
    - balance between the flexibility of a job shop and the efficiency of a production line
    - standard products, repeating demand, can make specials
    - a
4. Job shop
    - general purpose equipment and broadly skilled workers
    - works are arranged by function
    - requirements can change dramatically
    - highly flexible, not very efficient
    - very small quantities
    - specially made, high variety, low repetition
    - skilled jobber or team, complete whole product
5. Fixed position layout or Projects
    - position of product is fixed
    - materials, equipment, workers transported to and from the product
    - one off, complex, large scale, high work content products
    - specially made
    - many different skills to be coordinated
    - products are bulky
    - defined start and finish time, quality and cost objectives

VOLUME: 5 is lower, 1 is higher
VARIETY: 5 is higher, 1 is lower
PROCESS FLOW: 5 is intermittent, 1 is continuous
PROCESS TASKS: 5 is complex and diverse, 1 is repeated and divided
Hybrid manufacturing process is a process that seeks to combine the characteristics and advantages of more than one classic process.

1. Machining centers:

    a. a type of manufacturing process that completes several manufacturing steps without removing an item from the process;
2. Group technology:
    a. A type of manufacturing process that seeks to achieve the efficiencies of a line process in a batch environment by dedicating equipment and personnel to the manufacture of products with similar manufacturing characteristics;
3. Flexible manufacturing systems:
    a. Highly automated batch processes that can reduce the cost of making groups of similar products;
    b. FMSs are highly automated (like line processes) but are able to handle a wider range of products (like batch processes)

Hybrid manufacturing processes combine the characteristics and advantages of more than one process to make chairs.
Manufacturing processes can also be linked across the supply chain.

## Product process matrix

The product process matrix:

| | one off for very low production volumes, customized products | small to medium production volumes, some standardization | medium to large production volumes, moderate product range | high production volumes, highly standardized products, competing on cost |
|---|---|---|---|---|
| job shop | | | process inefficient | process inefficient |
| low volume batch | | | | process inefficient |
| high volume batch | process too inflexible | | | |
| production line | process too inflexible | process too inflexible | | |

What about services?

- Professional service
    - high level of customer contact
    - clients spend a considerable time in the service process
    - high level of customization with service processes being highly adaptable
    - contact staff are given high levels of discretion in servicing customers
    - people based rather than equipment based
- Service shop
    - medium levels of volumes of customers

        - medium or mixed levels of customer contact
        - medium or mixed levels of customization
        - medium or mixed levels of staff discretion
- Mass service
    - high levels of volumes of customers
    - low to medium levels of customer contact
    - low or mixed levels of customization
    - low or mixed levels of staff discretion

Deviating from the “natural” diagonal line on the product process matrix has consequences for cost and flexibility;
The natural line fits processes to volume/variety characteristics, if volume too high or variety too low you have more process flexibility than is needed. If volume too low or variety too high you don’t have enough process flexibility, so high cost.
Old process new product deviates from the line so a new process must fit back.

## Customization

Four levels of customization:

- Make To Stock - products that require no customization
- Assemble to order - are customized only at the very end
- Make to order - products that use standard components but have customer specific final configuration of those components
- Engineer to order - products that are designed and produced from the start to meet unusual customer needs or requirements

- When customization occurs early in the supply chain:
    - flexibility in response to unique customer needs will be greater
    - lead times to the customer will be longer
    - products will be more costly
- When customization occurs late in the supply chain:
    - flexibility in response to unique customer needs will be limited
    - lead times to the customer will be shorter
    - products will be less costly

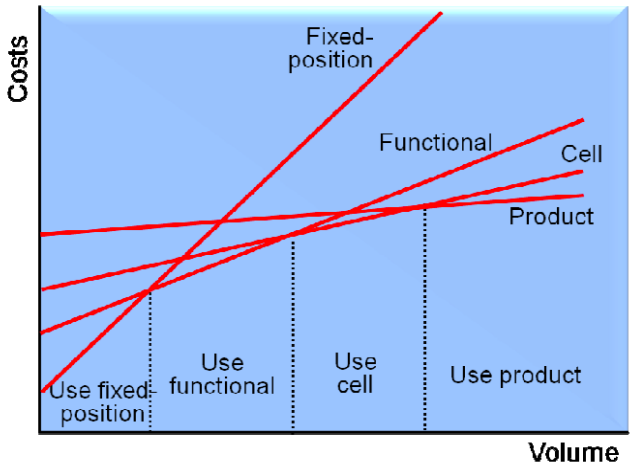
## Layout of an operation or process

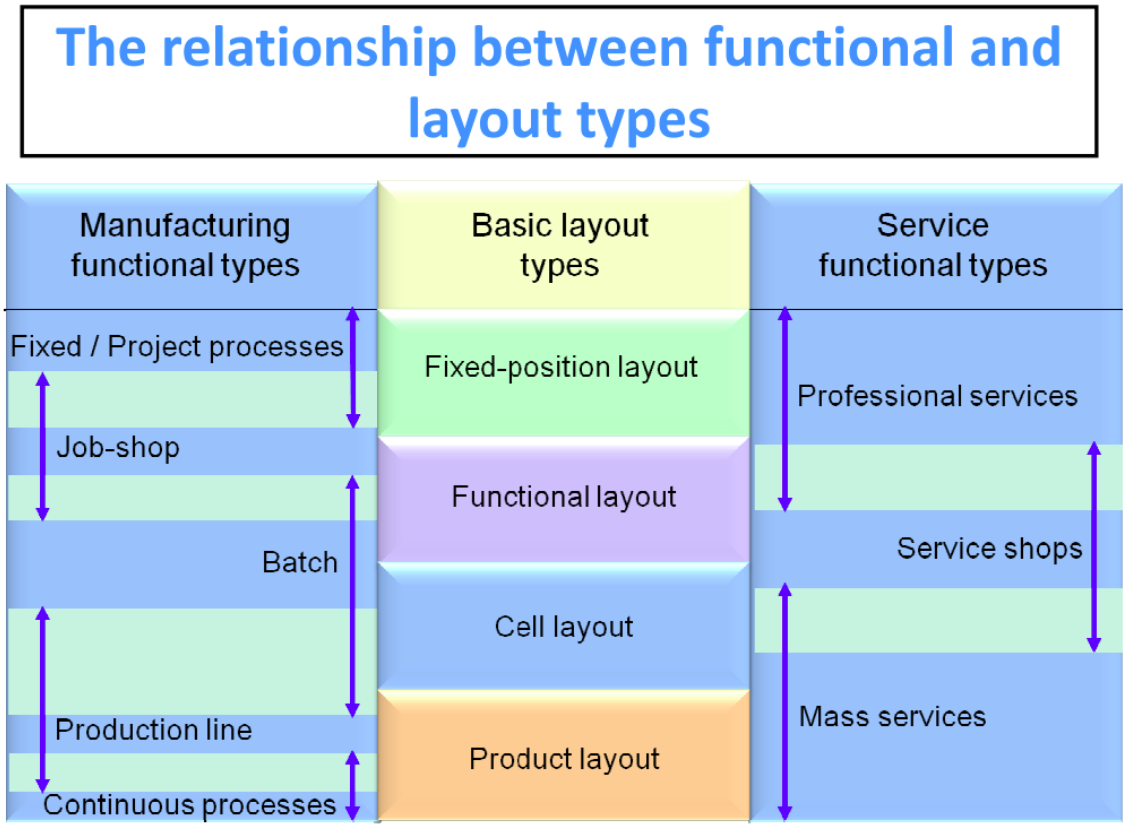
Layout of an operation or process means how its transformed resources are positioned relative to each other and how its various tasks are allocated to these transforming resources. If the layout proves wrong, it can lead to over-long or confused flow patterns, customer queues, long process times, inflexible operations, unpredictable flow and high cost.

Types of layout:

- product based layout - arranges resources sequentially, according to the steps required to make a product or provide a service
    - advantages:
        - low unit costs for high volume
        - opportunities or specialization of equipment
    - disadvantages:
        - can have low mix flexibility
        - now very robust in the case of disruptions
        - work can be very repetitive
- functional layout - physically groups resources by function
    - advantages:
        - high product and mix flexibility
        - relatively robust in the case of disruptions
        - easy to supervise
    - Disadvantages:
        - low utilization
        - can have very high WIP
        - complex flow
- cellular layout - production resources are dedicated to a subset of products with similar requirements
    - advantages:
        - can give good compromise
        - fast throughput
        - group work can result in good motivation
    - Disadvantages:
        - can be costly to rearrange existing layout
        - can need more plant
- fixed position layout - productive resources are moved to where the product is being made or service is being provided
    - advantages:
        - high product and mix flexibility
        - product/customer not moved
        - high variety of tasks for staff
    - Disadvantages
        - high unit costs
        - scheduling space and activities can be difficult

Fixed position -> Functional -> Cell -> Product
from intermittent flow to continuous flow
regular flow becomes more important
regular flow becomes more feasible
volume from lowest to highest
variety from highest to lowest
from the volumes and cost perspective, in this order costs grows less with volume




Product layout: assembly line balancing techniques.
Balancing loss is that proportion of the time invested in processing the product or service which is not used productively. An ideal balance is where work is allocated equally between the stages, but if work is not equally allocated, the cycle time will increase and balancing losses will occur.

## Line Balancing

Line Balancing:

1. identify all steps, their relationships and times required
2. draw a precedence diagram
3. determine takt time (time available divided by desired output rate)
4. determine minimum number of workstations required (total process time divided by takt time)
5. assign tasks to workstations according to precedence and total time for each to not exceed takt time
6. evaluate solution for times per workstation, % of idle time and efficiency delay (100% - % idle time).

# PACCO SLIDE BELINGHERI INTRODUCTION AND LOGICAL FRAMEWORK

## What is a Project

Project is any series of activities and tasks that have a specific objective, with a focus on the creation of business value, to be completed within certain specifications, have defined start and end dates, have funding limits, consume human and non human resources, and are multifunctionals. They are also an engine of change, and sometimes they are presented as problems, issues or messes.

## Remer rule and waterfall project phases

Remer's rule: at every stage of the project it costs 10x more to fix something than at the start.

Project phases:

- conception and initiation
    - selection of best project
    - recognizing benefits of the project
    - preparation of the documents
    - assigning of PM
- definition and planning
    - work requirements
    - quantity and quality of work
    - resources needed
    - scheduling activities
    - evaluating risks
- launch or execution
    - negotiating for the project team members
    - directing and managing the work
    - working with the team members
- performance and control
    - tracking progress
    - comparing actual outcome to predicted
    - analyzing variances and impacts
    - making adjustments
- project close
    - verifying that all work has been accomplished
    - closure of the contract
    - financial closure
    - administrative closure
    - lessons learnt

TOP 6 mistakes of project managers:

- Tolerating vague objectives
- Ignoring environmental context
- Using limiting tools and processes
- Neglecting stakeholder interests
- One shot planning
- Mismanaging people dynamics

## Logical framework

The logical framework:

- what are we trying to accomplish and why?
- how will we measure success?
    - valid to accurately measure the objective
    - verifiable so non subjective
    - targeted in quality, quantity, time
    - independent for each level in the LF
- what other conditions must exist?
    - identify assumptions
        - what conditions must exist
        - how must external parties cooperate with us
        - what else must happen for us to succeed
        - what else should we assume
    - analyze and test them
        - how important is each assumption
        - how likely is it to work out
        - if the assumption fails what are the consequences
        - what could cause this assumption not to be valid
    - Act
        - can we take the risk?
        - can we control it? should we monitor it? how?
        - which contingency plans do we need?
        - how can we design the project to work around or eliminate the assumption? (add task? add outcomes or input activities?)
- how do we get there?

| objectives | success measures | verification | assumptions |
|---|---|---|---|
| goal: the higher level, big picture objective | | | |
| purpose: the impact or behavior change you anticipate by doing the project | | | |

| | | | |
|---|---|---|---|
| objectives: the specific results that the project must deliver by managing the inputs | | | |
| inputs | | | |

if input and assumption
then objective
if objective and assumption
then purpose
if purpose and assumption then goal

A project management team is necessary to bridge the gaps between horizontal (managerial) and vertical (functional) gaps, operational islands.

## Three legged Stool

Project management is a three legged stool and must balance between project manager, line management and senior management (sponsor). Things that stay on top are organizational structure, organizational behavior and tools and techniques.

Benefits:

- identification of functional responsibilities to ensure that all activities are accounted for, regardless of personnel turnover
- minimizing need for continuous improvement
- identification of time limits for scheduling
- identification of a methodology for trade off analysis
- measurement of accomplishment against plans
- early identification of problems so that corrective action may follow
- improved estimating capability for future planning
- knowing when objectives cannot be met or will be exceeded

Obstacles:

- Complexity
- special requirements and scope changes
- organizational restructuring
- project risks
- changes in technology
- forward planning and pricing

Project management is the planning, organizing, directing and controlling of company resources for a relatively short term objective that has been established to complete specific goals. Furthermore, project management utilizes the systems approach to management by

having functional personnel (vertical hierarchy) assigned to a specific project (horizontal hierarchy).

## Project success

Project success is completion

- within the allocated time period
- within the budgeted cost
- at the proper performance or specification level
- with acceptance by the customer/user
- with minimum or mutually agreed on scope changes
- without disturbing the main work flow of the organization
- without changing the corporate culture

Competing constraint:
Risk inside image, quality and value, all inside time, cost and scope for traditional projects risk inside scope, cost, time, all inside value, quality and image for complex projects. Outside can be changed first.

## PM talent triangle

The PM talent triangle:

- Leadership
- Technical project management skills
- Strategic, business and management skills

Resources to coordinate:

- Money
- Employees
- Equipment
- Facilities
- Materials
- Information Technology

Multiple boss reporting:
every line or functional manager must report to the GM. PMs have a sponsor and Assistant Project Managers: every worker has to report to Assistant Project Managers and Line Managers.
It works with a good daily relationship between PM and line managers, and the ability of employees to report both vertically and horizontally.

## Interface management

Interface management:

- Managing HR within project team
- Managing HR between project team and functional organization
- Managing HR between project team and senior management
- Managing HR between project team and the customer's organization

Integration management is a part of interface management where the PM takes

| inputs | integration management | outputs |
|---|---|---|
| • capital<br>• materials<br>• equipment<br>• facilities<br>• information<br>• personnel | integrated processes | • products<br>• services<br>• profits |

## Functional manager, functional obstacles

Functional manager has the role of defining how a task will be done and where, and they also have the responsibility to provide sufficient resources to accomplish the objective within the project's constraints.

Functional obstacles:

- unlimited work requests
- predetermined deadlines
- all requests have a high priority
- limited number of resources
- limited availability of resources
- unscheduled changes in the project plan
- unpredicted lack of progress
- unplanned absence of resources
- unplanned breakdown of resources
- unplanned loss of resources
- unplanned turnover of personnel

## Project sponsor

The project sponsor literally sponsors the project to management. Priority projects get a senior management sponsor, maintenance projects get lower to middle management.

A sponsor can aid with objective setting, up front planning, project organization, key staffing, master plan, policies, monitoring execution, priority setting, conflict resolution, and executive client contact.

## Types of project governance

| structure | description | governance |
|---|---|---|
| dispersed locally | team members are still attached administratively to their functional area | usualli 1 person or internal committee |
| dispersed geographically | virtual team | usually governance by committee, can include stakeholders |
| colocated | everyone close proximity, PM has no responsibility for wages | usually 1 person |
| projectized | like colocated but PM has some line manager functions | may be governance by committee based on the size of the project and # of strategic partners |

## PM as planning agent

- complete task definitions
- resource requirement definitions
- major timetable milestones
- definition of end item quality and reliability requirements
- basis for performance measurement
- definition of project success
- if properly carried out:
    - functional units understand responsibilities
    - problems resulting from scheduling and allocation are known
    - early ID of problems

## PM in non project driven groups:

- projects may be few and far between
- not all projects have the same PM requirements
- executives do not have sufficient time to manage projects but do not delegate
- projects tend to be delayed because approvals follow vertical command
- only a portion of the organization understands project management
- there is a heavy dependence on subcontractors and outside agencies

Tip of the iceberg syndrome:

- delegation of authority to PM
- executive meddling
- lack of understanding of project management
- lack of training in communications/interpersonal skills

## Success

Success is more of a “cube” in a graph where the axes are quality, time and cost.
There are three types of factors.

1. Customer:
    a. time
    b. cost
    c. quality
    d. accepted by customer
2. Firm:
    a. customer reference
    b. follow on work
    c. financial success
    d. technical superiority
    e. strategic alignment
    f. regulatory agency relations
    g. health and safety
    h. environmental protection
    i. corporate reputation
    j. employee alignment
    k. ethical conduct
3. Stakeholders
    a. consumers want safety in use
    b. employees want guaranteed employment
    c. management wants bonuses
    d. stockholders want profit
    e. government wants compliance with regulation

## Types of culture:

1. Cooperative (trust and effective communication)
2. Non cooperative (mistrust and selfishness)
3. Competitive (competition for valuable resources, attachment to project)
4. Isolated (large companies, functional units each with own PM culture)
5. Fragmented (multinationals, parts of team are separated).

## Change management:

There exists a professional resistance to change.
It is higher in sales, marketing, finance and procurement.
It is neutral in HR.
It is quite low in manufacturing.
It is low in engineering, R&D, I.T.

Resistance might come from

| work habits | social groups | embedded fears |
|---|---|---|
| causes:<br>● new guidelines<br>● need to share power information<br>● creation of fragmented work environment<br>● need to give up established work pattern<br>● change in comfort zone | causes:<br>● unknown new relationships<br>● multiple bosses<br>● multiple temporary assignments<br>● severing of established ties | causes:<br>● fear of failure<br>● termination<br>● added workload<br>● dislike of unknowns<br>● embarrassment<br>● we/they organization |
| to overcome:<br>● dictate mandatory conformance from above<br>● create new comfort zones at an acceptable pace<br>● identify tangible and intangible individual benefits | to overcome:<br>● maintain existing relationships<br>● avoid cultural shock<br>● find an acceptable pace for rate of change | to overcome:<br>● educate workforce on benefits of changes to the individual/corporation<br>● show willingness to admit/accept mistakes<br>● show willingness to pitch in<br>● transform unknowns into opportunities<br>● share info |

The change process goes through 5 phases: denial, resistance, exploration, another harder resistance, and finally support.

## Project risks

Project risks include:

- poorly defined requirements
- lack of qualified resources
- lack of management support
- poor estimating

Risk identification is an art combining rigorous analysis and creative thinking, tools to support risk management include:

- decision support systems
- expected value measures
- trend analysis/projections
- independent reviews and audits

## Stage Gate process:

The starting point in the development of any project management methodology is the implementation of a stage gate process, where stages are groups of series or parallel

activities managed by cross functional teams to reach a predetermined deliverable established by management.
Gates are structured decision points at the end of each stage, and number of gates must be limited.

Gatekeepers are individuals or groups assigned by senior manager to enforce the structured process, they are authorized to evaluate performance and make decisions and willing to provide the team with necessary technical and business information.
They can either decide to

- proceed to the next gate with the original objectives
- proceed to the next gate with revised objectives
- delay making a gate decision until further info is obtained
- terminate the project

The three major benefits of this process:

- provides structure to PM
- provides standardization in planning, scheduling and control
- allows for a structured decision making process

Failures:

- assign gatekeepers and not empower them to make decisions
- assign gatekeepers who are afraid to terminate a project
- failure to provide team with info critical to gate reviews
- allow team to focus more on gates than on stages

## Planning

Planning is the function of selecting the enterprise objectives and establishing the policies, procedures and programs necessary for achieving the,
In a project environment, it could be described as establishing a predetermined course of action within a forecasted environment.

Managers dislike planning because

- It takes time
- you have to think
- it involves paperwork
- you are bound to systematic procedures
- you are committed to achieve a specific result within a specified time period

Effective planning

| Project planning must be<br>● Systematic<br>● flexible enough to handle unique activities | An effective plan must be<br>● Explicit (stated in detail)<br>● Intelligible<br>● Flexible (accepting | We plan:<br>● to eliminate or reduce uncertainty<br>● to improve efficiency<br>● to obtain a better |
|---|---|---|

| | | |
|---|---|---|
| ● disciplined through reviews and controls<br>● capable of accepting multifunctional input | change)<br>● Controllable (capable of being monitored) | understanding of the objectives<br>● to provide a basis for monitoring and controlling work |

If the task is well understood prior to being performed, much of the work can be preplanned

If the task is not understood, then during the actual task execution more knowledge is gained that, in turn, leads to changes in resource allocations, schedules, and priorities.

The more uncertain the task, the greater the amount of information that must be processed in order to ensure effective performance.
Planning terminology:

- objective: a goal - target - quota to be achieved by a certain time
- program: strategy to be followed and actions to be taken to achieve objectives
- schedule: plan showing when individual or group activities will be completed
- budget: planned expenditures
- forecast: projection of what will happen
- organization: design of the number and kinds of positions and duties required
- policy: general guide for decision making and individual actions
- procedure: detailed method for carrying out a policy
- standard: level of individual or group performance defined as adequate

Necessary inputs for planning:

- SOW statement of work:
- project specs
- milestone schedule
- work breakdown structure WBS

The business case:

- businesses have specific needs
- opportunity options must be checked
- benefit realization plans are sometimes in a separate documents
- assumptions must be checked
- high level objectives
- recommendation for evaluation
- project metrics
- exit strategies
- project risks and complexity
- resources needed
- timing
- legal requirements
- there might be changes in
    - business owners or leadership
    - assumptions
    - constraints

    - resource availability

Project life cycles:

- the first phase is the conceptual phase
- the second is feasibility and preliminary planning phase
- the third is the detailed planning phase, where there's a scope freeze milestone - scope now cannot change
- the fourth is the implementation phase, peak usage of resources, design freeze milestone
- the last one is conversion/terminal phase, customer approval milestones, less resource usage.

Responsibilities:

| project manager | line manager | senior management or project sponsor |
|---|---|---|
| goals and objectives<br>major milestones<br>requirements<br>ground rules<br>time, cost, performance constraints<br>operating procedure<br>administrative policy<br>reporting requirements | detailed task descriptions to implement objectives, requirements, milestones<br>detailed schedules and manpower allocations to support budget and schedule<br>identification of areas of risk, uncertainty and conflict | act as the negotiator for disagreements between PM and LM<br>provide clarification of critical issues<br>provide communication link with customer's senior management |

| Problem areas in project planning | Questions to ask following objectives |
|---|---|
| objectives and goals could be either too rigid to accommodate changing priorities, or not agreeable to all parties | what are the major elements of the work required to satisfy the objectives, and how are these elements interrelated? |
| there could not be enough times to define objectives well | which functional divisions will assume responsibility for accomplishment of these objectives and the major element work requirements? |
| objectives could be not documented enough or not quantified adequately | are the required corporate and organizational resources available? |
| personnel turnover high | what are the information flow requirements for the projects? |
| not coordinated efforts | |

## SOW statement of work:

- a narrative description of the work required for the project and the end results to be provided under the contract

    - complexity is determined by desires of top management and customers or user groups
    - Preparation of this statement requires training rather than luck
    - The internal SOW is prepared by project office and/or user groups
    - The external SOW is prepared depending on the situation:
        - Project manager, line manager, project sponsor
        - client who has the capabilities
        - independent body contracted by client
        - client may contract your services
    - points to address:
        - purpose
        - exclusions (what should not be done)
        - quantities
        - schedule
        - deliverables
        - acceptance criteria
        - responsibility
    - SOW elements:
        - general scope of the work
        - objectives and related background
        - contractor tasks
        - contractor end item performance requirements
        - reference to related studies, documentation, specifications
        - data items (documentation)
        - support equipment for contract end item
        - customer furnished property, facilities, equipment, services
        - customer furnished documentation
        - schedule of performance
        - exhibits attachments and appendices
    - possible misinterpretation areas:
        - mixing tasks, specification, approvals, special instructions
        - using imprecise language
        - no pattern, structure, chronological order
        - wide variation in size of tasks
        - wide variation in how to describe details of the work
        - failing to get third party review

Project specifications

- it is a document that defines the management plan of a project as a whole, by listing all the elements

Milestone schedule

- it contains project start and end dates, and other major milestones, also reports

## Work breakdown structure

- product oriented, or process oriented, family tree subdivision of hardware, services and data required to produce the end product
- it structures and assigns project into various activities so that
    - the total program can be described as a sum of divided elements
    - planning can be performed
    - costs and budgets can be established
    - time, cost and performance can be tracked
    - objectives can be linked to company resources in a logical manner
    - schedules and status reporting procedures can be established
    - network construction and control planning can be initiated
- it can be developed either bottom up or top down
- it can be hardware related, function related or a combination of the two
- the depth must balance out management effort against planning accuracy
- for accuracy purposes, the WBS should be taken down several levels
- the WBS must be structured for objective control and evaluation
- Most common structure: six level indentured. The first three levels are managerial and usually specified by client and managed by PM, the last three are technical and generated by contractor for in house control and managed by functional managers;
    - 1. total program
    - 2. project
    - 3. task
    - 4. subtask
    - 5. work package
    - 6. level of effort
- planning accuracy is dependent on the WBS level selected, the lower the level and the greater is the planning accuracy, but higher the management cost.
- Criteria:
    - process based
    - location based
    - phase based
    - cost center based
- WBS tasks:
    - clearly defined start and end dates
    - they must be usable as communication tools in which results can be compared with expectations
    - they must be estimated on a total time duration, not when the task must start or end
    - they must be structured so that a minimum of project office control and documentation is necessary
- WBS work packages
    - represent units of work at the level where the work is performed
    - clearly distinguishes one work package from all others assigned to a single functional group
    - contains clearly defined start and end dates that are representative of physical accomplishment
    - specifies a budget in terms of dollars, man hours or other measurable units

    - limits the work to be performed to relatively short periods of time to minimize the work in process effort (slide 83)

The project plan eliminates conflicts between
- functional manager
- functional management and program management

it also provides
- standard communication tool throughout the lifetime of the project
- verification that the contractor understands the customer's objectives and requirements
- a means for identifying inconsistencies in the planning phase
- a means for early identification of problem areas and risks so that no surprises occur downstream

and it contains all of the schedules needed for progress analysis and reporting.

It is approved by customer and contractor and answers the questions of what, how, where, when and why it will be accomplished.

The management section of the project plan contains procedures, charts and schedules.
- the assignment of key personnel to the project is indicated - usually only project office personnel and team members, since under normal operations these will be the only individuals interfacing with customers
- manpower, planning and training are discussed to assure customers that qualified people will be available from the functional units
- a linear responsibility chart might also be included, to identify to customers the authority relationships that will exist in the program

The technical section can include:
- a detailed breakdown of charts and schedules used in the project master schedule including schedule and cost estimates
- a listing of the testing to be accomplished for each activity
- procedures for accomplishment of the testing (this might include a description of key elements in the operations or manufacturing plans, as well as a listing of the facility and logistic requirements)
- identification of materials and material specifications (this might include system specifications)
- an attempt to identify risks associated with specific technical requirements. this assessment tends to scare management personnel who are unfamiliar with the technical procedures so it should be omitted if possible.

## Scheduling:

A schedule is a representation of the project's milestones, activities and deliverables, with intended start and finish dates. it adds a time dimension to the Work Breakdown Schedule.
Advantages:
- they form the basis for all planning and predicting and help management decide how to use its resources to achieve time and cost goals

- they provide visibility and enable management to control one of a kind programs
- they help management evaluate alternatives by answering such questions as how time delays will influence project completion, where slack exists between elements, what elements are crucial to meet the completion date
- they provide a basis for obtaining facts for decision making
- they utilize a time network analysis as the basic method to determine manpower, material and capital requirements, as well as to provide a means for checking progress
- they provide the basic structure for reporting information
- they reveal interdependencies of activities
- they facilitate “what if” exercises
- they identify the longest and critical paths
- they aid in scheduling risk analysis

Scheduling techniques:
- Gantt or bar charts
    - every task is put in a chart with bars that show the months after go ahead and show planned vs executed
- Milestone charts
    - every task is put in a graph that shows the milestones over time like triangles
- Line of balance
- Networks
    - precedence diagram method (pdm)
    - arrow diagram method (adm, sometimes called critical path method cpm)
    - program evaluation and review techniques (pert)
    - graphical evaluation and review techniques (gert)

## Network based techniques

tackle the interdependencies of activities, project completion time and assess the impact of late and early starts. They render able trade offs between resources and time, and what if exercises. They can determine the cost of a crash program and show the impacts of slippages in planning and performance. they also aid evaluation of performance.

Nomenclature:
Milestones are called events, and indicate when an activity starts or finishes.
Activities are the element of the work that must be accomplished.
Duration is the total time required to complete the activity.
Effort is the amount of work actually performed within the duration.
Critical paths are the longest paths through the network and determine the duration of the project. They are also the shortest time necessary to accomplish the project.

in WBS, we can identify the interface activities for each work package with other work packages - which one provide input and which one use outputs.

There are 5 main types of dependencies, with or without lag:
- finish to start (B starts when A finishes)

- start to finish (A must have started before B finishes)
- start to start (A must have started before B starts)
- finish to finish (A must have finished before B finishes)
- percent complete (A must be completed for a percentage before B starts)

Some dependencies are mandatory by hard logic, some are discretionary, some are external and beyond the scope of control of the project managers

Burst points are when an event goes to more events through more activities, sink is when multiple events all converge to an activity.

Every activity has an
- ES earliest start time
- EF early finish time
- LF latest finish time
- LS latest start time
- time of duration
- slack time: LS - ES
- to calculate ES and EF forward pass through net
- to calculate LS and LF backward pass through net watching critical path first

## PERT

all of the individual tasks to complete a program must be clear enough to be put down in a network, which comprises events and activities: that is follow the WBS.
Events and activities must be sequences on the network under a highly logical set of ground rules that allow the determination of critical and subcritical paths. Networks may have more than one hundred events, but not fewer than ten.

Time estimates must be made for each activity on a three way basis: optimistic, most likely, and pessimistic elapsed time figures are estimated by the people most familiar with the activity.

Critical path and slack times are computed. The critical path is that sequence of activities and events whose accomplishment will require the greatest time.

| PERT | CPM |
|---|---|
| ● uses three time estimates to derive an expected time<br>● it is probabilistic in nature, based on a beta distribution for each activity time and a normal distribution for expected time duration, to calculate the risk in completing a project<br>● it is used for projects where the risks in calculating time durations have a high variability | ● it uses one time estimate that represents the normal time<br>● it is based on a single time estimate and it is deterministic in nature<br>● it is used for projects that are resource dependent and based on accurate time estimates<br>● it is used for those projects where percent complete can be determined with reasonable accuracy and |

| | |
|---|---|
| ● it is used on those projects where percent complete is almost impossible to determine except at completed milestones<br>● it is event oriented | customer billing can be accomplished based on percent complete<br>● it is activity oriented |

| PERT ADVANTAGES | PERT DISADVANTAGES |
|---|---|
| ● reveals interdependencies and problems that are not obvious with other planning methods<br>● determines where the greatest effort should be made to keep a project on schedule<br>● determines the probability of meeting deadlines by development of alternative plans<br>● sophisticated statistical analyses can be used to compute standard deviations and the probability of accomplishment<br>● evaluate the effect of changes on future activities<br>● presenting large amounts of data in a visually simple way | ● time and labor intensive<br>● decision making ability reduced<br>● lacks functional ownership in estimates<br>● lacks historical data for time cost estimates<br>● assumes unlimited resources<br>● requires too much detail |

PERT can show the differences between predicted timeline and actual time progression. Its output informations show earliest times and latest times with expected and variance values, shows slack, the original schedule and the probability of meeting it.
It can be charted for the whole process - master pert chart - and for single departments.

Estimating activity time goes like this:

- When activities are incremental and there is a sufficiently large historical database or experience, functional managers submit their best estimates
- Otherwise, functional managers submit three estimates for each activity:
    - optimistic completion time which should happen 1% of the time
    - pessimistic completion time which should happen 1% of the time
    - most likely completion time
- the expected times of the different activities follow a normal distribution, and their sum also is.
- So, the standard deviation of the total path is the sum of the standard deviations of the activities

## TOTAL PERT/CPM PLANNING

1. list of activities
2. activities precedence (arrow diagrams without activity time and critical path)
3. review with line managers, functional managers
4. conversion to pert/cpm by the line managers, by identifying the duration of each activity assuming infinite resources
5. first iteration on the critical path
6. adding calendar dates and eventual replanning

a. resource leveling is an attempt to eliminate the manpower peaks and valleys by smoothing out the period to period resource requirements (the ideal solution is to do this without changing the end date - however, the end date moves out and additional costs are incurred)
b. resource allocation is an attempt to find the shortest possible critical path based upon the available or fixed resources - the problem with this approach is that employees may not be qualified technically to perform on more than one activity in a network
c. not all PERT/CPM networks permit such easy rescheduling of resources
d. project managers should make every attempt to reallocate resources to reduce the critical path, provided that the slack was not intentionally planned as a safety valve.

## How do you compress a schedule??

- elimination of some parts of the project
- addition of more resources
- substitution of less time consuming components or activities
- shortening:
    - critical path activities
    - early activities
    - longest activities
    - easiest activities
    - activities that are least costly to speed up
    - activities for which you have more resources
- increasing the number of work hours per day
- parallelizing activities

| primary replanning | secondary replanning | limitations |
|---|---|---|
| best time<br>least cost<br>least risk | studying alternatives<br>optimum schedules<br>effective use of resources<br>communications<br>refinement of the estimating process<br>ease of project control<br>ease of time or cost revisions | calendar completion<br>cash or cash flows<br>restrictions<br>limited resources<br>management approvals |

Crashing of activities has a cost for the project, which is usually computed in cost per week and can add up. There should be an estimate of all the possibilities of crashing and cost rises, and all these possibilities should be projected.
Also, by plotting an estimate of direct and indirect costs through time there should be a projection of optimum project duration time for minimum total costs.
Also, there is a region of feasible budgets which stands between early and late start of activities.

Scheduling problems:

- using unrealistic estimates for effort and duration
- inability to handle employee workload imbalances
- having to share critical resources across several projects
- overcommitted resources
- continuous readjustments to the WBS primarily from scope changes

| compression technique | myth | reality |
|---|---|---|
| use of overtime | work will progress at the same rate on overtime | work is slower, there might be more mistakes and burnout |
| adding more resources, aka crashing | the performance rate will increase due to the added resources | it takes time to find resources, to get them up to speed, the resources used for the training must come from the existing resources |
| reducing scope (reducing functionality for example) | the customer always asks for more work than needed | the customer needs all of the tasks agreed to in the statements of work |
| outsourcing | numerous qualified suppliers exist | the quality of the suppliers' work can damage your reputation, the supplier might go out of business and may have limited concern for your scheduled dates |
| doing series work in parallel | an activity can start before the previous one is finished | the risks increase, rework becomes expensive because it may involve multiple activities |

## project pricing

is an art, information available to one bidder is generally available to others, it is an essential part of the planning process which forms the basis for establishing standards for budget, man hours, material costs, contingencies etc.
Specific pricing strategies must be developed for each situation.

| first global pricing strategy: one of a kind project with little to no follow on business | second global pricing strategy: new project with potential for large follow on business or representing a desired penetration into new markets |
|---|---|
| 1. develop cost model and estimating guidelines; design proposed project baseline for minimum cost, | 1. design proposed project baseline compliant with customer requirements, with innovative features but minimum risks<br>2. estimate cost realistically |

| | |
|---|---|
| to minimum customer requirements;<br>2. estimate cost realistically for minimum requirements<br>3. scrub the baseline, squeeze out unnecessary costs<br>4. determine realistic minimum cost, obtain commitment from performing organizations<br>5. adjust cost estimate for risks<br>6. add desired margins, determine the price<br>7. compare price to customer budget and competitive cost information<br>8. bid only if price is within competitive range | 3. scrub baseline, squeeze out unnecessary costs<br>4. determine realistic minimum cost, obtain commitment from performing organizations<br>5. determine “should cost” including risk adjustments<br>6. compare your final cost estimate to customer budget and the “most likely” winning price<br>7. determine the gross profit margin necessary for your winning proposal. this margin could be negative<br>8. decide whether the gross margin is acceptable according to the must win desire<br>9. depending on the strength of your desire to win, bid the “most likely” winning price or lower<br>10. if the bid price is below cost, it is often necessary to provide a detailed explanation to the customer of where the additional funding is coming from. the source could be company profits or sharing of related activities. in any case, a clear resource picture should be given to the customer to ensure cost credibility. |

good estimating requires that information be collected prior to the initiation of the estimating process. typical information includes:

- recent experience in similar work
- professional and reference material
- market and industry surveys
- knowledge of operations and processes
- estimating software and databases if available
- interviews with subject matter experts

| types of estimates | | | |
|---|---|---|---|
| order of magnitude estimates:<br>● made without any detailed engineering data<br>● may use past experience<br>● accuracy circa 35% error within | approximate estimates:<br>● made without any detailed engineering data<br>● may use previous similar projects<br>● accuracy circa 15% error | estimating manual<br>● developed over time<br>● use to price out “effort”, accuracy of an error of circa 10% | definitive or detailed estimates:<br>● prepared from well defined engineering data, vendor quotes, unit prices etc.<br>● accuracy with error or circa |

| | | | |
|---|---|---|---|
| the scope of the project | | | 5% |

During competitive bidding it is important that the type of estimate be consistent with the customer's requirements. For in house projects, the type of estimate can vary over the life cycle of a project:

- conceptual stage: venture guidance or feasibility studies for the evaluation of future work - this estimating is often based on minimum scope information
- planning stage: estimating for authorization of partial or full funds, these estimates are based on preliminary design and scope
- main stage: estimating for detailed work
- termination stage: re estimation for major scope changes or variance beyond the authorization range.

## Pricing out a project:

1. provide a complete definition of the work to be done
2. develop a logic network diagram
3. construct the WBS and estimate the activities in terms of time and cost
4. review times and costs with the respective functional managers
5. decide on a course of action
6. establish acceptable costs for each WBS-activity
7. review the base costs with your sponsor
8. develop the pricing cost report
9. document this in the project file.

in the vertical horizontal structure, both program management and functional hierarchy merge at the work breakdown structure that is at their intersection. it is important that both coordinate to define performance requirements and control performance costs.

Organizational input requirements:

- a kickoff meeting with all representatives once WBS and schedules have been established
    - all relevant functional managers attend
    - or a divisional representative together with possibly key department managers or section supervisors
        - the divisional representative must ensure that cost estimates come in on time
- additional meetings are required to solve issues that emerge

## Project costs can be divided into 4 main components:

- salary structure - labor distribution is both vertical and horizontal and has a flow.
- overhead structure
- labor hours

- materials/support costs

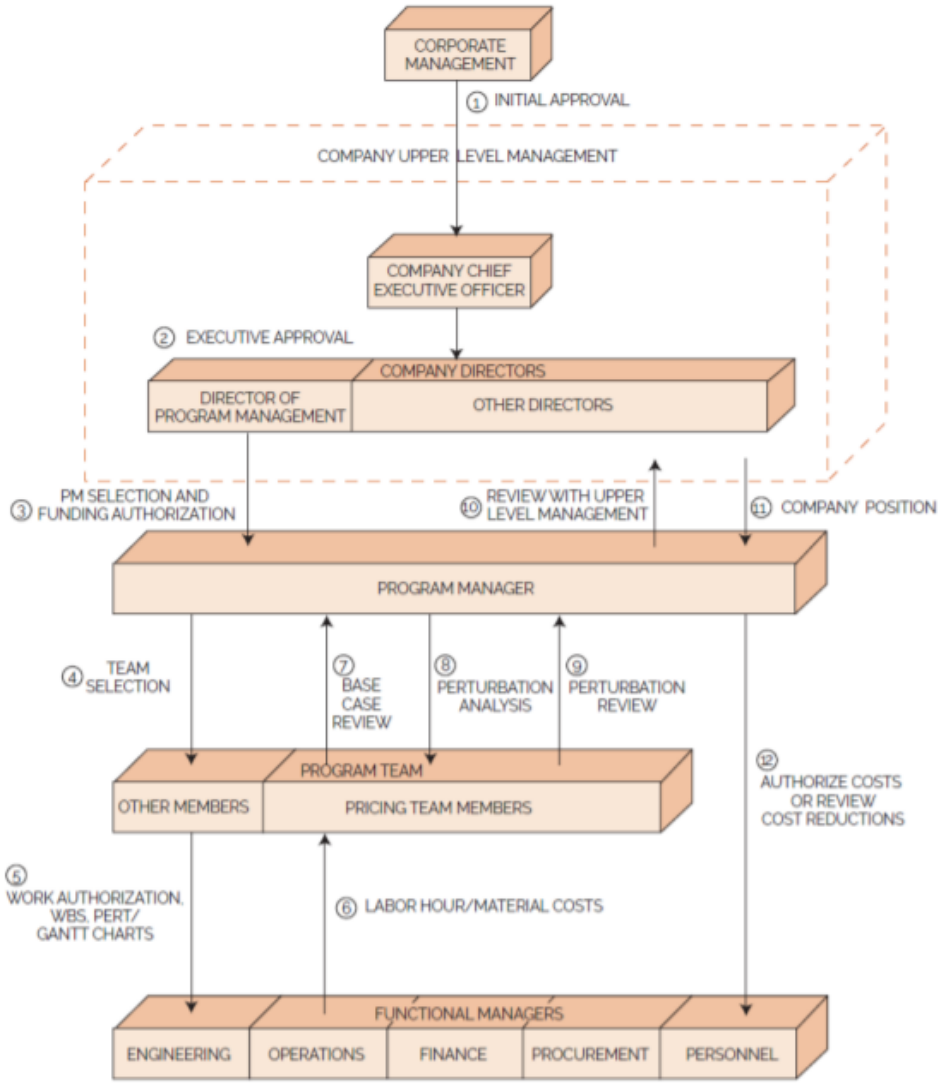
functional pricing flow starts from program management which releases the WBS to functional management. Functional management provides pricing informations about man hours and tasks to program management.
functional management communicates with departments, which communicate with sections.

Overhead rates are based
- direct business base projections
- projection of overhead expenses
- direct labor rates

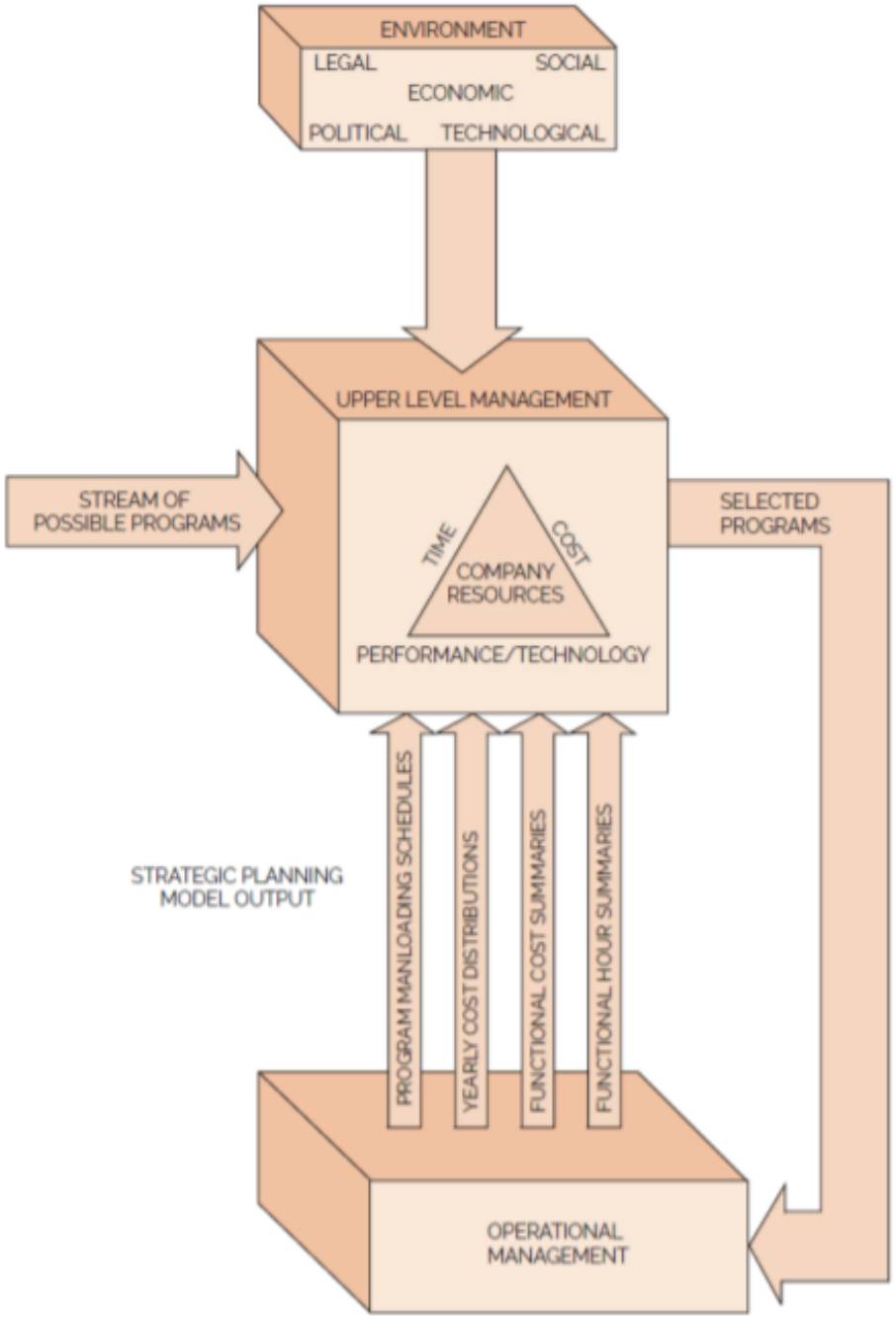
Material costs are comprised of materials, purchased parts, subcontracts, freight, travel and other related expenses.
This is the path:
- Statement of work
- Work breakdown structure
- Subdivided work description or work planning authorization + engineering drawings
- BOM
- manufacturing plans
    - tooling requirements
- master production schedule
    - detailed schedule
- MCCS planning activities
- budget

Pricing reports are used by project managers as the basis for project cost control and by upper level executives for selecting, approving and prioritizing projects.
- detailed cost breakdown for each WBS element
- total project manpower curve for each department
- monthly equivalent manpower cost summary
- yearly cost distribution table
- functional cost and hour summary
- monthly labor hour and dollar expenditure forecast
- raw material and expenditure forecast
- total project termination liability per month

Pricing review procedure



## System pricing




Developing supporting/backup costs can be required in a bidding process to justify the cost estimates (if customers want to audit the cost proposals). THese costs should be developed together with the pricing and be coherent. Backup costs may be based on subcontractor quotes, or historical data, and should be updated as each project is completed, as part of lessons learned.
It is usually very important in a cost reimbursable package, less for fixed price efforts.

It is a tool to gain credibility with the customer and it should be done both for direct and indirect costs.

## LOW BIDDER DILEMMA:

Companies have short and long range objectives on profit, market penetration, new product development, and so on.
These objectives may be incompatible with, or irrelevant to, a low price strategy.
For example,

- low prices could be suspicious and unrealistic
- the bid price may be too low relative to competition and customer budget, eroding profits
- the price may be irrelevant to the bid objective, such as entering a new market
- low pricing without market information is meaningless, the price level is always relative to
    - competitive prices
    - customer budget
    - bidder cost estimate
- the bid proposal and its price may cover only part of the total project
- the ability to win phase II on follow on business depends on phase I performance and phase II price.
- The financial objectives of the customer might be more complex than just finding the lowest bidder
- the lowest bidder is not an automatic winner, both commercial and governmental customers are increasingly concerned about cost realism and the ability to perform under contract.

## Pricing method problems

1. work is priced out at the department average, and all work performed is charged to the project at the department average salary, regardless of who accomplished the work
2. work is priced out at the department average, but all work performed is billed back to the project at the actual salary of those employees who perform the work
3. the work is priced out at the salary of those employees who will perform the work and the cost is billed back the same way

| pitfall | solution |
|---|---|
| misinterpretation of the statement of work | ensure the SOW is free of imprecise language by having it reviewed by a third party |
| omissions or improperly defined scope | verify the scope statement and project scope, use a template or check list to define it. obtain support from functional group. |
| poorly defined or overly optimistic schedule | ensure that functional groups are involved in the planning, consider risks associated with scheduling, validate |

| | |
|---|---|
| | assumptions |
| inaccurate WBS | use functional manager knowledge, use templates from previous projects, review WBS with scope statement and statement of work |
| applying improper skill level to project activities | identify the appropriate skill levels required, provide training as needed, and verify competency levels |
| failure to account for risks | prepare a risk management plan and conduct risk analysis |
| failure to understand or account for cost escalation and inflation | review lessons learned, obtain support from accounting groups, ensure that estimates include forecasts of economic conditions |
| failure to use the correct estimation technique | review standard practices, review expectations with project sponsors and executives |
| failure to use forward pricing rates for overhead, general administrative and indirect costs | consider the time value of money, plan for inflation and changing market prices for material, identify overhead (rent, telecom costs, support services, benefits) consider contractual raises bargained for by employees, obtain templates to assist in estimating, obtain a third party review of estimates |

Two types of project management softwares: online or on premises. They show precedence networks of tasks, and activity information.
Typical features also include planning, tracking and monitoring, reporting, project calendars, what if analysis, multi project analysis.
Task management: it's the ability to create tasks and manage them during the entire process
team collaboration features allow any number of team members to communicate
learning material
email integration
document management
mobile
third party integration
customization
reporting
scheduling
time management

## Definitions of organizational structures:

Authority is the power granted to individuals to make final decisions
Responsibility is the obligation incurred by individuals in their roles to effectively perform assignments
Accountability is the sum of these two.

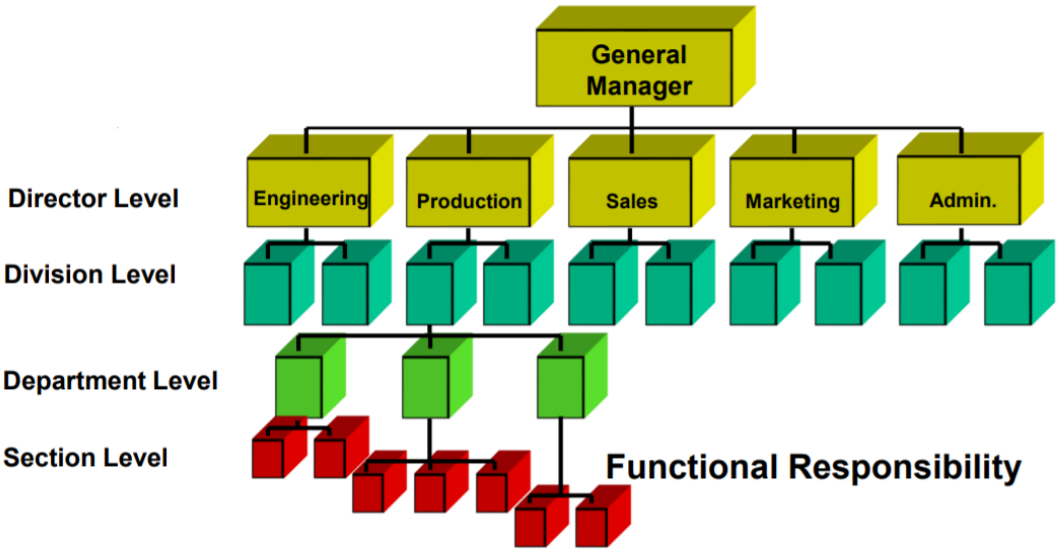
Traditional weaknesses:

- management is satisfied with its technical skills, but projects are not meeting time, cost and other project requirements
- there is a high commitment to getting project work done, but great fluctuations in how well performance specifications are met
- highly talented specialists involved in the project feel exploited and misused
- particular technical groups or individuals constantly blame each other for failure to meet specifications or delivery dates
- projects are on time and to specifications, but groups and individuals aren't satisfied with the achievement

Questions to choose the best structure:

- to what extent does the task of organization call for close control if it is to be performed efficiently?
- what are the needs and attitudes of the people performing the tasks? what are the likely effects of control mechanisms on their motivation and performance?
- what are the natural social groupings with which people identify themselves?
- to what extent are satisfying social relationships important in relation to motivation and performance?
- what aspect of the organization's activities needs to be closely integrated if the overall task is to be achieved?
- what organizational measures can be developed that will provide an appropriate measure of control and integration of work activities while at the same time meeting the needs of people and providing adequate motivation?
- what environmental changes are likely to affect the future trend of company operations? what organizational measures can be taken to ensure that the enterprise responds to these effectively?

# The Classical Management Structure




## CLASSICAL MANAGEMENT STRUCTURE

| advantages | disadvantages | functional weaknesses |
|---|---|---|
| easier budgeting<br><br>better technical control<br><br>flexibility in use of manpower<br><br>it provides a broad manpower base to work with<br><br>provides continuity in the functional disciplines - policies, procedures and lines of responsibility are easily defined and understandable<br><br>it readily admits mass production activities within established specifications<br><br>provides good control over personnel, since each employee reports to only one person | coordination becomes complex and additional lead time is required for approval of decisions<br><br>no one individual is directly responsible for the total project<br><br>it does not provide the project oriented emphasis necessary to accomplish for project tasks<br><br>decisions normally favor the strongest functional groups<br><br>no customer focal points<br><br>response to customer needs is slow<br><br>difficulty in pinpointing responsibility for little or no direct project reporting, very | functional organizations tend to emphasize the separate functional elements at the expense of the whole organization<br><br>no group effectively integrates the various functions of an organization and monitors them from the big picture standpoint<br><br>they emphasize functional relationships based on the vertical organizational hierarchy<br><br>tend to fragment other management processes<br><br>develop a strong resistance to change<br><br>through the formal organization process |

| | | |
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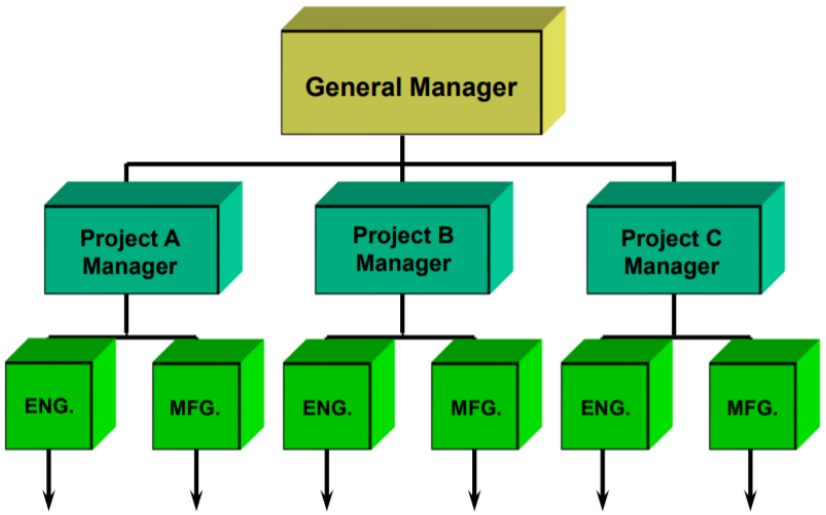
| communication channels are vertical and well established<br><br>quick reaction capability exists but may be dependent upon the priorities of the functional managers | little project oriented planning and no project authority<br><br>motivation and innovation are decreased<br><br>ideas tend to be functionally oriented with little regard for ongoing projects | encourages conflict among the various functions<br><br>the emphasis on the various operation functions focuses attention on the internal aspects and relations of the company to the detriment of its external relations<br><br>tend to be closed systems |

## Pure Project Structure

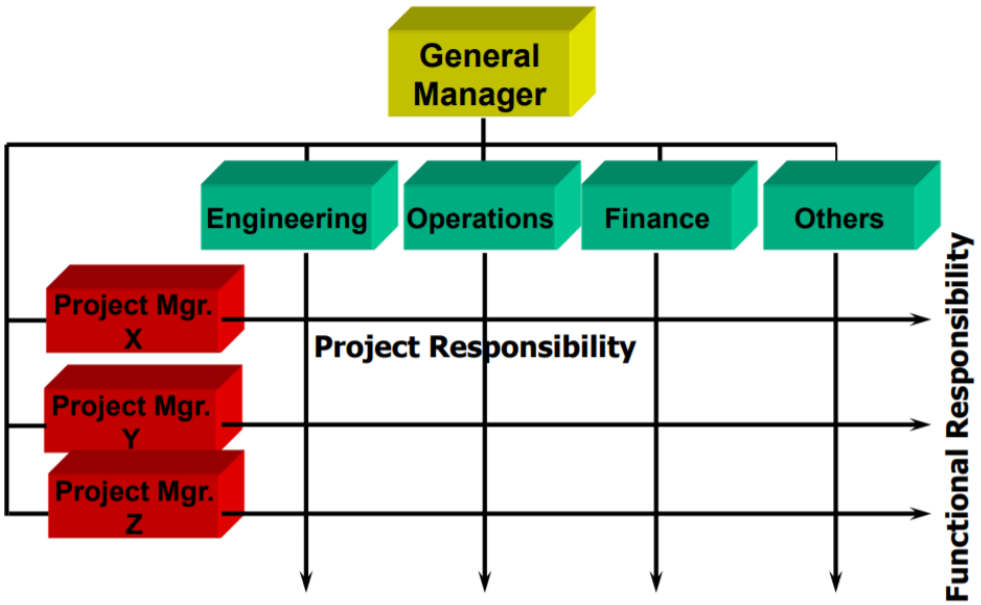



## PURE PROJECT STRUCTURE

| advantages | disadvantages | matrix development |
|---|---|---|
| provides complete line authority over the project<br><br>project participants work directly for PM, unprofitable product lines are easily identified<br><br>strong communications channels<br><br>staff can maintain expertise on | cost of maintaining this form in a multi product company means duplication of many things<br><br>there is a tendency to retain personnel on a project long after they are needed<br><br>upper level management must balance workloads as projects start up and are | participants must spend full time on project, this ensures a degree of loyalty<br><br>horizontal as well as vertical channels must exist for making commitments<br><br>there must be quick and effective methods for |

| | | |
|---|---|---|
| a given project without sharing key personnel<br><br>rapid reaction time is provided<br><br>personnel demonstrate loyalty to the project, better morale with product identification<br><br>focal point develops for out of company customer relations<br><br>flexibility in determining time, cost and performance tradeoffs<br><br>interface management becomes easier as unit size is decreased<br><br>upper level management maintains more free time for executive decision making | phased out<br><br>tech suffers because without strong functional groups, outlook of the future to improve company's capabilities for new programs would be hampered (no perpetuation of technology)<br><br>control of functional specialists requires top level coordination<br><br>lack of opportunities for technical interchange<br><br>lack of career continuity and opportunities for project personnel | conflicts resolution<br><br>there must be good communication channels and free access between managers<br><br>all managers must have input into the planning process<br><br>both horizontally and vertically oriented managers must be willing to negotiate for resources<br><br>horizontal line must be permitted to operate as a separate entity except for administrative purposes |

## The Matrix Management Structure




MATRIX MANAGEMENT STRUCTURE

| Advantages | Disadvantages |
|---|---|

| | |
|---|---|
| PM maintains max control over projects over all resources<br><br>policies and procedures can be set independently for each project if in compliance with company's<br><br>PM can commit company resources, provided that scheduling does not cause conflicts with other projects<br><br>rapid responses are possible to change, conflict resolution, project needs<br><br>functional organization exists primarily as support for the project<br><br>each person has a "home" after project completion<br><br>key people can be shared so program cost is minimized<br><br>strong technical base can be developed, and much more time can be devoted to complex problem solving - knowledge available for all projects equally<br><br>conflicts are minimal and those requiring hierarchical referral are more easily resolved<br><br>better balance between time, cost, performance<br><br>rapid development of specialists and generalists occurs<br><br>authority and responsibility shared<br><br>stress distributed among the team | multidimensional information and work flow<br><br>dual reporting<br><br>continuously changing priorities<br><br>management goals different from project goals<br><br>potential for continuous conflict and conflict resolution<br><br>difficulty in monitoring and control<br><br>company wide the org structure is not cost effective bc more people than necessary are required<br><br>each project org operates independently, care must be taken that duplication of efforts does not occur<br><br>more effort and time are needed initially to define policies and procedures<br><br>functional managers may be biased according to their own set of priorities<br><br>balance of power between project and functional organizations must be watched<br><br>balance of time, cost, performance, must be monitored<br><br>although rapid response time is possible for individual problem resolution, reaction time can become slow<br><br>employees and managers are more susceptible to role ambiguity than in the traditional organizational form<br><br>people do not feel they have any control over their own destiny when continuously reporting to multiple managers |

If there's a project management office, it is informal committee to steer projects, made up of cross functional and potentially part time staff
includes activities such as identifying, recording and disseminating best practices; identifying lessons learnt and as a result promoting standardization, advice on staffing, benchmarking, standards, best practices; creating and executing training programs; problem solving; planning for disaster recovery and auditing.

## Factors for selecting an organizational form:

Project size ■ Project length ■ Project management experience ■ Philosophy and visibility of executives ■ Project location ■ Available resources ■ Unique aspects of the project ■ Diversity of product lines ■ Rate of change of the product lines ■ Interdependencies among subunits ■ Level of technology ■ Presence of economies of scale ■ Organizational size

Parameters:
Integrating devices: formal, informal
Authority structure: functional, product, matrix
Influence distribution
Information system

## A strategic business unit

popularly known as SBU, is a fully-functional unit of a business that has its own vision and direction. Typically, a strategic business unit operates as a separate unit, but it is also an important part of the company. It reports to the headquarters about its operational status.

## AGILE PROJECT MANAGEMENT

we have come to value:

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

That is, while there is value in the items on the right, we value the items on the left more.

principles:

1. satisfy the customer through early and continuous delivery of software capabilities and services through short software “sprints”
2. embrace the environment of change
3. business development, management and developers must cooperate and collaborate throughout the development project
4. communication needs to be face to face
5. it is designed to allow a sustainable constant pace throughout the entire development project
6. the primary measure of success is working software and capabilities, not equivalent software lines of code
7. it does not mean a lack of design
8. simplicity is essential
9. the best architectures, requirements, software designs, emerge from self organizing teams and not from management mandated team structures

In comparison with the traditional structure of project development cycle, which is linear, AGILE has a cycle of initiating processes, planning processes, executing processes: sprints

If a problem is discovered during execution, there will be requirement changes in the next sprint.

The procedure is recursive.
Sprint 0 is when you initialize project by developing initial vision, start building team, allocate initial requirements and architecture development, setup environments and engage active stakeholder participation.

next are development sprints, with active stake holder involvement, collaborative development, model storming, test driven design, continuous integration,documentation evolution and internally deployed software.
Every release which is deployed internally is tested - the Nth is the one that goes into production and there is a final system testing, acceptance testing, user training, staff training. When the release is deployed it will need to still be supported in order to be fixed and enhanced.

| agile team dynamics | non agile team dynamics |
|---|---|
| teams are self organizing<br>cross functional, with all skills necessary for developing a sprint<br>all team members are “developers”<br>recommended size 5-12<br>manager is more of a facilitator<br>all functions for sprint development (planning, estimating, design, coding, testing, release and customer collaboration) are done by the team<br>knowledge and power are colocated throughout the team creating their own center of authority<br>responsibility and attachment are shared as a whole within the team | teams directed by manager<br>teams contain subteams with specific skill sets<br>there are specific titles<br>no recommended size<br>manager directs and leads from the front<br>planning function done by manager, design coding and testing done by specific team members. release done by other team.<br>knowledge and power located within management<br>responsibility attached only to a single job for project |

## Different types of agile:

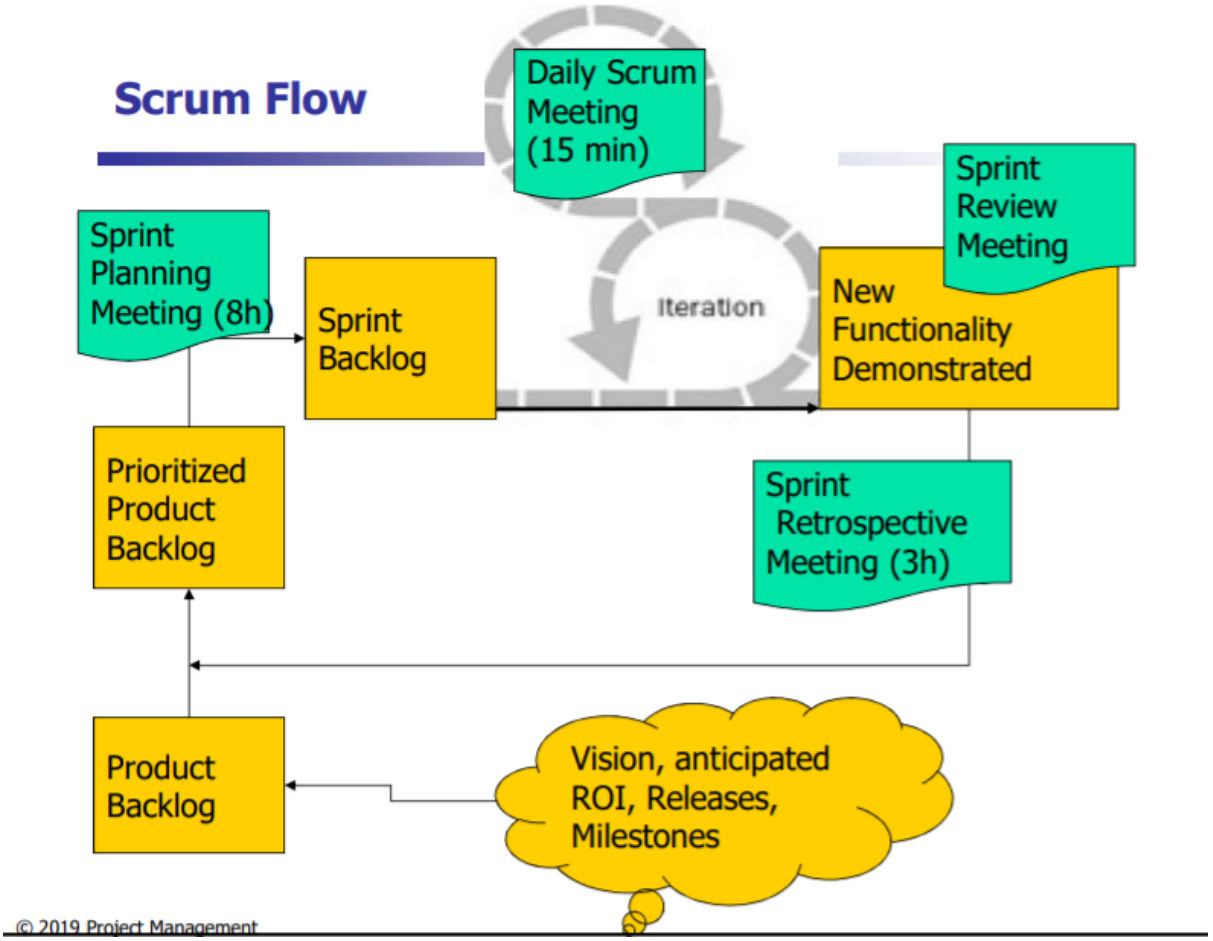
- crystal methodologies: for co-located teams with different size and criticality, based on
    - frequent delivery
    - osmotic communication
    - reflective improvement
    - personal safety
    - focus
    - easy access to expert users
    - technical environment with automated tests
    - configuration management

    - frequent integration
- dynamic systems development method
    - splits each project in three phases: pre project, project life cycle, post project
    - 9 principles:
        - active user involvement
        - team empowerment in decision making
        - focus on frequent delivery
        - correspondence to current business needs
        - iterative and incremental development
        - possibility of reversing changes
        - definition of high level scope before project starts
        - testing during project lifecycle
        - efficient and effective communication
- extreme programming: emphasizes best practices for development, made up of 12 practices:
    - planning game
    - small releases
    - metaphor
    - simple design
    - testing
    - refactoring
    - pair programming
    - collective ownership
    - continuous integration
    - 40 hours week
    - in site customers
    - coding standards
    - corollary practices: sit together, whole team, informative workspace, energized work, pair programming, stories, weekly cycle, quarterly cycle, slack, 10 minute build, continuous integration, test first programming, incremental design
- Feature driven development mixes model driven and agile development focusing on initial object model, work divided in features and iterative design for each feature. suitable for critical systems' development.
- kanban is a flavor of agile focusing on workflow and continuous delivery, this allows to manage quality closely and continuously deliver work to the customer.
  requires to:
    - visualize the work flow through the system
    - limit the work in process at each step to ensure not to exceed the capacity
    - measure and optimize the work flow through the system to make continuous improvements
- scrum: it is suitable for project management in situations where it is difficult to plan ahead, embeds mechanisms for process control where feedback loops constitute the key part.
  software is developed by a self organizing team in short iterations called sprints, starting with planning and ending with a review.
  features to be developed are listed in a backlog.
  the product owner decides the prioritization of the backlog items in the following

sprint.
team members coordinate their work in a daily stand up meeting.
1 team member, the scrum master, is appointed to solve problems that stop the team from working effectively.
“scrum is a framework within which people can address complex adaptive problems while productively and creatively delivering products of the highest possible value”
it is lightweight, simple to understand, difficult to master.
starting from a product backlog there is always an iteration of the sprint, which contains inside a 24 hour inspection. after the end of the sprint there will be an increment of functionality.
Some people (chicken) are involved, others are committed (pig).
commitments are made by:

- product owner - which is responsible for representing the interests of all the stakeholders in the project and the resulting system, creates backlog, prioritizes the requirements
- team is responsible for creating functionality and cross functional, collectively responsible for project success
- scrum master is responsible for scrum process, its adaptations to the company and the training of the employees

## scrum



Time boxing: sprints last thirty days and no more, teams must prioritize and simplify the problem
Incremental delivery: in complex projects it's difficult to figure out everything in advance, so orderly progress is made towards delivery in small steps so that each increment of code is shippable
Empowerment: teams find their own ways through complex situations
Self organization: freedom that breeds creativity

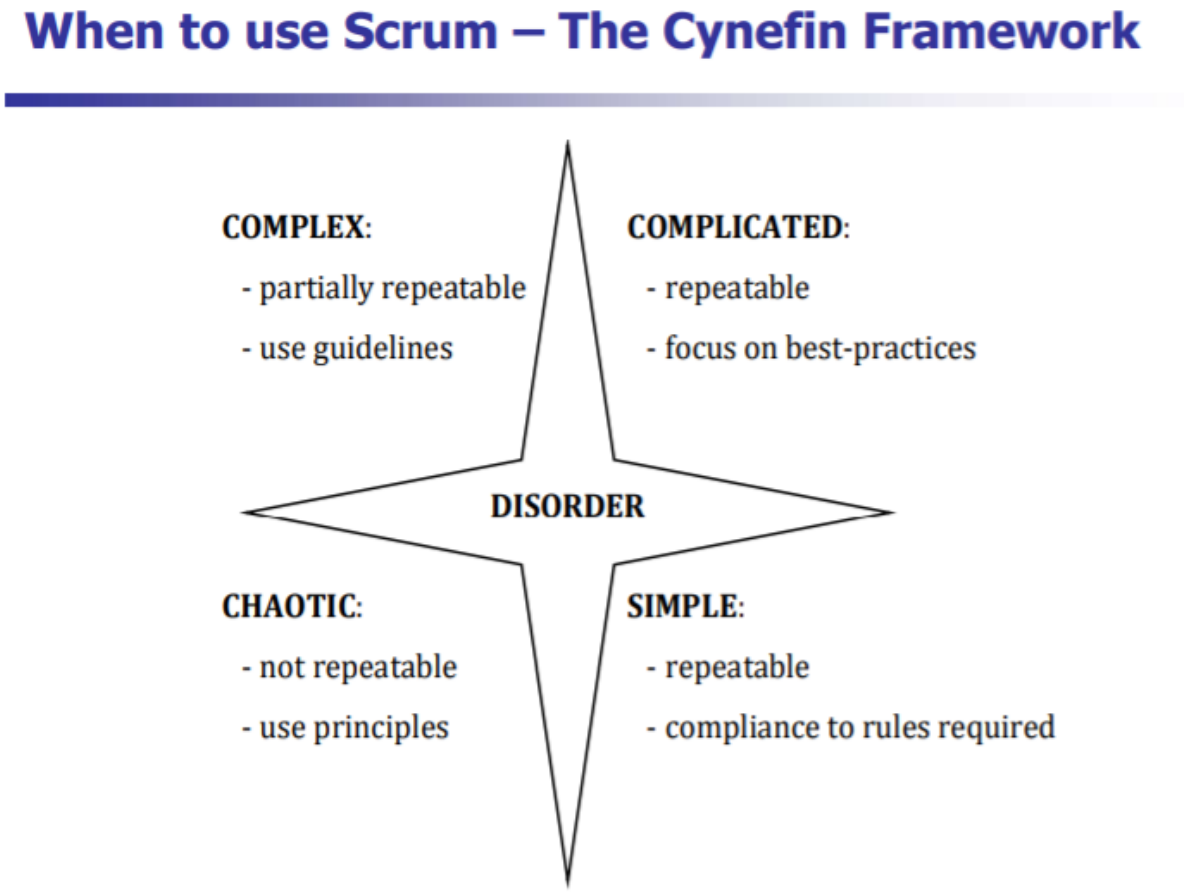
Planning a scrum project:

- setting stakeholders' expectations
- synchronizing them with team expectations
- enabling stakeholders to plan for functionalities as they become available
- shows when funding should be made available
- basis for project reporting

When to use SCRUM? use the

## CYNEFIN framework

used to aid decision making




Simple: employ 'Best Practice', the product we create or problem we face is so clear and constrained that almost anyone could respond with simple instruction. It only needs a checklist to be followed. There would be no value in structuring a response based on Scrum roles and ceremonies. In fact, it would only add overhead and confusion

Complicated: implies that the ‘right’ solution requires expertise, perhaps via specialist assistance or advice. The ‘known unknowns’ can be surfaced through sensing and analysing. This may require teamwork or cooperation, but does not need nor warrant Scrum. We don’t need collaboration and are not exploring in this domain. There is no emergence.

Complex is the domain of ‘unknown unknowns’, in which most software development initiatives occur.  Within Cynefin, the implication is that we must test the waters, analyse the outcomes and adapt our next move based on the knowledge created and feedback received. Scrum predominantly resides here and reaps the benefits of small development cycles (Sprints) to contain the generation of this knowledge. The customer (Product Owner) is then very well positioned to reconsider what the most valuable thing to do next may be.

Chaotic: we have no choice but to act as quickly as possible to make our way back (clockwise) toward the Complex domain. We need to ‘do something’ that can help us achieve this, then analyze the next most important step and keep moving. We cannot indulge in experimentation to generate knowledge – so Scrum is largely inappropriate – we need to survive!

Disorder: we are lost. Cynefin is effectively a ‘sense making’ framework, and if we cannot make sense of the environment we are in we will remain in disorder. We need immediate data to make this determination, and can then move to the most appropriate domain aligned to the activity required. It could be any of them. Scrum is not likely to help us as disorder is unbounded – there are not even ‘loose constraints’ to guide us.

## SCRUM REPORTING:

there are 4 types of report for the product owner and scrum master to create at the end of each sprint.

- list of product backlog at the start of the previous sprint
- list of product backlog at the start of the new sprint
- changes report between the product backlogs
- product backlog burndown report