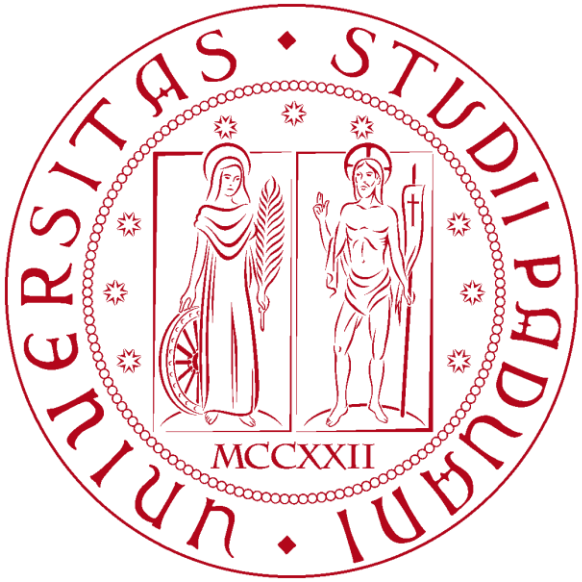

UNIVERSITÀ DEGLI STUDI DI PADOVA

NOTES OF

INNOVATION, ENTERPRENEURSHIP and FINANCE

(Version 19/01/2021)

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CONTENTS

This document was written by students with no intention of replacing university materials. It is a useful tool for the study of the subject but does not guarantee an equally exhaustive and complete preparation as the material recommended by the University.
The purpose of this document is to summarize the fundamental concepts of the notes taken during the lesson, rewritten, corrected and completed by referring to the to be used as a "practical and quick" manual to consult. There are no examples and detailed explanations, for these please refer to the cited texts and slides.

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The document will be updated as soon as possible

1.INNOVATION

1.1. Innovation

Invention: Creating a new technology, capability, process, material, etc.
Patents: protect inventions. They are not innovation.
Innovation: Finding a commercially valuable application of an invention.

Incremental Innovation: build on and reinforce the applicability of existing Knowledge. Improves and exploit an existing technological Trajectory. Is **competence enhancing.**

Eg. Pen --> fountain pen --> Biro

Radical Innovation: destroy the value of an existing knowledge base. Disrupt an existing technological trajectory. Is **competence destroying**.

Eg. Biro --> typewriter --> computer

Technical evolution is usually characterized by periods of great experimentation followed by the acceptance of a **dominant design**.

Eg. Qwerty keyboard, bicycle, VHS.

Modular (component) **Innovation**: entails changes to one or more components of a product system without significantly affecting the overall design.
Architectural innovation: entails changing the overall design of the system or the way components interact.
E.g., Xerox-Canon: Xerox invented the core technologies of paper copiers, but Canon offered copier with much smaller and more reliable, so Xerox lost half of its market share.

Component Knowledge	Architectural knowledge: Preserved	Architectural knowledge: Destroyed
Preserved	Incremental	Architectural
Destroyed	Modular	Radical

Component Knowledge	Architectural knowledge: Preserved	Architectural knowledge: Destroyed
Preserved		
Destroyed		

Combinatorial Innovation: a set of component technologies can be combined and recombined to create new products.

Innovation for the customer

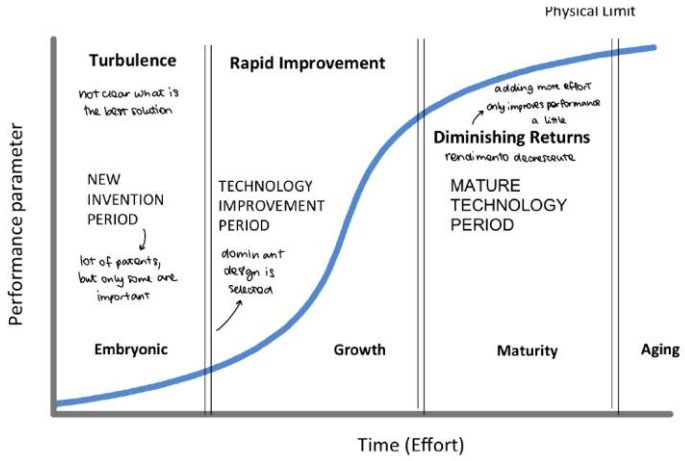
Tecnological change	Behavioural change: Low	Behavioural change: High
Low	1. Improvement (es. batteries)	3. Behavioural change (es. Texting)
High	2. Technological change (es. tacs/GSM)	4. Radical change (es. video calls)

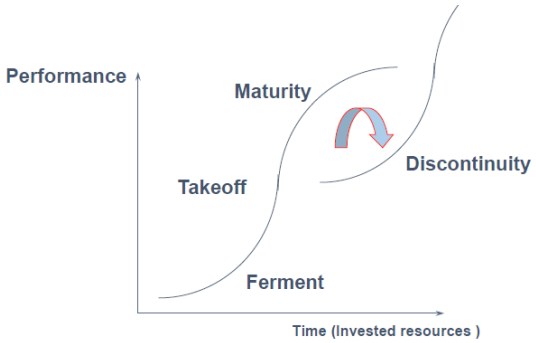
Innovation for the company

Market	Product: Current	Product: New
Current	1. Product improvements	3. New product lines
New	2. Same product for new segments, distribution channels, countries	4. Radical new product Diversification

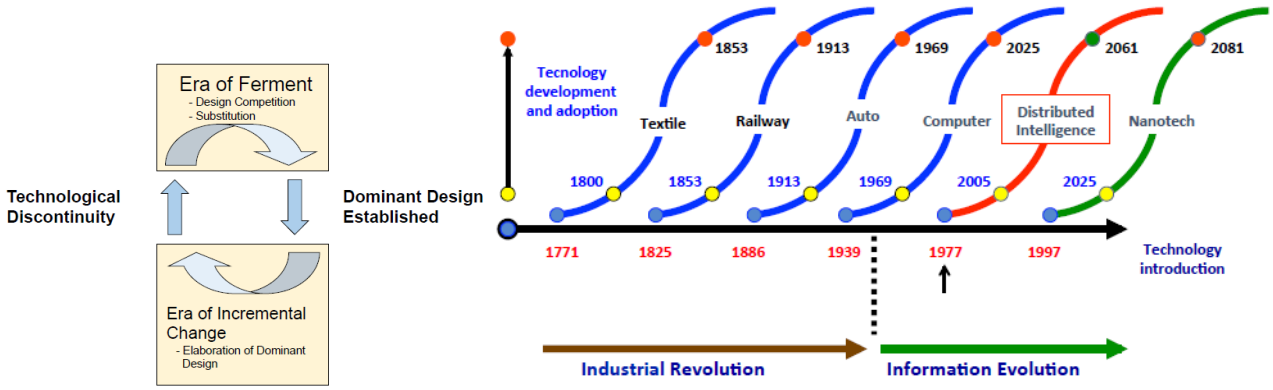
1.2. Technology

Technology S-curve: initial period of turbulence, followed by rapid improvement, then diminishing returns, and ultimately is displaced by a new technological discontinuity.
Discontinuous technology fulfills a similar market need by means of an entirely new knowledge base. Technological discontinuity may initially have lower performance than incumbent technology. e.g. from film photography to digital photography. Initially digital photography had lower quality (performance) than film photography.





Technology Cycles
During the era of incremental change, firms often cease to invest in learning about alternative designs and instead focus on developing competencies related to the dominant design. This explains in part why incumbent firms may have difficulty recognizing and reacting to a discontinuous technology.



The length of the s-curves is getting increasingly shorter.
Which unit of analysis? (Industry? Firm? Technology? Product?), Which dimension of performance? Effort vs. time? Can performance limits be predicted?

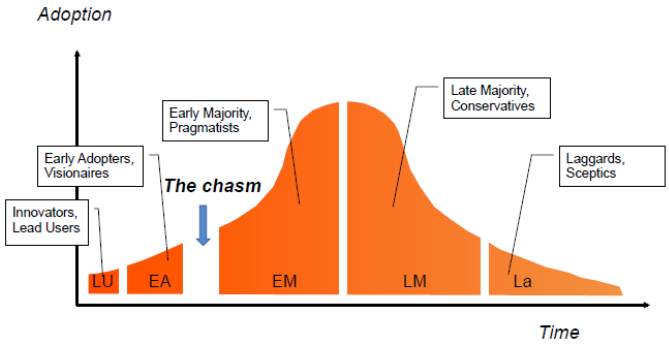
1.3. Markets

Lead users: express emerging needs in advance. They are able to give indications on possible market developments. Innovation for these users is more important than for the majority of users who simply welcome innovations already experienced by others.
New customers, With new needs, Often at lower margins.

Adoption of innovation

- **Crossing the Chasm:** strategic and marketing process by which technology startups transition from selling their products and/or services to innovators and early adopters to selling to the early majority.
- Early Adopters want a technical change agent. Expect a radical discontinuity between the old and the new.
- Early Majority wants a productivity improvement for existing operations. Wants to minimize the discontinuity with the old way.

The technology is to enhance, not overthrow, the established business.



Uniqueness: Controlling the knowledge generated by an innovation can maintain a unique position of power for the company. Sources:

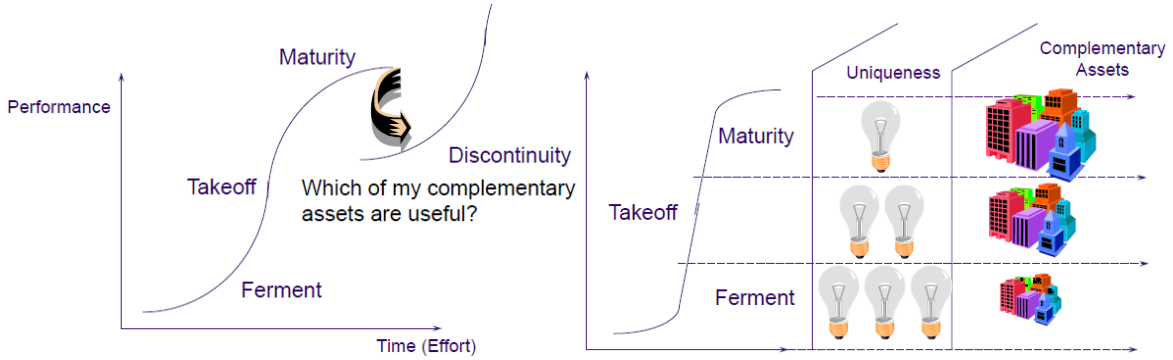
- Intellectual property protection
  - Patents: Finite length, the right to prohibit “producing”
  - Copyrights: The right to prohibit “copying”
- Secrecy: Trade secrets & non-compete clauses, “Tacit” knowledge
- Speed

Is powerful but often difficult to maintain: Legal mechanisms can be costly to create, and then even more costly to enforce and sometimes they require public disclosure. Secrecy may be difficult to maintain. Speed is hard work, and sometimes imitable.

Complementary assets: controlling the assets that maximize the profits from innovating.
Types:

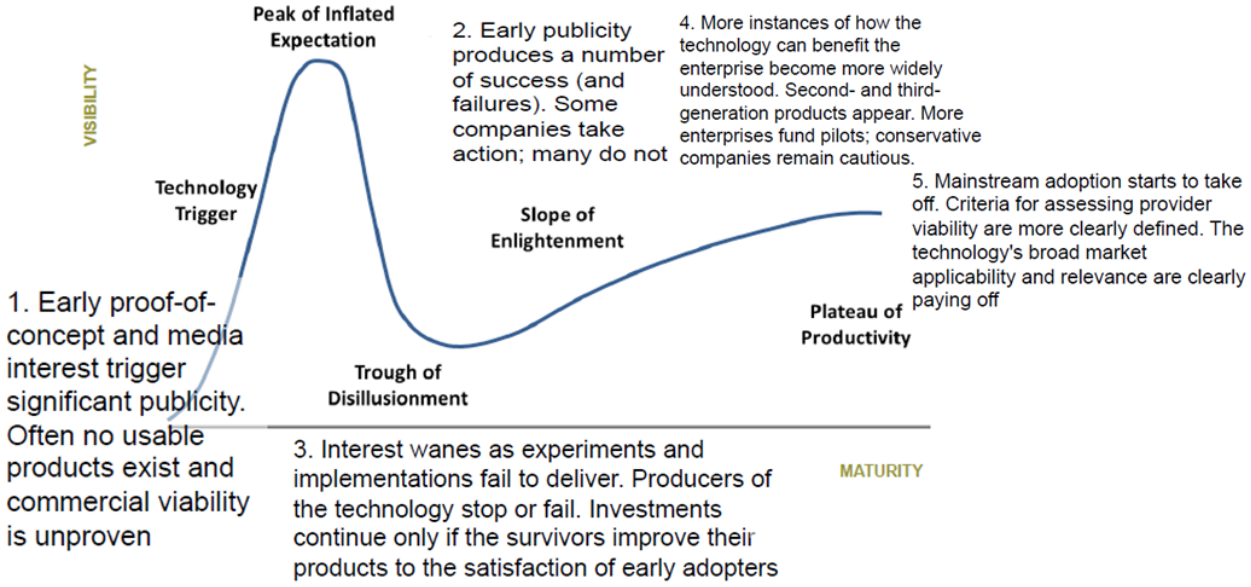
- **Things you can do:** Manufacturing capabilities, Sales and service expertise
- **Things you own:** Brand name, Distribution channels, Customer relationships

Competencies create Resources and vice versa.
Managing discontinuities means managing complementary assets.



Gartner Hype Cycles provide a graphic representation of the maturity, adoption and evolution over time of technologies and applications, and how they are potentially relevant to solving real business problems and exploiting new opportunities.

Composed in 5 phases:



1.4. Disruptive Technologies

- Technologies can progress faster than demand.
- Companies give customers more than they need or are willing to pay.
- Room for initially underperforming disruptive technologies.
- Incumbent companies often find difficulties with technological discontinuity.
- Newcomers (startups) are often successful with disruptive technologies.

The Innovator's Dilemma: Should a company invest its money to

- make new products that its best customers can use and that would improve the company's profit margins?
- Or create worse products that none of its customers can use, that would wreck its profit margins?

Well managed companies often fail because the management practices that have allowed them to become industry leaders also make it extremely difficult for them to develop the disruptive technologies that ultimately steal away their markets.

Good companies are good in:

- Listen to their customers
- Invest aggressively in the technology, products, and manufacturing capabilities that satisfied their customers' future needs.
- Seek higher margins
- Target larger markets

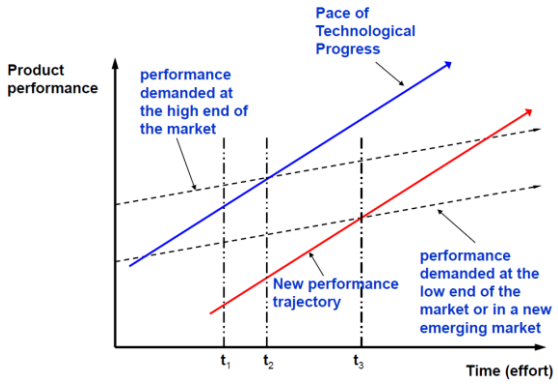
Sustaining technologies: Meet the needs of customers today and the ones who are paying.

- Improve performance of established products
- Meet demands of mainstream customers in major markets.
- Vary in difficulty, cost, time, etc.
- Established firms
- Technological improvement (sustaining innovation): aims to satisfy demanding (high end) customers with better performance products.
- Deliberate planning
- The incumbents are winners.

Disruptive technologies: is something that brings to the market a product or service that is not as good as what historically had been available, and therefore it can't be valued or used by customers in the mainstream of the market. Yet it takes root in a different application.

Simple, convenient to use innovations that initially are used by only unsophisticated customers at the low end of markets. Come from innovators who keep improving the product performance till it comes "from below" and starts hurting the entrenched incumbents.

- Generally, **underperform established products in mainstream markets**.
- Have **new features** and new customers value
- Cheaper, simpler, smaller, **more convenient** to use
- Entrant firms
- Companies do not try to make better products for established customers in existing markets Instead, companies redefine a trajectory by introducing products that are less good than the existing ones, but simpler, cheaper, less expensive, aimed at less demanding customers.
- Discovery-driven planning
- Newcomers (startups) can be winners.



Market Needs vs Technology Improvement:

- Technologies can progress faster than demand.
- Suppliers give customers more than they need or are willing to pay.
- Allows room for underperforming disruptive technologies.

Disruptive technologies do not initially satisfy the demands of the high end of the market.
Large companies choose to overlook disruptive technologies until they become more attractive profit wise.
Eventually they surpass sustaining technologies in satisfying market demand with lower costs.
Large companies who did not invest in the disruptive technology sooner are left behind.

Why companies have problems with disruptive technologies:

- Disruptive technologies **are difficult to recognize**.
- Incumbent companies rationally tend to ignore disruptive technologies because they are **not equipped to deal with them**.
- The **markets** for disruptive technologies are **initially very small**.
- Incumbent companies should compete with their own products.
- Radical innovations initially emerge in small markets, they can, and often do, become competitors for already established products.
- If a company is prepared to deal only with "sustaining technologies," or technologies that improve product performance, and not disruptive technologies, it can fail.

5 Principles of the disruptive innovations:

- **Create an independent structure for innovation.** Because Companies depend on customers and investors for resources. It is difficult to invest in ideas that customers do not want immediately... until it is too late.
- **Create a structure for innovation similar in size to the market.** Because Too small markets do not meet the growth needs of companies. It is risky to wait to invest to the point where the market is interesting.
- **Use Discovery based planning.** Because Markets that do not exist cannot be analyzed and in lesser-known markets there are the advantages of first mover.
- **Evaluate the capabilities of the organization and Create new capabilities to cope with change.** Because An organization's capabilities lie in its processes and values. Processes and values are not as flexible as people. The processes and values that make up an organization's capabilities in a particular context also define its "capabilities" in a different context.
- **A product that performs less well today than the market demands tomorrow becomes more than competitive.** Because The speed of technological progress in products often exceeds the level of change required by the market.

1.5. Design thinking

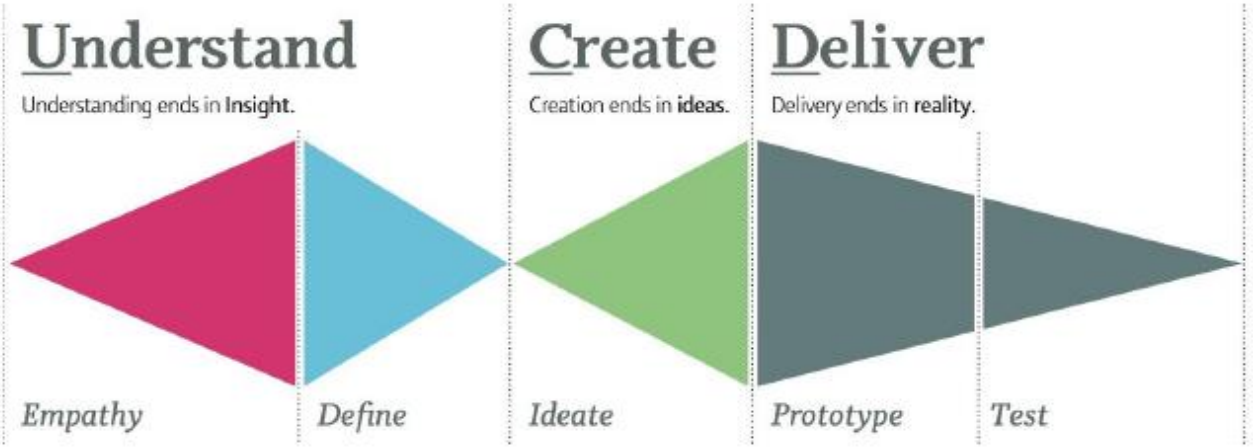
Design thinking:

- approach to solve design problems by **understanding users' needs** and develop insights to solve those needs
- It's a mindset and a process
- employs **divergent thinking** to ensure that many possible solutions are explored in the first instance, and then **convergent thinking** to narrow these down to a final solution.
- is a human centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology , and the requirements for business success.
- brings together what is desirable from a human point of view with what is technologically feasible and economically viable.
- also allows people who aren't trained as designers to use creative tools to address a vast range of challenges.

Divergent thinking: ability to offer different, unique, or variant ideas adherent to one theme.
Convergent thinking: ability to find the "correct" solution to the given problem.

Steps:

- **Empathize**: learn about the audience
- **Define**: construct a point of view based on user needs and insights
- **Ideate**: brainstorm and come up with creative solutions
- **Prototype**: build a representation of one or more of your ideas to show
- **Test**: return to your original user group and testing your ideas for feedback



Understand

- Gain basic knowledge so you know the right questions to ask.
- Gain empathy with your target users by talking and observing them.

1.5.1. Empathize

Watching what people do and how they interact with their environment gives you clues about what they think and feel.

- **Observe**: View users and their behavior in the context of their lives.
- **Engage**: Interact with and interview users through both scheduled and short 'intercept' encounters
- **Immerse**: Experience what your user experiences.

Assume a beginner's mindset:

- Your assumptions may be misconceptions and stereotypes and can restrict the amount of real empathy you can build.
- Assume a beginner's mindset to put aside these biases, so that you can approach a design challenge with fresh eyes.
- **Don't judge**. Just observe and engage users without the influence of value judgments upon their actions, circumstances, decisions, or issues.
- **Question everything**, even (and especially) the things you think you already understand. Ask questions to learn about how the user perceives the world.
- **Be truly curious.** Strive to assume a posture of wonder and curiosity, especially in circumstances that seem either familiar or uncomfortable
- **Find patterns.** Look for interesting threads and themes that emerge across interactions with users
- **Listen.** Absorb what users say to you, and how they say it.

Interview for empathy: understand a person's thoughts, emotions, and motivations, so that you can determine how to innovate for him or her. By understanding the choices that person makes and the behaviors that person engages in, you can identify their needs, and design to meet those needs.

- **Ask why:** Even when you think you know the answer, ask people why they do or say things.
- **Never say "usually"** when asking a question. Instead, ask about a specific instance or occurrence, such as "tell me about the last time you____"
- **Encourage stories.** Whether or not the stories people tell are true, they reveal how they think about the world. Ask questions that get people telling stories
- **Look for inconsistencies.** Sometimes what people say and what they do are different. These inconsistencies often hide interesting insights.
- **Pay attention to nonverbal cues.** Be aware of body language and emotions.
- **Don't be afraid of silence.** Interviewers often feel the need to ask another question when there is a pause. If you allow for silence, a person can reflect on what they've just said and may reveal something deeper.
- **Don't suggest answers to your questions.** Even if they pause before answering, don't help them by suggesting an answer. This can unintentionally get people to say things that agree with your expectations.
- **Ask questions neutrally**
- **Don't ask binary questions.** Binary questions can be answered in a word; you want to host a conversation built upon stories.
- **Make sure you're prepared to capture.** Always interview in pairs. If this is not possible, you should use a voice recorder.

1.5.2. Define

Synthesize: Come up with a point of view statement that will inform your prototyping
You can't design for everyone, and you can't fix every need you identified, Instead, tightly focus on one.
Point of view: user + need + insight. Phrased as *"(User) needs (verb phrase) in a way that (way*)"

1.5.3. Ideate

Based on your point of view, generate as many ideas as possible.
Set yourself a time limit, and try to generate a minimum number of ideas (100 ideas in 60 minutes)

Brainstorming is a great way to come up with a lot of ideas that you would not be able to generate by just sitting down with a pen and paper. The intention of brainstorming is to leverage the collective thinking of the group, by engaging with each other, listening, and building on other ideas. Brainstorming can be used throughout a design process.

- Provide focus
- Defer judgement. (Don't judge if the idea is feasible or not)
- Build on the ideas of others
- Encourage wild ideas
- Visualize it
- On conversation at a time
- Go for quantity not quality

Select: Harvest that brainstorm, so those ideas don't just sit there on the board.

- Harvesting is straight forward for some brainstorms (pick a couple of ideas), but when ideating design solutions give some thought to how you select ideas.
- Carry forward a range of those ideas, so you preserve the breadth of solutions and don't settle only for the safe choice.

1.5.4. Prototype

Can be anything that takes a physical form: a wall of post it notes, a role-playing activity, a space, an object, an interface, or even a storyboard.
Make your ideas real & learn from peoples' reactions to your prototype
Every prototype should answer a question.
In early explorations keep your prototypes rough and rapid to allow yourself to learn quickly and investigate a lot of different possibilities.
Prototyping is used for:

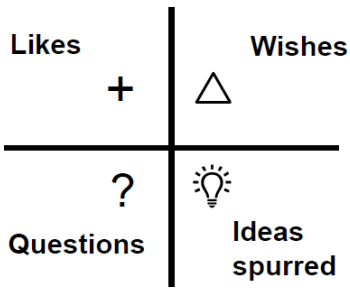
- **Empathy gaining**: Prototyping is a tool to deepen your understanding of the design space and your user, even at a pre solution phase of your project
- **Exploration: Build to think.** Develop multiple solution options
- **Testing**: Create prototypes (and develop the context) to test and refine solutions with users
- **Inspiration**: Inspire others (teammates, clients, customers, investors) by showing your vision.

1.5.5. Test

Test with users:

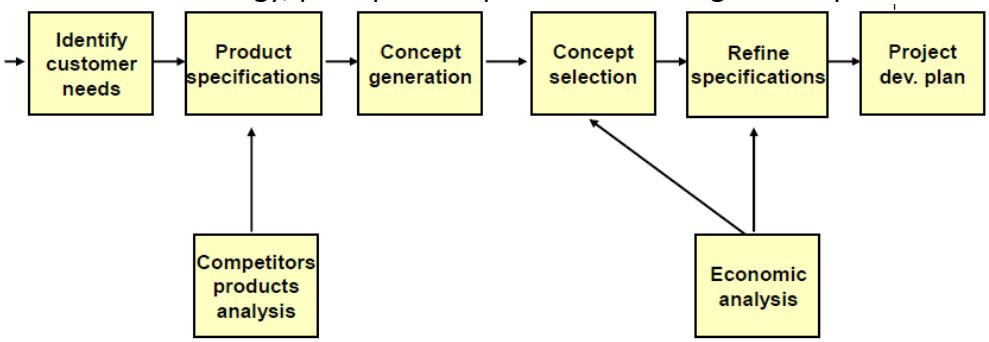
- fundamental part of a human centered design approach.
- to refine your solution and your understanding of the people for whom you are designing. Consider both their feedback on your solution and use the opportunity to gain more empathy.
- You are back in a learning and empathy mode when you engage users with a prototype.

Use a feedback capture grid:

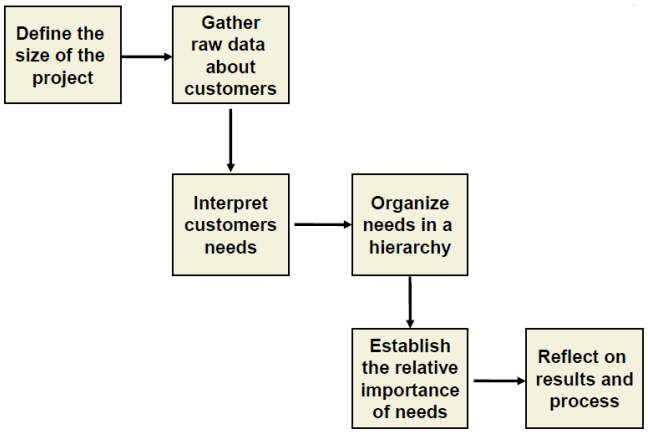


1.6. Product Concept

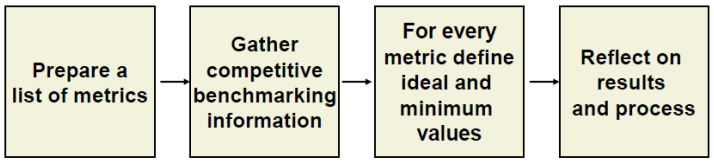
Is a description of the technology, principles of operation and design of the product.



1.6.1. Identify customers' needs



1.6.2. Product specifications



It is then necessary to review these specifications in the light of the technology constraints and production costs, that is, after it was selecting a particular concept, getting the so-called refined specifications.

- **Define the metrics:** Every metric is associated to a unit of measure and to a level of importance.
- **Gather competitive benchmarking information:** Comparing the new product to the existing ones is crucial for its commercial success. At this point of the process no values have been associated to the metrics yet but it's important to gather the values for the competitive products in order to have some terms of comparison.

For every metric define ideal and minimum values: The **ideal value** is the best result the team can aim to. **The minimum value** is that one that makes the product acceptable.

Ways to express the metric values:

- At least X it is set the lower limit
- At most X it is set the upper limit
- Between X and Y both the lower and upper limits are set
- Exactly X every offset from the set value means a worsening of the performances
- A set of discrete values some metrics can assume value associated with some discrete choices.

1.6.3. Product concept generation

Inputs of this phase are:

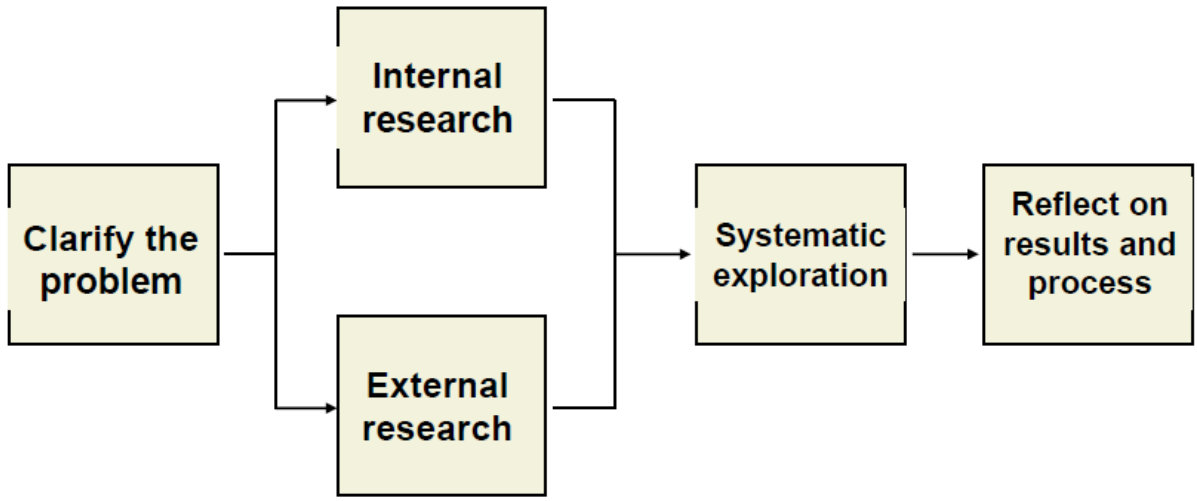
- the mission of the product
- the customer needs
- the target specifications

External research: aims at finding potential solutions to the problem as a whole or to the subproblems identified by the previous point.

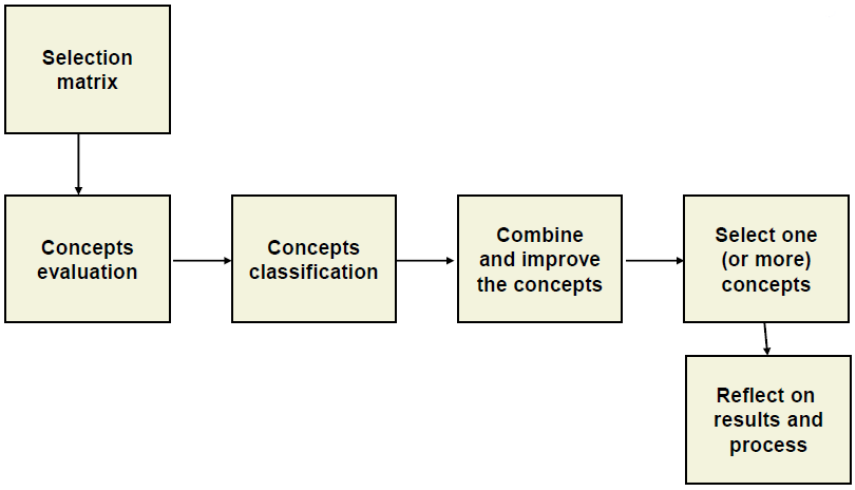
- **Interview the lead users**
- **Consult experts**
- **Look for patents**: are a rich source of technical information containing both detailed drawings and explanations on the functioning of the product.
- **Search the literature.** Newspapers, magazines, conference proceedings, information on markets, consumers and products. This type of research is very useful to find existing solutions.
- **Evaluate related products**. In the context of concept generation, benchmarking is the study of existing products having similar features.

Internal research:

- **Suspend judgment:** the goal is just to generate as many concepts as possible
- **Generate many ideas:** ideas help generate more ideas.
- **Consider the unrealistic ideas:** Unfeasible ideas expand the boundaries of the space of solutions and encourage the team to think at the limit of possible.
- **Use graphical and physical means.**



1.6.4. Concept selection



Select a product concept: methods

- **Distribute concepts to customers** or other external entities to carry out their choice
- An influential **member of the team chooses** a concept based on his personal preferences
- For each concept, the team creates a list of strengths and weaknesses and makes a **collective choice.**
- The company builds a prototype for each concept and the choice is made based on the results of the **tests on prototypes**

Decision matrix methods.

Concept screening:

- **Prepare the selection matrix:** The **columns** are the concepts under consideration. The **rows** are the selection criteria, chosen based on the respect of the customer needs and the production and cost constraints One of the concept is chosen as a reference model for the evaluation usually it is a standard or an obvious solution to the problem
- **Concepts evaluation:** It uses a simple evaluation for the various criteria, such as 1 is better than the reference concept, 0 is equivalent, 1 is worse.
- **Concepts classification:** For each concept, a net evaluation is obtained by making an algebraic sum of the single evaluations Starting from this score, a ranking is made.

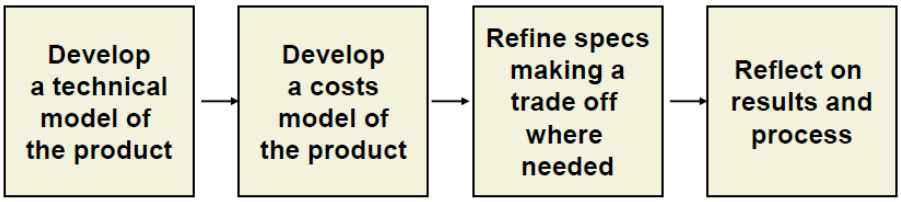
	Concepts		
Selection criteria	**Concept A**	**Concept B**	**Concept C (reference)**
Handling	0	0	0
Ease of use	0	-	0
Readability of settings	0	0	0
Accuracy of measurement	0	0	0
Duration	0	0	0
Ease of production	+	-	0
Portability	+	+	0
Total +	2	1	0
Total 0	5	4	7
Total -	0	2	0
Net score	2	-1	0
Ranking	1	3	2
Continue?	Yes	No	Combine

Concept scoring:

- **Prepare the selection matrix:** As for the concept screening, a selection matrix is prepared, containing only the concepts selected in the previous task. In addition, a weight is assigned to each selection criterion.
- **Concepts Evaluation:** 1 to 5 rating scale.
- **Concepts Classification:** For each concept, a weighted sum is computed based on the importance of the criteria using the introduced weights. Then you establish a ranking.

		Concept A (reference)		Concept B	
Selection criteria	**Weight**	**Ranking**	**Weighted score**	**Ranking**	**Weighted score**
Handling	5%	3	0,15	3	0,15
Ease of use	15%	3	0,45	4	0,6
Readability of settings	10%	2	0,2	3	0,3
Accuracy of measurement	25%	3	0,75	3	0,75
Duration	15%	2	0,3	5	0,75
Ease of production	20%	3	0,6	3	0,6
Portability	10%	3	0,3	3	0,3
	Total score		2,75		3,45
	Ranking		2		1
	Continue?		No	Developing phase	

1.6.5. Refine specifications



Refine Specifications:

- Once the team has chosen a specific concept the related specifics are reviewed.
- The specifications that were originally expressed as ranges of values are now refined to make them more precise.
- Tradeoffs between different metrics related to technical performances
- Tradeoffs between metrics and costs

Development of technical models of the product:

- Is a tool to predict the metric values.
- The goal is to make sure that the product can be made at a reasonable cost.
- The analytical models allow to predict the kind of performance that should be expected by making a particular choice of the design variables, avoiding expensive concrete implementations.
- When no analytical model is available, the creation of physical models is necessary. Those models must be duly tested.
- A technical model is closely related to a particular concept: changing the concept implies also to change the model.
- For many products the first estimation of the manufacturing costs is represented by a list of the product components with an assessment of the purchase (or manufacturing) price of each component. A useful way to record information is to associate to every part a low price (best case) and a high price worst case) in order to estimate the degree of uncertainty related to the economic evaluation.

Bills Of Material Example

Category	Parts ID	Material ID	Name of the Parts	Colour	Quantity	Picture	Unit Cost	Cost
Bricks	20-001	50746	Every Road GPS	White	1		10	10
Plates	20-002	50747	Every Road Car	Yellow	1		20	20
Plates Special	40-002	50748	Gasket screen	Green	1		30	30
Bricks Special	40-003	50740	10k Resistor	Red	1		40	40
Technic	40-004	50743	51k Ristor	White	1		50	50

Reflect on results and process: Is the product a winner? Which degree of uncertainty accompanies both the technical and cost models? Is the chosen concept the most suitable for the considered market segment or may be placed with greater advantage in other segments?

1.6.6. Case: Google Glass

A wearable computer that projected information on a display that was viewable with an upward glance.

“We questioned whether you should be walking around looking down at a smartphone. Instead, the company’s designers asked: Can we make something that frees your hands and frees your eyes?”

Early adopters were testing a beta version of Glass

- The Explorer Edition of Glass was made available to 2,000 software developers who preregistered at the Google I/O conference in June 2012.
- Later, 8,000 consumers willing to pay $1,500 for the device were chosen.

Positive aspects:

- New users adapt to the device very quickly
- Many Explorers comfortably wear the device for 16 hours at a stretch.
- Partnerships: Google announced its deal with the largest U.S. eye insurance company.
- Glass had little direct competition. A few startups.

Negative Aspects:

- Design challenge with Glass has been creating a product that fits with the very personal ways in which consumers relate to eyewear.
- unlike a new phone, which you can slip into your pocket, you can’t hide Glass.
- raise questions about social acceptance, so we wanted to start a public discourse early.
- Glass would entail **radical behavioral change**.
- Potential for privacy violations
- “From my perspective, I was wearing a computer, a tool that gave me constant, easy ability to access information quickly. To everyone else, I was just a guy with a camera on his head”
- “Glass is socially awkward . . . . I made people very uncomfortable.

Glass Enterprise Edition has helped workers in a variety of industries from logistics , to manufacturing , to field services do their jobs more efficiently by providing hands free access to the information and tools they need to complete their work.

Google originally developed something with promising technology and in its first effort at presenting it, failed to understand who could use it best and what it should be doing.

1.7. Intellectual Property Rights (IPR)

Main reasons for IPR:

- give expression to the moral and economic **rights of creators** in their creations and to the rights of the **public in accessing** those creations.
- to **promote creativity** , and the dissemination and application of its results, and to encourage fair trade, which would contribute to economic and social development.

Main strategies to protect intellectual property:

- trade secret
- patent
- trademark
- copyright

Trade secret: confidential information, including a practice, formula, method, process, program, device or technique, that a company uses to compete with other businesses for its own economic benefit. In order for this information to be considered a trade secret, considerable efforts must be made to maintain its secrecy.

Intellectual property is usually divided into two branches: industrial property and copyright.

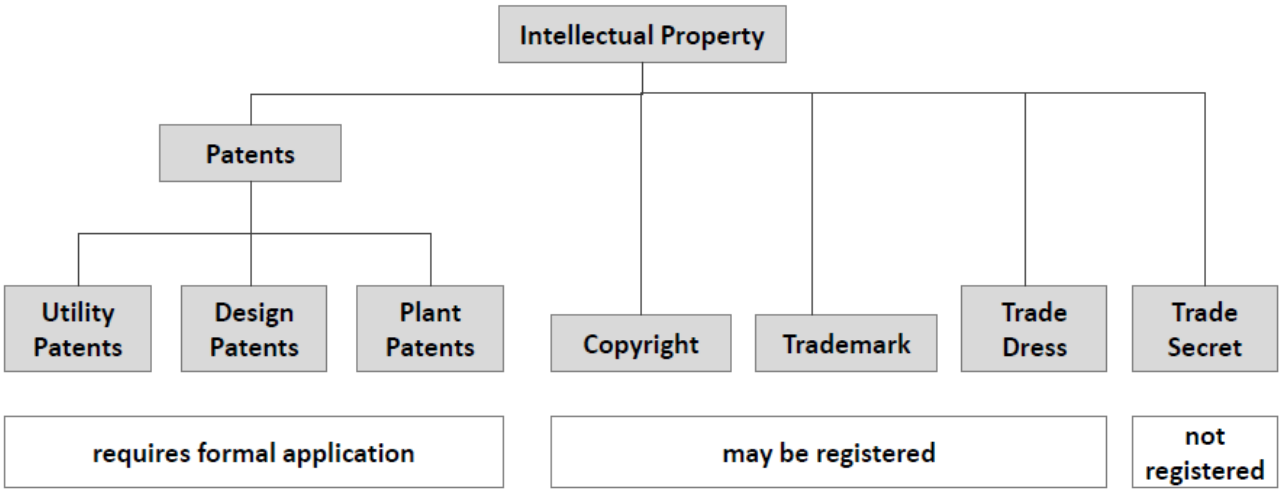
Industrial property: protects inventions.
Has different forms: **patents** to protect inventions, and industrial designs, which are aesthetic creations determining the appearance of industrial products.
Industrial property also covers **trademarks**, service marks, layout designs of integrated circuits, commercial names and designations, as well as geographical indications, and protection against unfair competition.

Patent types:

- **Utility Patent (patent for invention):** covers the creation of a new machine, article of manufacture, composition of matter (chemicals, cell lines), process or an Improvement of any of the previous (most common patent type).
- **Design Patent** (or **industrial design** rights or design right): protects the visual design of objects that are not purely utilitarian.
  The design may be three dimensional based on the shape or surface of the object, or two dimensional based on the object's patterns, lines or colors.
  Novelty, originality and visual appeal are essential.
- **Plant Patent** (or plant variety rights): it is the right to commercially use a new variety of a plant. The variety must amongst others be novel and distinct.

Trademark: word, name, symbol or device used by a business to distinguish itself and its goods from others. The purpose is not to prevent others from making the same goods or selling them, but to **prevent others from using the same symbol**, word or device. In theory, this should prevent the public from being deceived about the origin and quality of a product.
Symbol ™ next to a phrase or image that a company thereby claims as a trademark, or the **symbol ®** , which signifies that the trademark has been registered with the relevant trademark registry.
Trademarking is a central legal component for corporate branding.

Copyright: protects published or unpublished literary, scientific and artistic works, such as books, software and music, that have been fixed in a tangible or material form.
Copyright laws grant the author the exclusive right to copy, sell, license, distribute, modify, translate and, in general, do whatever he/she wants to with the original work.
“exclusive right" means that only the copyright holder is allowed to do these things; everyone else is prohibited from doing them without the copyright holder's consent.
Copyright is often called a "**negative right**", to stress that it has less to do with permitting people (e.g. authors) to do anything, and more to do with prohibiting people (e.g. readers , viewers , or listeners) from doing something: reproducing the copyrighted work.
Copyright relates to artistic creations, such as books, music, paintings and sculptures, films and technology-based works such as computer programs and electronic databases.



1.8. Patents

1.8.1. What is a patent

A patent is an **intellectual property right** granted by the Government to an inventor "**to exclude others** from making, using, offering for sale, or selling the invention throughout the Country or importing the invention into the Country" for a limited time in exchange for public disclosure of the invention when the patent is granted.

You can stop others from

- making something in a specific Country and selling it in the same Country
- making something in a foreign Country and selling it in the specific Country
- making it in the specific County and selling it overseas

BUT: you cannot stop others from making and selling it entirely in a foreign Country.

Types of patents:

- **Utility patents** may be granted to anyone who invents or discovers any new and useful process, machine, article of manufacture, or composition of matter, or any new and useful improvement.
  Duration: 20 years. Has maintenance fees.
- **Design patents** may be granted to anyone who invents a new, original, and ornamental design for an article of manufacture.
  Duration: 15 years. No maintenance fees.
- **Plant patents** may be granted to anyone who invents or discovers and asexually reproduces any distinct and new variety of plant.
  Duration: 15 years. No maintenance fees.

1.8.2. Why patents

Patents provide **incentives** to individuals by offering them recognition for their creativity and material reward for their marketable inventions.
These incentives **encourage innovation**, which assures that the quality of human life is continuously enhanced.

All patent owners are obliged, in return for patent protection, to **publicly disclose information** on their invention in order to enrich the total body of technical knowledge in the world.
Such an ever-increasing body of public knowledge promotes further creativity and innovation in others.
In this way, patents provide not only protection for the owner but valuable information and inspiration for future generations of researchers and inventors.

Protection is granted for a limited period, generally 20 years.
The invention cannot be commercially made, used, distributed or sold without the patent owner's consent.
These patent rights are usually enforced in a court, which, in most systems, holds the authority to stop patent infringement . Conversely, a court can also declare a patent invalid upon a successful challenge by a third party.

Grants its owner the right to exclude others from commercially using the invention.

This includes the right to prevent or stop others from making, using, offering for sale, selling or importing a product or process, based on the patented invention, without the owner's permission.
Does not grant the owner the "freedom to use" or the right to exploit the technology covered by the patent but only the **right to exclude others**.
Patents owned by others may overlap, encompass or complement your own patent. You may, therefore, need to obtain a license to use other people's inventions in order to commercialize your own patented invention and vice versa.

A **patent owner has the right** to decide who may or may not use the patented invention for the period in which the invention is protected.
The patent owner may give permission to, or license, other parties to use the invention on mutually agreed terms.
The owner may also sell the right to the invention to someone else, who will then become the new owner of the patent. (Royalties)

Once a **patent expires**, the protection ends, and an invention enters the public domain , that is, the owner no longer holds exclusive rights to the invention, which becomes available to commercial exploitation by others.

1.8.3. Requirements

It must show an element of novelty, some new characteristic which is not known in the body of existing knowledge (**prior art**) in its technical field.
Must show an **inventive step** which could not be deduced by a person with average knowledge of the technical field.

Requirements for patentability:

- **Novel:** the invention was never described in a patent, published patent application or other publication (eg academic papers), and never in public use or on sale, by others before you filed your application.
- **Useful:** Capable of industrial application.
- **Not obvious:** the invention must not be an obvious development of what has gone before, in the judgment of an ordinary person skilled in the applicable field (your invention is obvious if someone who knows everything there is to know, would have known to combine these previously existing inventions to result in your invention, without having seen your patent application first).
- **Adequately described:** or enabled for one of ordinary skill in the art to make and use the invention you can't keep the most important parts secret You must tell the world how to practice your invention.
- **Claimed** by the inventor in clear and definite terms.

Not patentable: scientific theories, mathematical methods, plant or animal varieties, discoveries of natural substances, commercial methods, methods for medical treatment (as opposed to medical products), Abstract ideas, Literary, dramatic, musical, and artistic works (these can be Copyright protected) and Inventions which are Not useful (such as perpetual motion machines); or Offensive to public morality.

Business methods: are routinely patented in the US but are not patentable in most countries in Europe or through the European Patent Office.

Many countries have restrictions on patenting of medical procedures.

Software: In some countries, inventions within the meaning of patent law must have a technical character and software as such is not considered a patentable invention, while in others, such requirements do not exist, so that software is generally patentable subject matter.
On the other hand, computer programs may be protected under **copyright**. However, according to a well-established principle, copyright protection extends only to expressions, not to ideas, procedures, methods of operation or mathematical concepts as such.

An invention is new or novel: if it does not form part of the prior art. In general, prior art refers to all the relevant technical knowledge available to the public anywhere in the world prior to the first filing date of the relevant patent application.
It includes, inter alia, patents, patent applications and non-patent literature of all kinds.
In many countries, any information disclosed to the public anywhere in the world in written form, by oral communication, by display or through public use constitutes prior art.
In principle, the publication of the invention in a scientific journal, its presentation in a conference, its use in commerce or its display in a company's catalogue would all constitute acts that could destroy the novelty of the invention and render it unpatentable.
It is important to prevent accidental disclosure of inventions prior to filing the patent application.

Capable of industrial application: cannot be a mere theoretical phenomenon; it must be useful and provide some practical benefit.
The term "industrial" means anything distinct from purely intellectual or aesthetic activity, and includes, for example, agriculture. In some countries, instead of industrial applicability, the criterion is utility.
The utility requirement has become particularly important for patents on genetic sequences for which a utility may not yet be known at the time of filing the application.

1.8.4. Who owns the rights over a patent?

Inventor: The person who conceived the invention.
Owner: the person (or company) that files the patent application is the applicant.

Employee inventions: In many countries, inventions developed in the course of employment are automatically assigned to the employer. In some countries, this is only so if it is so stated in the employment contract.
In some cases (e.g., if there is no employment agreement) the inventor may retain the right to exploit the invention, but the employer is given a non-exclusive right to use the invention for its internal purposes (shop rights).

Independent Contractors: In most countries, an independent contractor hired by a company to develop a new product or process owns all rights to the invention, unless specifically stated otherwise.
This means that, unless the contractor has a written agreement with the company assigning the invention to that company, in general, the company will have no ownership rights in what is developed, even if it paid for the development.

Joint Inventors: more people contribute in significant ways to the conception and realization of an invention, they must be treated as joint inventors and mentioned as such in the patent application.

If the joint inventors are also the applicants, the patent will be granted to them jointly.

Joint Owners: Different countries and institutions have different rules.
In some cases, no single co-owner may license a patent or sue third parties for infringement without the consent of all other co-owners.

1.9. Getting a patent

A patent is granted by a **national patent office** or by a regional office that does the work for several countries, such as the European Patent Office.
Under such regional systems, an applicant requests protection for the invention in one or more countries, and each country decides as to whether to offer patent protection within its borders.

- Do not publicly disclose the invention
- Study prior inventions
- Formulate a strategy and plan
- Outline claims
- Write a description of the invention
- Refine claims
- Apply
- Reflect on the results and the process

1.9.1. Do not publicly disclose the invention

When an invention is publicly disclosed it becomes public knowledge and it is no longer possible to patent it.
Pay attention to: scientific and technical journal, conference presentation, Exhibition, Textbook, theses (embargo!), Websites, magazine and newspaper articles
To publish the invention also for scientific purposes, FIRST apply for a patent THEN submit the paper.

Grace period: 6 or 12 months from the moment an invention was disclosed until the application is filed, in which the invention does not lose its patentability because of such disclosure.
The US a patent application must be filed within one year of the first public disclosure of the invention.

1.9.2. Perform a prior art search

To prevent you from wasting time and money on a patent application if the search reveals prior art references that are likely to preclude the patenting of your invention.

A prior art search should extend also to all relevant non patent literature, scientific and technical journals, conference proceedings, company brochures, trade publications, Textbooks, Theses, Websites, magazine and newspaper articles

Before ordering a professional search, do a **preliminary search** to:

- learn whether the invention may infringe on existing unexpired patents
- get a sense of how similar his invention is to prior art how likely his patent will be successfully filed.
- develop knowledge enabling him to craft novel claims.

Professional research: get in touch with a patent attorney by completing an **Invention Disclosure Form** with a description of the invention and other important information.
The patent attorney conducts a novelty search at the Patent and Trademark Office.

Patent databases: worldwide.espacenet.com, patents.google.com, uspto.gov, uibm.gov.it
Patent analysis platforms: lens.org, ipqwery.com
Scientific publications databases: scopus, ebsco, web of science, IEEE, ScienceDirect, PubMed

Other ways to use the databases:

- **look at new technologies:** patents and published patent applications provide means of learning about current research and innovations often long before the relevant innovative product appears on the market
- **get a sneak preview**: of what your competitors are developing patent information is a unique source of classified technical information, which companies may find of great value for their strategic business planning
- **find solutions:** to your technical problems patent searches should be part of the essential inputs to any company's R&D effort.

When file a patent application:

- as soon as you have all the information required for drafting the patent application.
- patents are granted on a **first-to-file** basis (exception for USA)
- Applying for patent protection early will generally be useful if you are seeking financial support or wish to license your invention to commercialize it.
- You can generally only enforce a patent once it has been granted by the relevant patent office, which is a procedure that may take a few years.
- If you apply too early and subsequently make changes to your invention it will generally not be possible to make significant changes to the original description of the invention.
- Once you have filed your application in one country or region, you normally have 12 months to file an application for the same invention in all the countries of interest to your business in order to enjoy the benefit of the filing date of your first application.
- **Your rights effectively begin on the date of grant of your patent**
- In some countries , you may sue infringers after the grant, for infringement that occurred between the date of publication of the patent application (generally 18 months after the first application has been filed) and the date of grant.

Patent pending:

- Once the patent is granted, it is increasingly common for companies to place a notice indicating that the product is patented ("Patent Pending" or "Patent Applied For", sometimes followed by the number of"), sometimes including the patent number.
- While these terms do not provide any legal protection against infringement, they may serve as **a warning to dissuade others** from copying the product as a whole or certain innovative features.

1.9.3. File a local patent application

Many Countries require their citizens to file in their country before filing elsewhere, or at least to apply for permission before filing elsewhere. This is to allow the government the chance to decide that the invention should not be filed in foreign countries for national security reasons.

The **inventor** and **patent office** work closely together to achieve the highest level of protection. The whole job can last even a few months producing a series of documents and subsequent revisions.

Provisional Patent Applications: low-cost entry point to the patent system.
The applicant may then wait up to a year before filing a full patent application.
Possible in United States, Australia, Canada and India.

For 12 months from his earliest filing date the inventor retains the right to file a regular patent application and/or a foreign patent application.
Some advantages

- Less effort: It needs only to fully describe the invention (there are no specific claims and it is not necessary to use a formal structure and language). It doesn't undergo substantive examination
- The filing fees are lower than the fees requested for a full patent application
- It will be held in confidence by the patent office (only you and your attorney will know what it contains or be able to view the file)
- From this moment the inventor can mark the product "patent pending"

Disadvantages:

- it delays the eventual issuance of a patent by up to one year
- the regular patent application that follows CAN'T contain features that were not described in the provisional application.

1.9.4. File a PCT patent application

Within 12 months from the earliest filing date.

Today (2021) **no world patents or international patents exist.**
In general, an application for a patent must be filed, and a patent shall be granted and enforced, in each country in which you seek patent protection for your invention, in accordance with the law of that country.
In some regions, a regional patent office, for example, the European Patent Office (EPO) and the African Regional Intellectual Property Organization (ARIPO), accepts regional patent applications which have the same effect as applications filed in the member States of that region.

Patents are territorial rights: an invention is only protected in the countries or regions where patent protection has been obtained.
Patent protection in foreign countries will enable your company to enjoy exclusive rights over the patented invention in those countries.
In addition, patenting abroad may enable your company to license the invention to foreign firms, develop outsourcing relationship, and access those markets in partnership with others.

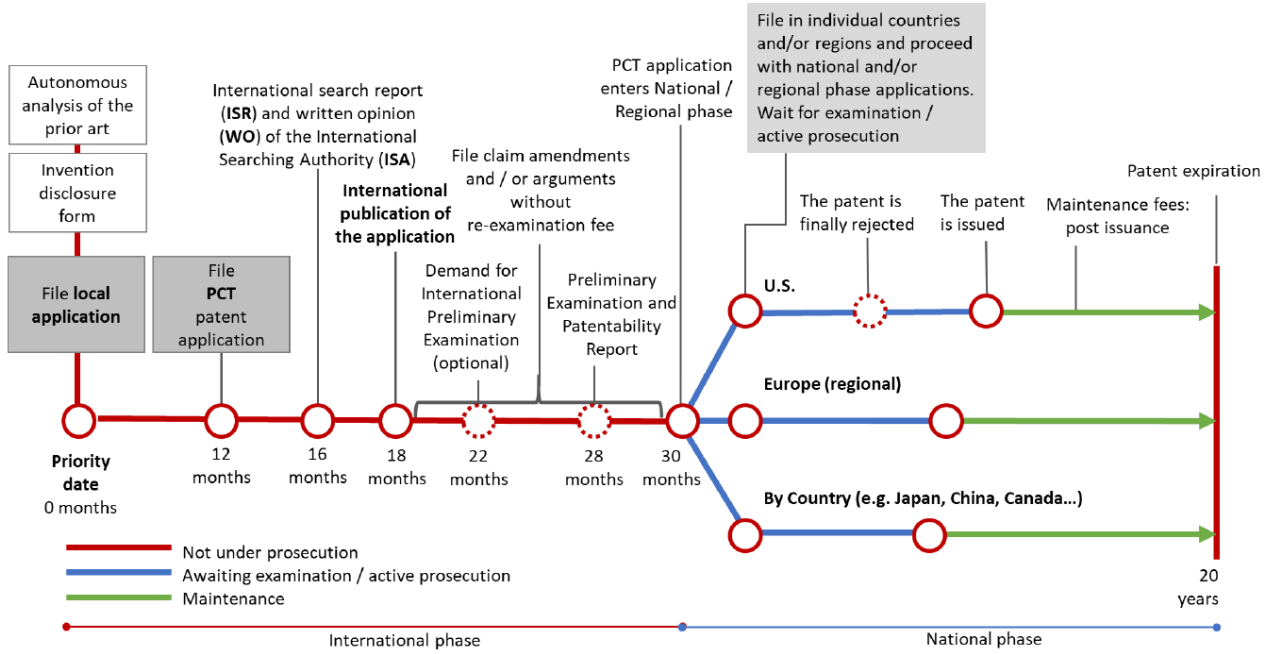
Generally, the inventor doesn't already know if his/her invention will actually have success on the market nor in which Countries will be effective to have a patent.
The **Patent Cooperation Treaty (PCT):** widely used by applicants to keep their options open for as long as possible.

- Provides at least **18 additional months** on top of the 12-month priority period total 30 months from the priority date in which applicants can explore the commercial potential of their product in various countries and decide where to seek patent protection.
- Provides for the filing of **a single international patent application** which has the same effect as national applications filed in the designated Countries.

Advantages of the PCT:

- PCT applicants receive valuable **information about the potential patentability** of their invention in the form of the PCT International Search Report and the Written Opinion of the International Searching Authority

- During this period, the inventor can assess the true **commercial potential** of his invention and can estimate the value of more extensive patent protection.



Where protect your invention: protecting in many countries is an expensive undertaking, companies should carefully select the countries in which they require protection.

- Where is the patented product likely to be commercialized
- Which are the main markets for similar products
- What are the costs involved in patenting in each target market and what is my budget?
- Where are the main competitors based?
- Where will the product be manufactured?
- How difficult will it be to enforce a patent in a given country?

1.9.5. Wait and review

Steps:

- The patent attorney sends the PCT application to the Patent Office, where a Patent Examiner reviews the application and does his own search. This process can take many month/years.
- During this time the examiner issues an office action usually rejecting the application (based on format or wording, novelty or obviousness).
- The results of the examination are sent in written form to the applicant.
- The applicant respond to and/or remove any objections raised during the examination.
- The patent attorney can reply to the action by modifying the application (without adding any new matter). This process often results in the narrowing of the scope of the claims.

Publication: the patent application is usually published 18 months after the first filing date (patent offices also publish the patent once it is granted).

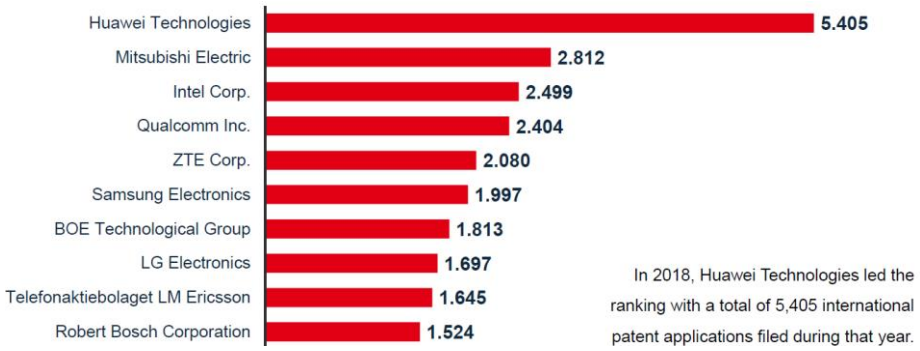
Grant: If the Examiner is not satisfied by the reply then the patent is finally rejected. If the examination process reaches a positive conclusion the patent office grants the patent and issues a certificate of grant. The patent is issued upon payment of an issue fee.

Opposition: period during which third parties may oppose the grant of a patent. Opposition proceedings may be pre grant and/or post grant, and are possible within the specified time limits.

1.9.6. Choose the actual Countries where you intend to patent

The decision must be taken **within 30 months** from his first filing date, before the PCT application enters the National Regional phase.

For every single Country, an application will have to be filed and a maintenance fee will have to be paid as long as he/she desires to keep the patent.



Costs to patent:

- Costs related to patent **application** and **maintenance**/renewal fees (annually).
- Costs associated with performing a **prior art search**.
- The costs vary considerably from country to country and within a country depending on factors such as the nature of the invention, its complexity, the length of the application and objections raised during the examination by the patent office.
- In case you decide to patent your invention abroad, you should consider also the relevant official filing fees for the countries in question, the translation costs and the costs of using local patent agents (which is a requirement, in many countries, for foreign applicants.

2. ENTREPRENEURSHIP

2.1. Entrepreneurship

Puzzle:

- Establish a goal
- Acquire resources to achieve the goal
- Design a process to complete the puzzle
- Measure progress, make adjustments and revise the plan

Start with a clear goal and follow a linear process to completion.

Prediction approach:

- Predefined goals
- Information is known for analysis and testing
- Tools and framework are available to guide decision making
- Optimal solutions are identifiable given a set of constrains
- Risk can be minimized or mitigated
- Outside organizations are seen has competitors and barriers to future growth.

Prediction (puzzle)	Creation (quilt)
Big planning	Small actions
Wait until you get what you need	Start with what you have
Expected return	Affordable loss
Linear	Iterative
Optimization	Experimentation
Avoid failure at all costs	Embrace & Leverage failure
Competitive	Collaborative
Knowable	Unknowable

you have a result to achieve

Manager: improve the efficiency of an existing process. Needs to know the result.
Entrepreneur: locate new ideas and put them into effect.

Entrepreneurship: process by which individuals pursue opportunities without regard the resources in their control.

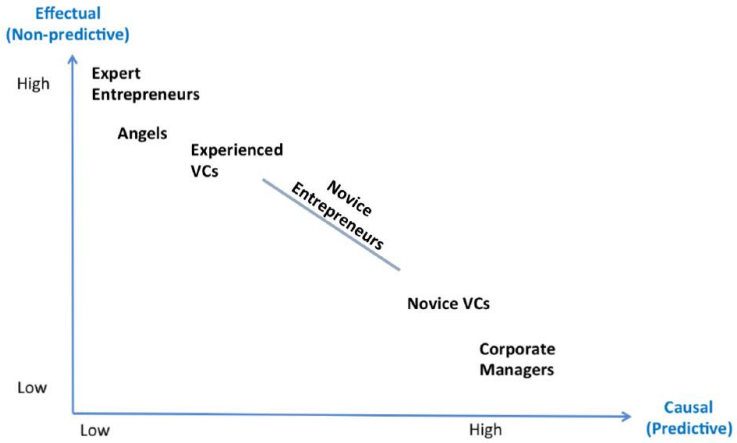
Expert entrepreneur: founded one or more companies, full time for over 10 years, have made at least one public company.

- Start immediately taking action and interact with other people instead of planning to much.
- Focus on what they can do, without worrying about what they should do
- Some people will join the venture.
- Each commitment results in new means and new goals for the venture.
- The constraints reduce possible changes in future goals and restrict who may or may not be admitted into the stakeholder network.

5 Principles:

- **Start with your means:** don't wait for the perfect opportunity. Start taking action based on what you have, who you are (**identity**), what you know (**knowledge** base) and who you know (social **network**).
- **Set affordable loss:** evaluate opportunities based on whether the downside is acceptable, rather than on the attractiveness of the predicted upside. Think about what you are willing to lose rather than investing in calculation about expected returns.
- **Form partnership:** with people and organization. Allow stakeholders who made actual commitments to participate actively in shaping the enterprise.
- **Leverage contingencies:** remain flexible, exploit contingencies. Pivot.
- **Pilot in the plane:** non predictive control

Causal logic: if we can predict the future, we can control it.
Effectual logic: if we can control the future, we can predict it.



2.2. Startup

Small & Medium Enterprise (SME):

- Focus on local market only
- Innovation is not necessary for growth.
- Linear growth
- Often is a family business
- Small growth
- Non-tradable jobs performed locally

Innovation driven Enterprise (IDE):

- Focus on Global / regional markets
- Based on innovation (technological, busines process/model, new product,…)
- Tradable jobs not performed locally
- Diverse ownership, including external capital providers
- Exponential growth

Startup:

- Temporary organization that searches for a repeatable and scalable business model.
- Deliver a new product or service under of extreme uncertainty.
- Designed to grow fast

2.3. Entrepreneurial project

Steps.

Problem/Solutions, Users/Customers:

- Find a relevant problem to solve and a proposed preliminary solution
- Identify potential users / customers' needs and profiles: Value for the user? Problems to solve? Limits of previous solutions? Advantages of the current solution? Alternative potential solutions? Overall value added?
- Research the market size
- Competitors analysis and differentiation

Feasibility and constraints:

- **Technology Readiness Level (TRL):** is technology already available?

- **Patented technologies:** Do we need patented technologies? Who are the owners of patents? Are they available to sell/license the patents?
- **Technological expertise and competencies:** Do we have all technological expertise in house? Do we need to get some expertise from the outside? Is the expertise easily found?
- **Legal constraints:** Are there significant regulations to adhere? Needs for certifications? Security issues?
- **Timing and the window of opportunity:** Too early? Too late?

Product/Service Concept, Value/proposition

- Develop a product /service concept
- Create a value proposition

Intellectual Property Protection: Types of IP, Patents, The patenting process, Potential infringements

Business model: Market segments, Revenue streams, Form partnerships

Pricing, Cost analysis:

- Develop a pricing strategy
- Perform a cost analysis
- Develop sales projections and a break-even analysis

The Team: Team building, Fine tune the team

Funding the company: Define a financing plan, Investment needs, Investment round, Milestones

Financials of the company:

- Income Statement (Revenues Costs > Income)
- Balance Sheet (Equity Liabilities Assets)
- Business Plan financials

Project Management, Venture creation

2.4. Information Goods

An information good is a **good that can be digitized**. Software, books, music, stock prices, images, airline tickets, financial services, news…
Distribution channel: internet

Types:

- IS information: text, music, movies, …
- DOES something: software, services, …

Technology: The infrastructure that makes it possible to store, search, retrieve, copy, filter, manipulate, view, transmit, and receive information. The technology infrastructure makes information more accessible and hence, more valuable.

The demand side (consumers): Information goods are **usually experience goods**. Consumers must experience good in order to value it. Recommendations, **reviews**, **try** before purchase, **reputation** become important. People are willing to pay for information. Consumers differ greatly in how they value particular information goods. Price information goods according to **consumer value**, not according to production cost.
The supply side (producers): Information goods have **large fixed costs** of production **and small variable/marginal costs** of reproduction. Producing information is expensive, reproducing information is cheap. Production costs are sunk costs. There are no capacity constraints. Small incremental costs. There are no natural capacity limits for additional copies.
In the real-world information is not usually sold in a competitive market. **Copyright** allows producers to hold a Monopoly.

Lock in and **Switching Costs:** Once you chose a technology, switching is expensive. Also the knowledge acquired on a technology is part of the switching cost.
Suppliers want to lock in customers. Customers want to avoid lock in.

- **Contractual Commitments:** Settlement and liquidation charges.
- **Durable investments:** After the initial purchase you have to **buy complementary goods** to be used with the durable goods. The speed of technological progress reduces the lock in. Reduction of switching cost from durable goods with leasing contracts.
- **Brand specific Training:** It is the necessary training to learn how to use a new System. It leads to direct costs and loss of productivity. Switching costs increase over time.
- **Information and Databases:** Conversion of data into new formats. Switching costs increase with the amount of data to be converted.
- **Specialized suppliers:** It is difficult to find alternative suppliers.
- **Search costs:** Psychological costs of change. Time and efforts.
- **Loyalty Programs:** by changing supplier or operator you lose the benefits accumulated up to that moment.

A good is **rival** when there is competition to use the same good, and when appropriation by one person reduces the quantity of the good available to other people. This concept applies where scarcity, in the economic sense, exists, as is the case with petrol.
A good is **excludable** when others can be prevented from appropriating or consuming the good.
If a good is **non-rival and** often **non-excludable**, the number of people who can use it is theoretically unlimited and no one can impose limitations on its use, i.e. exclude.

	Excludable	Non-excludable
Rival	**Private goods** food, clothing, cars	**Common goods** water
Non-rival	**Club goods** cable television	**Public goods** information goods (?)

Information Goods are **Public Goods**: When distributed online, it is difficult to keep people from benefiting from information goods.
Some individuals are willing to contribute to a public good even when the costs appear to outweigh the benefits. For Altruism, Anticipation of reciprocity, Effect on personal reputation, Sense of efficacy (making an impact)

Knowledge resources:

- are not as scarce and limited as physical ones.
- Knowledge can be used and exchanged without becoming impoverished.
- The more knowledge resources are used and exchanged, the more attractive they become.

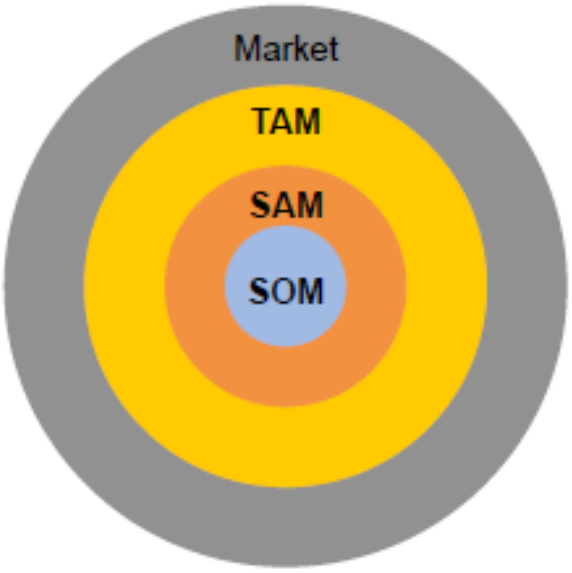
2.5. Market analysis

The single necessary and sufficient condition for a business is a paying customer.
We cannot define a business as a product, because if nobody buys a product, we simply do not have a business.
Before starting a new venture, it is necessary to evaluate the effective existence of a market.
Measured in terms of value (money) or unit (number of customers, number of products sold)

Total Addressable (or Available) Market (TAM): total market demand for a product or service.
Calculation:

- Top-down approach
  - Using industry research and reports
  - taking a large population that comprises the target market and narrow down the population to a specific market segment.
  - can be represented by an inverted pyramid that shows the large population at the top and the narrowed down segment at the bottom.
- Bottom-up approach:
  - Using data from company's early sales
  - company selects certain customer segments and left others.
  - The company relies on data from its research or survey.
  - TAM = (Annual Contract Value) x (# of possible Accounts)
- Value theory:
  - Using conjecture about users' **willingness to pay**
  - think carefully about what customers find valuable and how much they may be willing to pay for that value.
  - Next you need to estimate **how many customers** may find that amount of value in the product and choose it over alternatives.

Serviceable Available Market (SAM): segment of the TAM which is within your geographical reach.
Serviceable Obtainable Market (SOM): portion of SAM which you can realistically capture.



2.6. End User/Customer Profile

What problem are you solving?

- start viewing the customer as the center and the solution(s) rotating around them.

How many segments are you focused on?

- Chasing too many segments or choosing the wrong one is a real risk.
- One of the early-stage mistakes is not focusing on the right customer, trying to keep multiple opportunities open.
- Focus and find the 10% of the people for whom the problem is a real pain, not the 90% for whom it's just a nuisance.

Who are you going after first?

Select a "beachhead market": choose a single market segment to excel in, a startup can more easily establish a strong market position, and hopefully a state of positive cash flow, before it runs out of resources.

Who really want my product or service?

The end user: person who will be using the product or service.

Sometimes the same person will play the role of the economic buyer, but that is not always the case.

If founders don't take the time to fully understand who will be benefiting from their product or service, how their new idea will be used and what those people are like in day-to-day life, you run the risk of having them create something no one will buy (or invest in).

Build end-user profile:

- Segment end-users and stay focused on a relatively homogenous key group.
- create a description of a narrowly defined subset of end users with similar characteristics and with similar needs.
- based on **real customer data**
- The purpose of this profile is to understand the customer **demographics**, **behavior** patterns, **motivations**, and **goals** that will drive these people to choose your solution.
- Demographics: gender, age range, income range, geographic location, education level, work experience.
- Psychographics: What motivates them? What frustrates them? What do they fear most? What are their values? What are their goals?

Persona: real person, that matches the end user profile. Is of one end user who best exemplifies the End User Profile.

Prepare a fact sheet about the Persona

- Use the end user's real name
- Include a drawing or photograph of the individual
- Include information about the person's life (born, raised, education, family, etc.)
- Include information about the person's job (what company, how many years, training, managers, salary, etc.).

Interview the end user who is the Persona

- Personal Information (age, live in, family etc)
- Career Context (company, experience ect)
- Information Sources (websites etc)
- Purchasing Criteria in Prioritized Order e.g. Reliability (highest priority), Costs (medium priority), "Greenness" (low priority)
- Others (entertainments etc)

2.7. Networks and Network Effects

Two Economies

- Industrial Economy
  - Populated with oligopolies
  - Suppliers' Economies of Scale: Economies of scale in production: larger companies tend to have lower unit production costs. E.g. Automotive
- Information Economy
  - Temporary monopolies
  - Economies of Networks
  - Demand side Economies of Scale: Economies of scale coming from the value attributed to the product by customers by virtue of its diffusion.

Networks

- Real networks: Telecommunications, email, etc…
- Virtual networks: Mac users, Computer (both S/W and H/W) buyers are picking a network, not simply a product.

Network effects: As more people or organizations participate in a network, the value of the network to each participant increases. Value to users depends directly on

- number of adopters. e.g. fax machine, telephone, email
- adoption of some complementary product. DVD player and DVDs, eBook reader and contents

Network externalities are the effects a product or service has on a user while others are using the same or compatible products or services. Positive network externalities exist if the benefits are an increasing function of the number of other users.

- Technologies characterized by important network effects tend to show very long periods of introduction of the technology itself, followed by very rapid growth.
- do not concern only communication networks but also networks of users of a product (for example computer users).
- create demand side economies of scale and give rise to positive feedback.

Positive feedback: makes a network bigger and bigger and its value increases as the number of its members increases. The acquired value further increases the number of members of the network because it becomes more and more interesting and advantageous to belong to a large and widespread network.

Network value (Metcalfe Law): number of potential connections in a network on N nodes = $N^2 - N$

Increasing returns: are the trend whereby those who are in the vanguard proceed even more and those who lose ground lose even more.

- The positive feedback leads the market to extreme situations: complete domination by one company or one technology.
- When two or more companies compete in a market characterized by strong positive feedback, only one of them can be the winner (the winner takes all)
- Positive feedback tends to produce a critical mass of users and a standard.

Consumer expectations are very important in determining the success or failure of a product. The combination of economies of scale on the supply side and economies of scale on the demand side creates strong positive feedback.

The rise of a standard: Network externalities and positive feedback can lead to the affirmation of a solution, not necessarily the best, which by virtue of its diffusion becomes a de facto standard. The collective costs of the transition are much higher than the individual costs.

2.8. Business Models

Free: (it is not really a business model)
You don't have a business model until you have someone actually paying money for your product/service.
People will behave very positively toward your product/service when the price is zero because there is no friction to purchasing.
Free can be part of an overall strategy to reduce the Customer Acquisition Cost.
Get a large user base before coming up with ways to be profitable.

Freemium: Users get the basic functionality of the product at no charge and pay for premium features, whether through a subscription charge or by purchasing add-ons.
e.g. Free users of Spotify receive advertisements every 20 minutes and can't skip songs whenever they like. Paying users don't receive advertisements and can choose their song.

2.8.1. Customer pays the bill

Flat rate: how most products are sold. You pay a one-time fee and you own the product or you receive access to a lifetime service.
Hourly Rates It tends to reward activity as opposed to progress but when a project is poorly defined or very dynamic, this might well be the preferred model.

One-time Up-Front Charge plus Maintenance: customer pays a large up-front charge to obtain the product, with the option to secure ongoing upgrades or maintenance of the product for a recurring fee.
A large up-front infusion of cash is good because it helps offset high cost of capital.
On the contrary it is likely to minimize the ability to secure a recurring revenue stream.

Subscription: service you sell in a certain timeframe. The service can be:

- receiving a newspaper every day
- using a cloud service (software)
- being able to call car assistance when needed.

For example, the customer can make a subscription for the repetitive purchasing of a good which is periodically delivered directly to home.
Variations:

- **Annual or Multi-Year Commitment:** it locks the customer in and provides them with predictable lower payments as opposed to a one-time up-front payment (e.g., an annual fee for a monthly newsletter).
- **Month-to-Month Commitment:** it gives the user great flexibility and you can often extract a much higher monthly payment for this arrangement, compared to an annual or multi-year agreement.

Licensing: Licensing Intellectual Property to customers and receiving a royalty can result in a very high gross margin.
You do not have to make big investments in production and distribution capability for a whole product (e.g. areas like biotech).
Downsides:

- licensing generally only works when the IP is extremely strong

- you are not spending time with the ultimate end user learning their needs;
- your royalty rate will generally be equivalent to one-twentieth or less of the revenue per sale

Franchise: You get paid a percentage of sales and/or receive a large initial startup fee in return for providing the knowledge and brand that you have been developed.
You can also make money by selling your brand-name products to the franchises to be distributed.

Up-selling with High-Margin Products: The central product is sold at a very low margin, but the overall margin is increased from the sale of very high-margin add-on products.
e.g. in new car sales the additional items like warranty extension and accessories are the high-margin products where sellers make high profits.

Loss leader: A company collects multiple revenue streams but not every revenue stream is independently profitable. One or several revenue streams may serve as loss leaders and drive traffic to increase other purchases. Combined, all revenue streams enable the company to achieve profitability.
Example is a grocery store selling laundry detergent below cost in order to stimulate other purchases.

Pay per Use (Utility): Some products are only used a limited amount of times per customer (a car is idle 97% of the time on average).
Paying only for the times you need a product/service creates flexibility (more control over their expenses) and increases the value per use.
e.g. Amazon's cloud service that hosts websites, charge by the amount used. Customers only pay for the amount of bandwidth used, rather than paying for extra capacity they don't use.

Fractional ownership: When customers are not able to pay for the entire product, you can allow them to buy it together with peers.
Another variation of buying together with peers is 'group buying' to achieve a discount.
e.g. Share a Car. Set a calendar to share a car with other people.
e.g. Buy expensive stocks (fractional shares)

Transaction Fee: Online retailers often pay or receive a commission for referrals that lead to sales. It is similar to how credit card companies work, where a percentage of each transaction goes to the credit card company.
e.g. eBay receives a fee from each successful auction, paid by the seller

2.8.2. Third Party pays the bill

Advertising: attract and retain a desirable demographic can be monetized through third parties who want access to the customers you have attracted.
When done properly and on a sufficient scale, this can be a very lucrative model.
But many startups have fallen substantially short when they attempt to rely solely on advertising.
e.g. Google, Facebook, Pinterest

Marketplace: always has clear supply and demand. Bringing these 2 sides together might require a platform (marketplace) or a service provider (broker).
e.g. Airbnb is a travel service that links people with space available to people searching for a good place to stay (with locals). Commissions charged are 6-12% of the listing fee.

Matchmaking Platform: When matching 2 relevant parties to each other, both value your service and might pay for it.
e.g. Jobr matches companies with open applications (and looking for 'the perfect applicant') with applicants searching for 'their perfect job'.

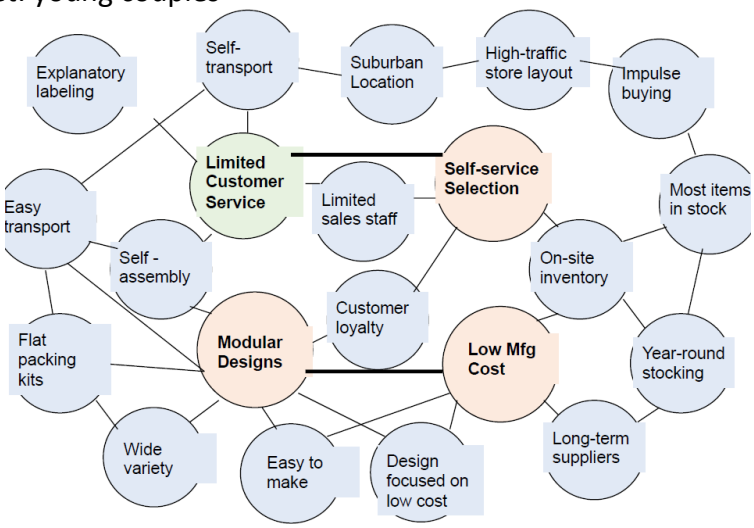
Affiliate/Referral: Online retailers often pay or receive a commission for referrals that lead to sales. Depending on the product and program, 5-10% of the product price, is a good indicator of the lead fee you'll receive.
e.g. ASAP54 is the Shazam for fashion. If you see something you like, the app will tell you what it is and where you can buy it. Often you will even get a direct buying link.

Product as a service: Servitization of products

2.8.3. Business Models Examples

Ikea

- Do-it yourself assembly
- Limited Customer Service
- Modular Designs: modules shared in different products
- Self-service Selection in the shop
- Self-Transport
- Impulse buying
- Low cost model
- Target Market: young couples



Zara

- Target Market: Young, Urban. Tastes change constantly. Don't want classics.
- Buying behavior: Visit stores often, Buy immediately
- High sales
- Few mark-downs
- Products: Simple, Low durability
- Factories: Flexible, Responsive
- Reduction of cycle time
- Just in Time. Produce exactly the quantity the market wants.

Blockbuster:

- business model depended on maximizing the days that a movie was out for rent. Movies not returned to the renting location by the end of the specified rental period were subject to extended viewing fees.
- approximately half of its rental inventory under a purchase model in which it would pay the studios $15–$18, rent it 9–10 times for $4 per rental, and then resell the DVD for an average of $8 per unit.
- other half was acquired under a revenue share model in which Blockbuster paid the studio about $5 per copy, rented it 9 times, and resold it for an average of $8, sharing 30% of the revenue with the studios.

Netflix (1997):

- DVD-by-mail service.
- Targeted early technology adopters who had recently purchased DVD players.
- unlimited rentals: Subscribers could keep three movies at a time and exchange them as frequently as they liked.
- Key to the success of Netflix's inventory management is the Recommendation System.
- Queue of 50 movies that the users can choose what want next. Making the users willing to keep the subscription.
- streaming service

Ipod and Itunes: instead of fight piracy, make people buy single songs instead of cds for $0.99 for a song. Most of the 0.99$ goes to the majors, but apple makes money selling the iPod.

Zipcar (2000):

- **Problem**: Car ownership is expensive
  - taxis can fill the need for short trips.
  - Rental cars are available for daily or weekly usage, but the hassle factor keeps people from using them as often as they might like.
  - So there is a big hole in the market: short-term, on demand private car access
- **Idea**: car rental with 24 hours Availability, Flexible Rental Timing, Flexible Pick up/Return, Locations, Petrol Included, Basic Insurance covered, Free Parking.
- **Potential costumers:** …
- **Technologies needed:** Proximity card reader ZipCard (NFC), web platform and app to book.
- **Business model:** subscription (300->75$/year) + fee for service (4.50-7$ hour, 0.40$/mile), advertising (650$/month/car)
- **Marketing:** Low-budget tactics, word of mouth, free media coverage generated through public relations. Guerilla marketing.
- **Finance:** professionals, classmates, friends, and family members. Then VC rounds.
- **Management:** mistake: hiring a big-company guy for a start-up. Founders weren't full time because studying in college and pregnant.
- **Partnerships:** 300 colleges, 10,000 small, medium, and large sized businesses.
- **Growth**: network effects + some mergers with other companies.
- **Exit**: 2011 IPO, 2013 sold for 500 million cash.

2.9. Investors (VC)

2.9.1. Financial intermediaries

Bank takes money from depositors and then loans it to businesses and individuals.

Venture Capital firm: is a financial intermediary, it takes the investors' capital and invests it directly in portfolio companies.

- Invests only in private companies. This means that once the investments are made, the companies cannot be immediately traded on a public exchange.
- Takes an active role in monitoring and helping the companies in its portfolio.
- Primary goal is to maximize its financial return by exiting investments through a sale or an initial public offering (IPO).

Angels use their own capital and, so, they are not financial intermediary. Types of angels:

- **Wealthy individuals (HNWI)** with no business background.
- **Groups** of angels with relevant business or technical backgrounds who have grouped together to provide capital and advice to companies in a specific industry.

Angels can keep all the returns to on their labor, so, they have a lower cost of capital and can invest in deals that would not work for a Venture Capital.

2.9.2. How Venture Capital firms works

Limited Partners (LPs): don't have responsibilities, not a day-to-day manager of the business, they just **collect the money**

- mostly large institutions (foundations, university donations, pension funds etc.) that invest in a portfolio of assets.
- pays few percentage points of this capital every year for the management fees of the fund.

The firm is composed of a small group of **General Partners (GPs)** that has a day-to-day role in managing it and sometimes of some junior figures (analysts, associates, principals, etc.).

About 80 percent of the organized VC market is controlled by independent VC firms.
VC firms are **small organizations**, averaging about **10 professionals**, who serve as the general partner (GP) for VC funds.
A VC fund is a limited partnership with a finite lifetime (usually 10 years plus optional extensions of a few years).

Limited Partners put up the capital, with a few percentage points of this capital paid every year for the management fees of the fund.
The remaining capital is then invested by the General Partner in private companies.
Successful investments are exited, either through a private sale or a public offering.

VC investing is a long-run business, and investors must often wait many years before enjoying any return of capital.
The expenses of VC investing start immediately. Thus, a baseline **management fee** is necessary.
The typical arrangement is for limited partners to start paying a set percentage of committed capital every year, most commonly **2.0 percent**.
Sometimes this fee remains constant for the full 10-year life of the fund, but in most cases the fee drops somewhat after the five-year investment period is over.

Lifetime fees is the sum of the annual management fees for the life of that fund.

$$\text{Investment capital} = \text{committed capital} - \text{lifetime fees}$$

Example: $100M fund with a 10-year life and an annual management fee of 2 percent for all 10 years. The fund has lifetime fees of $20M and investment capital of $80M

Carried interest enables GPs to participate in the profits of the fund, and historically it has provided the largest portion of GP compensation.
The most common **profit-sharing** (carried interest) arrangement is an **80-20 split**: after returning all the original investment to the limited partners, the **general partner keeps 20 percent** of everything else.
Example: if the investors commit $100 million to the fund, and total exit proceeds are $200 million, then the total profit is $100M. A GP with 20 percent carried interest would receive $20 million of this profit.

2.9.3. What do Venture Capitalists do?

Investing, Monitoring, Exiting.

Investing begins with VCs prospecting for new opportunities. VC may screen hundreds of possibilities.

- Preliminary offers are made with a **term sheet**, which outlines the proposed valuation, investment amount, percentage stake, voting rights, liquidation preference, type of security, and proposed control rights for the investors.
- If this term sheet is accepted by the company, then the VC performs extensive due diligence by analyzing every aspect of the company.
- If the VC is satisfied, then all parties negotiate the final **set of terms** to be included in the formal set of contracts to be signed in the final **closing**.

Portfolio companies can be divided into three stages:

- **Early-stage** include everything through the initial commercialization of a product.
- **Mid-stage**
- **Late-stage** are businesses with a proven product and either profits or a clear path toward profitability. Should be able to see a plausible exit on the horizon.

Investments by Stage:

- **Seed/Startup Stage**: small amount of capital provided to an inventor or entrepreneur **to prove a concept.** Involve product development, market research, building a management team, and developing a business plan. This is a pre-marketing stage.
- **Early-Stage:** financing to companies completing development where products are mostly in **testing or pilot production**. In business for three years or less. Tend to involve angel investors more than institutional investors. The networking capabilities of the venture capitalists are used more here than in more advanced stages.
- **Expansion (Mid) Stage:** applying working capital to the initial expansion of a company. The company is now producing and shipping and has growing accounts receivable and inventories. It may or may not be showing a profit. Money are used for plant expansion, marketing, or development of an improved product. More institutional investors are likely

to be included along with initial investors from previous rounds. The VC's role in this stage involves a switch from a support role to a more strategic role.
- **Later Stage:** companies that have reached a fairly stable growth rate. Other financial characteristics of these companies include positive cash flow. This also includes companies considering IPOs.

Financing rounds: first time a company receives financing is known as the first round (or Series A), the next time is the second round (or Series B), and so on.

Investment period (commitment period).
After the investment period is over, the VC can only make follow-on investments in current portfolio companies.
A successful VC firm will raise a new fund every few years so that there is always at least one fund in the investment period.

Most VC firms **specialize** their funds by stage, industry, and/or geography.

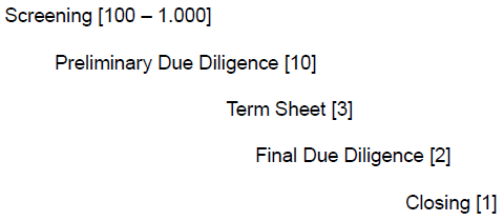
Monitoring: Once an investment is made, the VC begins working with the company through board meetings, recruiting, and regular advice.
VCs typically take at least one **position on the board** of directors of their portfolio firms.
Having board representation allows them to provide advice and support at the highest level of the company.
VCs often act as unofficial recruiters and matchmakers for their portfolio firms.

VCs are financial intermediaries with a contractual obligation to return capital to their investors.
Financial analysis is crucial for the valuation of IPO firms and acquisition candidates.
The possible outcomes of the investment are:
- acquisition by a big company
- Initial Public Offering (IPO)
- bankruptcy
- no cash returns for shareholders
- remain private

Exits can occur through:
- IPO (Initial Public Offering), with a subsequent sale of the VC stake in the open market
- sale of the company to another investor
- sale of the company to a larger company.

2.9.4. The VC investment process

Deal flow: quality of prospects at the screening Stage.
The generation of high-quality deal flow, also called **sourcing**.
The majority of investments are screened using a business plan prepared by the entrepreneur.
For early-stage companies, the projections usually focus on the uses of funds.
For later-stage companies, the projections should be more complete financial statements.



Market test: Does this venture have a large and addressable market?
An "addressable" market is one that can conceivably be entered by a new company.

Management test: Does the current management have the capabilities to make this business work?
The evaluation of the management team is most qualitative part of screening and due diligence.
Many VCs argue that the evaluation of people is the most important part of their job and believe that success or failure is driven primarily by the strength of the management team.
Mantra of VCs: "I would rather invest in strong management with an average business plan than in average management with a strong business plan".
But core business lines are remarkably stable from birth to exit. On the other hand, management changes are quite common.

Due diligence investigation: hard questions and thinking about what can go wrong.
The first part of this due diligence is the meeting of VCs with the company management.
This **pitch meeting** is a famous touchstone of the VC-entrepreneur relationship.
Many term sheets include a period of exclusivity, giving the VC some time to complete diligence while the company is restricted from negotiating with other potential investors.
12 main topics for a due diligence investigation: Management, market, customers, product, technology, competition, projections, channels, partners, money, transaction terms.

2.9.5. The term sheet

Term sheet: is a nonbinding agreement that shows the basic terms and conditions of an investment. The term sheet serves as a template and basis for more detailed, legally binding documents. Once the parties involved reach an agreement on the details laid out in the term sheet, a binding agreement or contract that conforms to the term sheet details is drawn up.

Post-money valuation company's estimated worth after outside financing and/or capital injections are added. To compute (equity) market capitalization for a public company, we multiply the price per share times the number of shares outstanding.

$$\text{Postmoney valuation} = \text{price per share} * \text{fully diluted share count}$$

For example, $1 * 15M = $15M.
Post-money valuation = $ investment / proposed ownership percentage

Pre-money valuation: market capitalization of the company before the VC investment.

$$\text{Premoney valuation} = \text{postmoney valuation} - \$\,\text{investment}$$

For example, pre-money valuation: $15M - $5M = $10M.
Pre-money valuation = price per share * pre-transaction (fully diluted) share count

Common stock held by founders and employees.
VCs typically purchase some form of **preferred stock**.
The capitalization table will always include a section for the employee stock pool, which contains shares set aside as incentive compensation for employees.

When a company is sold, merged, or shut down the proceeds are distributed to bondholders, preferred stockholders, and common stockholders, in that order.
Liquidation preference: tells an investor where he stands in the capital structure hierarchy.
When there have been multiple rounds of investment, it is common for the latest-round investors to get their money back first.
An alternative to this ordering is for all (or some) preferred investors to be paid back at the same time.
In some cases, investors insist on liquidation preferences in excess of their original investment.
For example, a 2X or 3X liquidation preference requires that the investor be paid back double or triple, respectively, their original investment before any of the other (junior) equity claims are paid off.

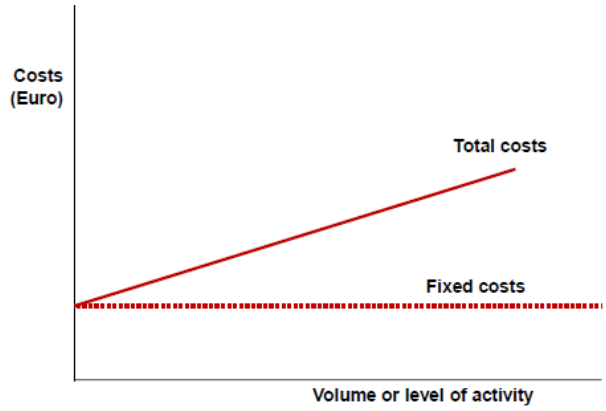
Voting Rights: VCs (the **minority shareholders**) protecting themselves from expropriation by the **majority shareholders**.
For example, the Series A investors are guaranteed two spots on the board and are also given the power to block some corporate actions with a separate vote.

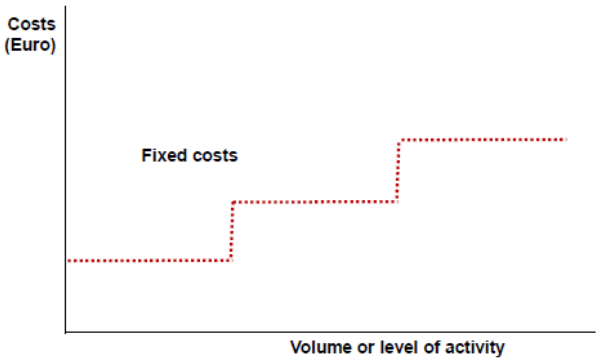
3. FINANCE

3.1. Product Service Economics

3.1.1. Costs

Fixed costs: unaffected by changes in activity level over a range of operations. (insurance, general management and administrative salaries, license fees, leasing, and interest costs on borrowed capital)
Tend to remain constant over a specific range of operating conditions.
When larger changes in usage of resources occur, or when plant expansion or shutdown is involved, fixed costs can be affected.
Variable costs: depend on the level of production. (Raw materials, energy, Contracted labor hours)
Total costs = Fixed costs + Variable costs





Marginal costs: cost associated with producing one additional unit at any given production level.
Marginal costs are particularly relevant in the software industry. In fact, while the development of a software generally requires high R&D investments, the cost associated with producing one additional copy of the software is practically irrelevant.

Direct costs: costs that can be reasonably measured and allocated to a specific output or work activity.
The labor and material costs directly associated with a product, service, or construction activity are direct costs. For example, the materials needed to make a pair of scissors would be a direct cost.

Indirect costs: costs that are difficult to allocate to a specific output or work activity.
Allocated through a selected formula (such as proportional to direct labor hours) to the outputs or work activities.
For example, the costs of common tools, general supplies, and equipment maintenance in a plant are treated as indirect costs.

Cash Cost: involves payment of cash (and results in a cash flow)
Book costs (noncash): do not involve cash payments but rather represent the recovery of past expenditures over a fixed period of time. Ex. **depreciation** charged for the use of assets such as plant and equipment.

3.1.2. Pricing

Good pricing strategy helps determine the price at which you can maximize profits on sales of your products or services. **Factors to consider** when deciding the price: Cost base pricing, Demand curve and revenue function, Target customers, Competitors offering, Company's goals.

Cost-based Pricing: method in which a fixed sum or a percentage of the total cost is added (as income or profit) to the cost of the product to arrive at its selling price.
Calculate the total costs to make the product, then add a percentage markup to get the final price.

Advantages:

- Simple to calculate
- Flexible
- If costs go up, it is easy to adjust prices
- Is easy for a marketer to defend pricing.
- May suit a manufacturer with scalable production based on demand.

- Fixed cost for making 10.000 shirts is 150.000 $.
- Variable cost = 30$ per shirt
- Total cost per unit = (150.000 $ / 10.000) + 30 $ = 45 $

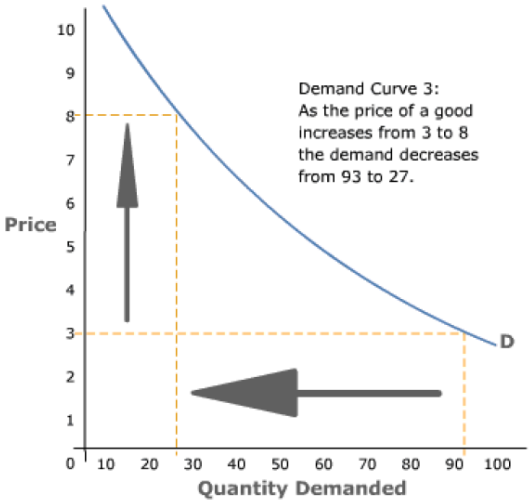
- The firm expects 30% **return on sales**
- The **Mark up Price** will be: 45 / (1 - 0.3) = 64.28 $
- 64.28 $ – 45 $ = 19.28 $ (30% of Sales Price)

Disadvantages:

- Ignores product demand or the influence price may have on demand
- Ignores what competitors are doing with their pricing
- If costs increase, so must the price
- Ignores brand positioning so may forfeit additional profit
- It provides no incentive to improve cost efficiency

Markup price $=$ $\text{total costs(for unit)}/(1 - \text{return on sales})$

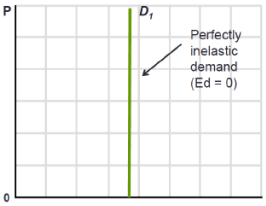
Demand curve: price varies according to the demanded quantity. $P = a - bQ$
If the price rises, the demanded quantity decreases.



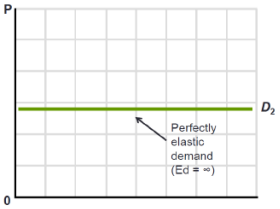
Price Elasticity of demand (PED): shows the responsiveness of quantity demanded to a price change. **How much demand is affected by a price change.**
Varies along a demand curve. With a downward sloping demand curve, price and quantity demanded move in opposite directions, so the price elasticity of demand is always negative.
A positive percentage change in price implies a negative percentage change in quantity demanded, and vice versa.

$$E_d = \frac{\text{Percent change in } \textbf{Quantity Demanded} \text{ of Product X}}{\text{Percent change in } \textbf{Price} \text{ of Product X}}$$

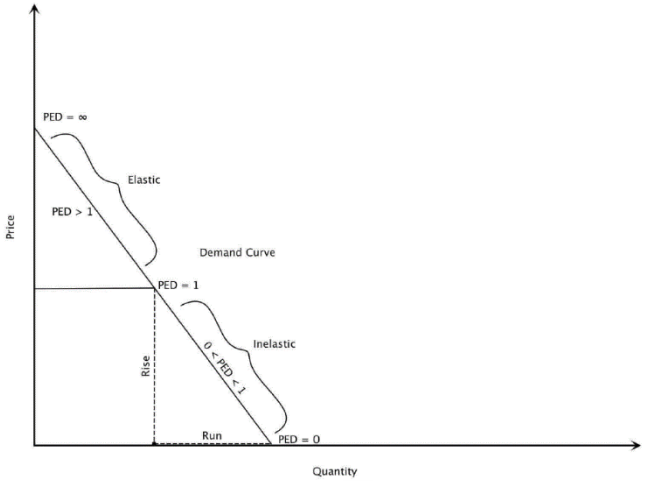
- $E_d > 1$ demand is elastic
- $E_d < 1$ demand is inelastic
- Extreme cases: Perfectly inelastic, Perfectly elastic

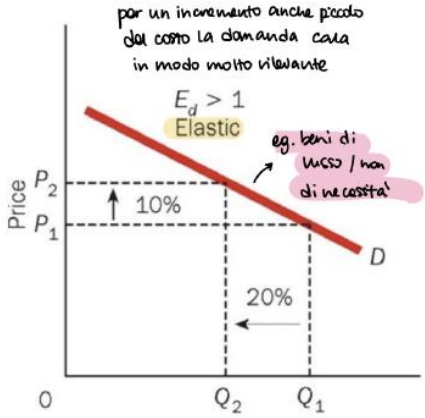


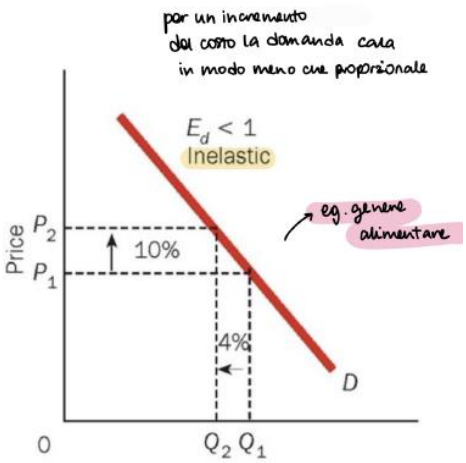
Perfectly inelastic demand



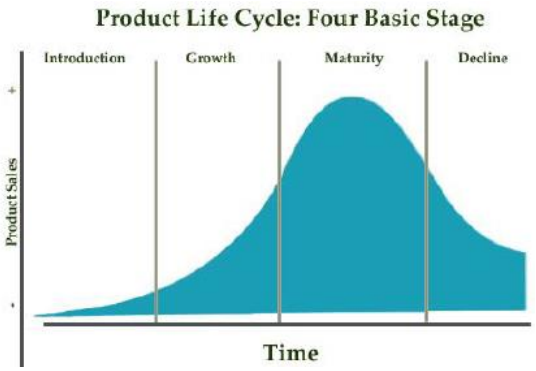
Perfectly elastic demand



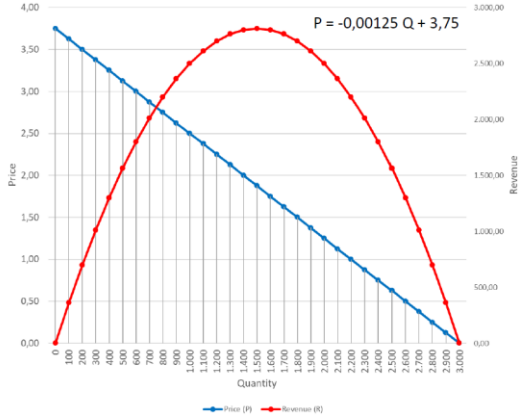




Demand and the product life cycle: Small quantities sold and high prices make price elasticity higher at the beginning of a product life cycle.



Total Revenue: $T_R = \text{price} * \text{demand} = P * Q = (a - bQ)Q = aQ - bQ^2$



Blue: Demand curve Red: Total Revenue

The target customers: we must consider their:

- **Expected price:** In spending, the customer compares the price with some reference points:
  - the last price he paid
  - the maximum price acceptable
  - the minimum logical alternative products on the shelf
  - the price list.
- **Product value perception and positioning:** Instead of changing the price, one can think about changing the perceived value.

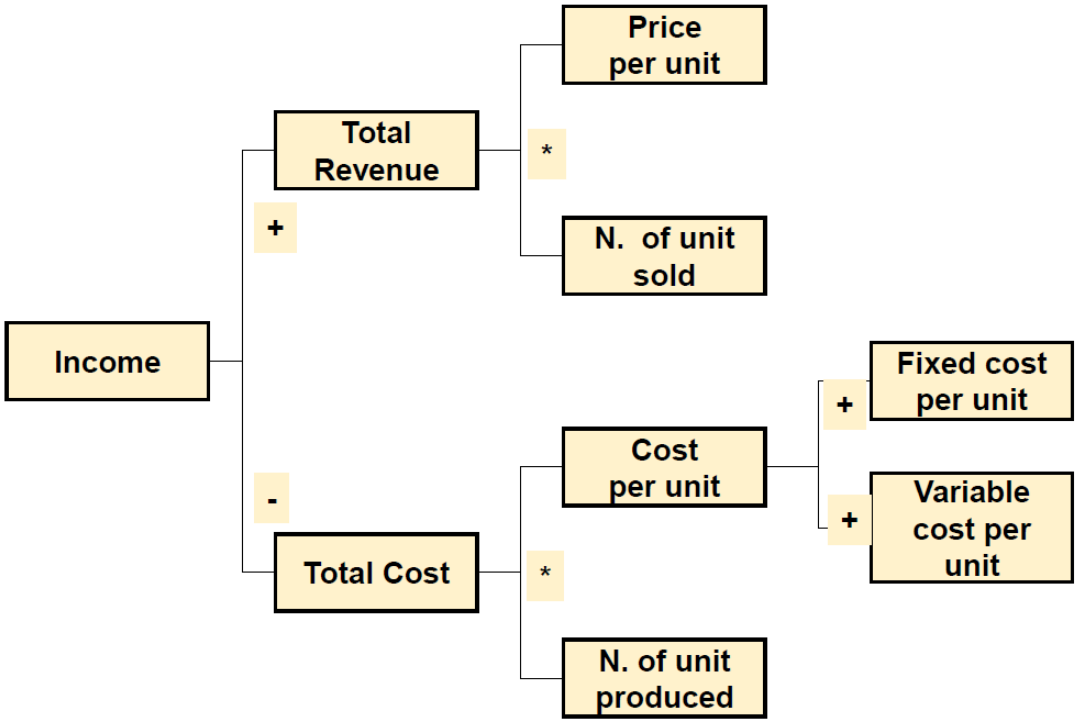
Competitors offering:

- **Price of the competitors:** If the value proposition is similar, the price should be similar.
- **Price of substitute products:** The price drops if the product can be easily replaced by another that meets the same needs in a similar way. A high price must have a unique value proposition.

Company's goals:

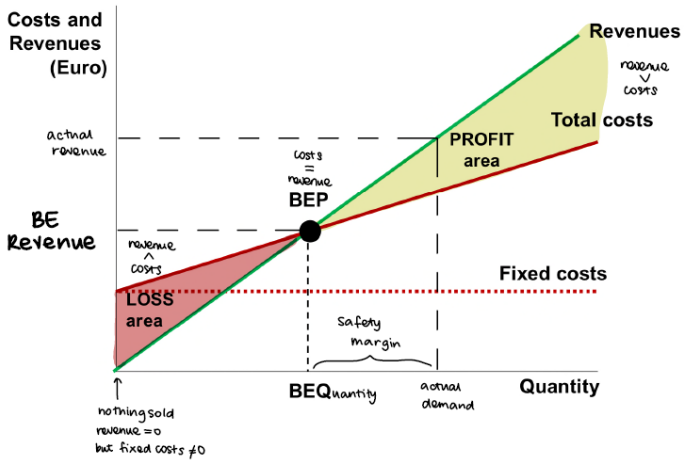
- **Survival**: cost recovery (just break even)
- **Maximize profits:** elaborate a demand and cost estimation for different price levels and choose the one allowing the maximum profit
- **Market penetration:** set a low price → high volume
- **Market skimming:** set a high price for a new high-end product or a uniquely differentiated technical product to obtain maximum revenue from the market before substitutes products appear.
- **Exclusive positioning:** set a high price
- **Entry barriers for competitors:** set a low price
- **Develop strong relationship with distributors:** choose with them

3.1.3. Revenues - Costs relationship



3.1.4. Break-even point

Price per unit (p) for a product or service can be represented as being **independent of demand**



Example

- Unit price = 20 euro
- Fixed costs = 1.500 euro
- Variable cost = 10 euro

Calculate the BEP (BEQ = break even quantity)

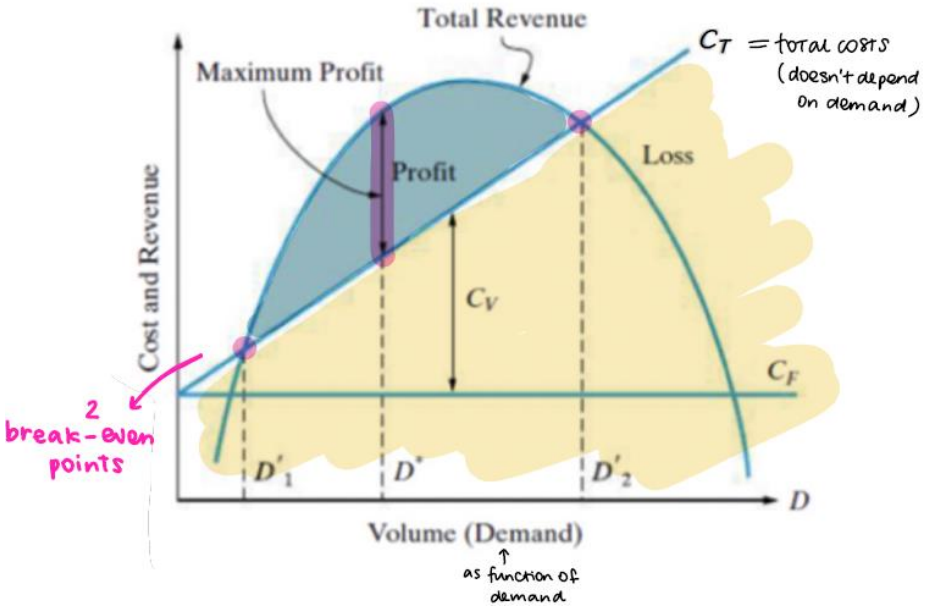
BEP → TR = TC → P x BEQ = FC + VC x BEQ

20 x BEQ = 1.500 + 10 x BEQ → BEQ = 150

TR = 20 x 150 = 3.000

BEP: (150; 3.000)

Price per unit (p) for a product or service is **dependent of demand**



At breakeven point D1, total revenue is equal to total cost, and an increase in demand will result in a profit for the operation.

At breakeven point D2, total revenue and total cost are again equal, but additional volume will result in an operating loss instead of a profit.

$$\overbrace{\text{PRICE PER UNIT} \times \text{BEQ}}^{\text{TOTAL REVENUES}} = \overbrace{\text{FIXED COSTS} + \text{VARIABLE COSTS} \times \text{BEQ}}^{\text{TOTAL COSTS}}$$

3.1.5. Contribution Margin

Metric that allows to evaluate different areas of a business to determine which service or product line to emphasize based on the highest margin.

- $C_M = \text{Price} - \text{Variable Cost}$
- $\text{Total } C_M = (\text{Price} - \text{Variable Cost}) * Q$

The goal is maximizing the contribution margin.

Negative or low contribution margins indicate a product line or business segment may not be profitable.

Used for:

- making pricing decisions
- analyzing the impact of different levels of sales
- resolving bottlenecks.

If limited resources are available, a business wants to contribute that scarce resource towards the most profitable items.

Relationship Contribution margin Break-even point:

The contribution margin determines the portion of each sale that is attributed to covering fixed costs. For this reason, fixed costs divided by the contribution margin results in the number of units needed to be sold to break even.

$$\underset{\text{(TOTAL)}}{CM} = \left(\underset{\text{(PER UNIT)}}{\text{PRICE}} - \underset{\text{(PER UNIT)}}{\text{VARIABLE COSTS}} \right) \times \text{QUANTITY}$$

$$\Downarrow$$

$$\text{BREAK-EVEN QUANTITY} = \frac{\overset{\text{(TOTAL)}}{\text{FIXED COSTS}}}{\underset{\text{(PER UNIT)}}{CM}}$$

3.2. Income Statement

1	**Income Statement**
	for the period including Transactions 0 through 0
	OPERATING INCOME
1	NET SALES
2	COST OF GOODS SOLD
1 - 2 = 3	**GROSS MARGIN**
4	SALES & MARKETING
5	RESEARCH & DEVELOPMENT
6	GENERAL & ADMINISTRATIVE
4 + 5 + 6 = 7	**OPERATING EXPENSES**
3 - 7 = 8	**INCOME FROM OPERATIONS**
	NON-OPERATING (i.e. FINANCIAL) INCOME
9	NET INTEREST INCOME
10	INCOME TAXES
8 + 9 - 10 = 11	**NET INCOME**

Income Statement reports on operating activities (making and selling) of a business over a period of time (a month, a quarter, a year).
(Also referred as the Profit & Loss Statement, the Earnings Statement, or simply the P&L.)
Gives one important perspective on the health of a business: its **profitability**.
Note: profit = earnings
It documents the **second basic equation of accounting**:

$$\text{Sales} - (\text{Costs} + \text{Expenses}) = \text{Income}$$

Does **NOT** reflect the **movement of cash**, but the generation of obligations (**payables**) to pay cash in the future.
Sales and costs are recorded when the goods are shipped and customers incur the obligation to pay, not when they actually pay.

Expenditure: the use of cash to pay for an item purchased. Two different kind:

- **Costs**: manufacturing expenditures **to build inventories**.
- **Expenses**: all other business expenditures. Developing and selling products and for running the "general and administrative" aspects of the business. e.g. paying legal fees and a sales person's salary.
  Directly lower income on the Income Statement.

Operations: normal day-to-day business activities (making and selling product).
Net Sales (revenue): are recorded on the Income Statement when the company actually **ships products** to customers. Customers now have an obligation to pay for the product and the company has the right to collect.
When the company ships a product to a customer, it also sends an **invoice** (a bill). The company's right to collect is called an **account receivable** and is entered on the company's Balance Sheet.
Typical phases: Order from the customer, Manufacturing, Shipment, Invoice, Payment by the customer.
Costs: what you spend when you buy (or make) products. e.g. expenditures for raw materials, workers' wages, manufacturing Overhead.
Gross Margin = Sales - Costs of Goods
Sometimes called gross profit or the company's manufacturing margin.

Operating expenses: expenses that a company makes for developing and selling products and for running the "general and administrative" aspects of the business.
They are also called SG&A expenses, meaning "Sales, General and Administrative expenses." (e.g. paying legal fees and a sales person's salary, buying chemicals for the R&D laboratory).
Common groupings of operating expense are: Sales & Marketing expenses, Research & Development ("R&D") expenses, General & Administrative ("G&A") expenses.

Income from operations = gross margin - Operating expenses

Net Interest Income e.g. paying interest on a loan, or receiving interest on cash balances in the company's bank account.

Net Income = Income from operations + Net interest income - Income taxes
Income or (Loss) = sales - (cost + expenses)
If sales exceed costs plus expenses, the business has earned a profit.
If costs plus expenses exceed sales, then a loss has occurred.

3.3. Balance Sheet

Is a snapshot, representing the state of a company's finances (what it owns and owes) on one particular day, an instant in time. The Balance Sheet includes:

- **Assets**: what the enterprise has (at a specific moment)
- **Liabilities**: how much the enterprise owes (at a specific moment)
- **Equity**: what the enterprise is worth (at a specific moment)

Balance sheet
as of a specific date

	ASSETS			LIABILITIES & EQUITY	
A	CASH	Current Assets	Liabilities	ACCOUNTS PAYABLE	K
B	ACCOUNTS RECEIVABLE			ACCRUED EXPENSES	L
C	INVENTORIES			CURRENT PORTION OF DEBT	M
D	PREPAID EXPENSES			INCOME TAXES PAYABLE	N
A + B + C + D = E	CURRENT ASSETS			CURRENT LIABILITIES	K + L + M + N = O
F	OTHER ASSETS	Non-current Assets		LONG-TERM DEBT	P
G	FIXED ASSETS AT COST		Equity	CAPITAL STOCK	Q
H	ACCUMULATED DEPRECIATION			RETAINED EARNINGS	R
G - H = I	NET FIXED ASSETS			SHAREHOLDER'S EQUITY	Q + R = S
E + F + I = J	**TOTAL ASSETS**		=	**TOTAL LIABILITIES & EQUITY**	O + P + S = T

Basic Equation of Accounting: $\text{Assets} - \text{Liabilities} = \text{Worth}$

Assets – **Liabilities** = **Worth**
"have" *"owe"* *"value to owners"*

Assets = **Liabilities** + **Worth**
"have" *"owe"* *"value to owners"*

Must always be "in balance".
Two entries are required to keep the equation in balance.
If you add an asset to the left side of the equation, you must also increase the right side by adding a liability or increasing worth.

3.3.1. Assets

Assets:

- **everything the company has got** (cash in the bank, inventory, machines, buildings, etc.).
- **Rights** the company owns that have a monetary value

Are grouped for presentation on the Balance Sheet according to their characteristics:

- **very liquid assets:** cash and securities
- **less liquid assets:** accounts receivable and inventory
- **productive assets:** plant and machinery

Are displayed in the asset section of the Balance Sheet in the descending order of liquidity.

Balance Sheet

as of this Transaction 0

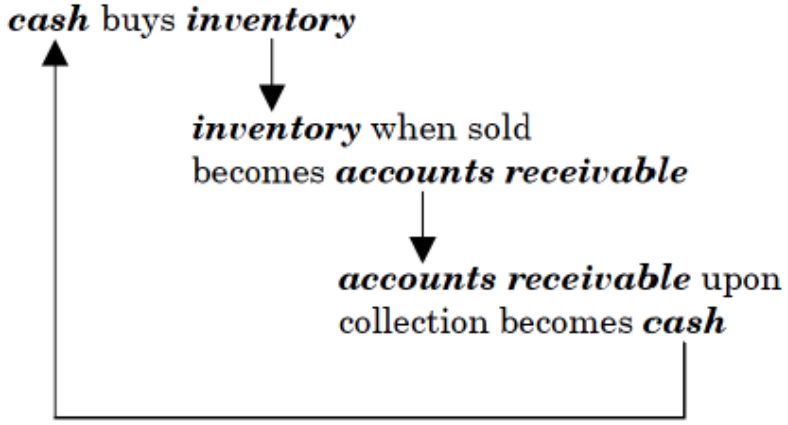
	CURRENT ASSETS
A	CASH
B	ACCOUNTS RECEIVABLE
C	INVENTORIES
D	PREPAID EXPENSES
A + B + C + D = E	**CURRENT ASSETS**
	NON-CURRENT ASSETS
F	OTHER ASSETS
G	FIXED ASSETS AT COST
H	ACCUMULATED DEPRECIATION
G - H = I	**NET FIXED ASSETS**
E + F + I = J	**TOTAL ASSETS**

most liquid ↓ *least liquid*

Current assets: assets that are expected to be converted into cash in less than 12 months.
Are listed in order of liquidity with the most easy to convert into cash listed first:

- **Cash:** e.g. on-demand deposits in a bank, money in the cash drawer.
  When you write a check to pay a bill, you are taking money out of cash assets.
- **Accounts Receivable:** credits. When the enterprise ships a product to a customer on credit (not yet paid), the enterprise acquires a right to collect money from that customer at a specified time in the future. These collection rights are totaled and reported as accounts receivable. Most business between companies is done on credit: customers are commonly given payment terms that allow 30 or 60 days to pay.
- **Inventories:** finished products ready for sale and also materials to be made into products.
  - **Raw material inventory** is unprocessed materials that will be used in manufacturing products.
  - **Work-in-process inventory** is partially finished products in the process of being manufactured.
  - **Finished goods inventory** is completed products ready for shipment to customers
- **Prepaid Expenses:** bills the company has already paid, but for services not yet received (e.g. prepaid insurance premiums, prepayment of rent, deposits paid to the telephone company, salary advances).
  They are current assets not because they can be turned into cash, but because the enterprise will not have to use cash to pay them in the near future. They have been paid already.

Current Assets Cycle: As finished goods inventory is sold it becomes an accounts receivable and then cash when the customer pays. The money the company will use to pay its bills in the near term (within the year) will come when its current assets are converted into cash (that is, inventory is sold and accounts receivable are then paid to the company by customers).



Non-current assets: assets that are not converted into cash during the normal course of business.

- **Fixed assets:** productive assets not intended for sale. (land, buildings, machinery, equipment, furniture, automobiles, trucks, etc.) also called Property, Plant and Equipment, or **PP&E.** They will be used over and over again to manufacture the product.
  Generally reported on the Balance Sheet at original purchased price (**Fixed assets at cost**).
- **Net fixed assets = Fixed assets at cost - accumulated depreciation**
  - **Depreciation:** is the decrease in the value of assets and the method used to reallocate, or "write down" the cost of a tangible asset (such as equipment) over its useful life span.
  - **Depreciation** (on the Income Statement): accounting convention reporting the decline in useful value of a fixed asset due to wear and tear from use and the passage of time.
    "Depreciating" an asset means spreading the cost to acquire the asset over the asset's whole useful life.
    Depreciation charges taken in a period do lower profits for the period, but do not lower cash. Cash was required to purchase the fixed asset originally.
  - **Accumulated depreciation** (on the **Balance Sheet**). Is the sum of all the depreciation charges taken since the asset was first acquired.

Other assets: catchall category that cannot be properly classified into current asset or fixed asset categories. (Intangible assets, that are things owned by the company that have value but are not tangible (that is, not physical property) in nature e.g. **patents**, **copyright**, brand names.)

Total Assets: everything you've got and certain rights you own that have a monetary value.

3.3.2. Liabilities + Equity

	LIABILITIES
K	ACCOUNTS PAYABLE
L	ACCRUED EXPENSES
M	CURRENT PORTION OF DEBT
N	INCOME TAXES PAYABLE
K + L + M + N = O	CURRENT LIABILITIES
E - O = X	WORKING CAPITAL
P	LONG-TERM DEBT
O + P = Y	TOTAL LIABILITIES
	EQUITY
Q	CAPITAL STOCK
R	RETAINED EARNINGS
Q + R = S	**SHAREHOLDERS' EQUITY**
O + P + S = T	**TOTAL LIABILITIES & EQUITY**

Liabilities: economic obligations of the enterprise, such as money that the corporation owes to lenders, suppliers, employees, etc.
Current Liabilities: bills that **must be paid within one year** of the date of the Balance Sheet.
The cash generated from current assets is used to pay current liabilities as they become due.
Are grouped depending on to whom the debt is owed:

- **Accounts payable:** owed to suppliers for materials, equipment or services bought on credit.
- **Accrued expenses:** owed to employees and others for services. (**salaries** earned by employees but not yet paid to them, **lawyers'** bills not yet paid, interest due but not yet paid on **bank debt**)
- **Current portion of debt** owed to lenders. e.g. loan from bank that must be repaid in less than 12 months and the current portion of long-term debt.
- **Income taxes payable:** owed to the government, that the company has not yet paid. Every time the company sells something and makes a profit on the sale, a percentage of the profit will be owed the government as income taxes. For the time between when the profit was made and the time when the taxes are actually paid, the company will show the amount to be paid as income taxes payable.

Working capital: amount of money the enterprise has to "work with" in the short-term.
With lots of working capital it will be easy to pay current financial obligations i.e. bills that come due in the next 12 months.
Net Working Capital (net current assets) = Current Assets – Current Liabilities

Long-term debt: any loan to the company to be repaid more than 12 months after the date of the Balance Sheet (e.g. mortgages for land and buildings and mortgages for machinery and equipment).

Total liabilities = Current Liabilities + Long Term Debt

Shareholders' Equity (net worth) = Total Assets - Total Liabilities

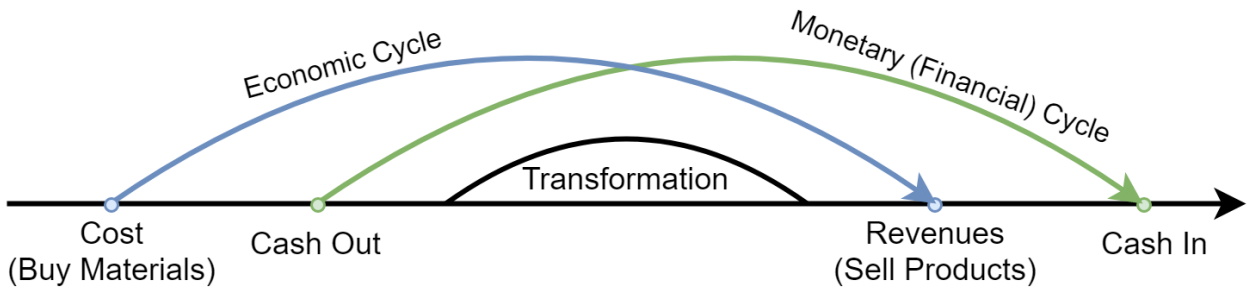
- **Capital stock**: original amount of money the owners contributed as their investment in the stock of the company plus any add-on money invested in the business by his shareholders.
    - **common stock** is the regular "denomination of ownership" for all corporations.
    - **preferred stock**: have certain contractual rights or "preferences" over the common stock. These rights may include a specified dividend and/or a preference over common stock to receive company assets if the company is liquidated.
- **Retained earnings = sum of all profits - sum of all dividends.** Are all the profits of the company that have been retained, that is, not paid out as dividends to the shareholders.
  Can be viewed as a "pool" of money from which future dividends could be paid.
  Dividends cannot be paid to shareholders unless sufficient retained earnings are on the Balance Sheet to cover the total amount of the dividend checks.
  If the company has not made a profit but rather has sustained losses, it has "negative retained earnings" that are called its accumulated deficit.

Shareholders' equity: is the company's value to its owners.
= investment made in the stock of the company + any profits (less any losses) - dividends that have been paid to shareholders.
The value of shareholders' equity increases when the company:

- makes a profit, thereby increasing retained earnings
- sells new stock to investors, thereby increasing capital stock.

The value of shareholders' equity decreases when the company:

- has a loss, thereby lowering retained earnings
- pays dividends to shareholders, thereby lowering retained earnings.



Economic cycle: Income Statement
Monetary cycle (Pure financial): Balance Sheet

Every time we write in 1 section we write also in at least 1 other section.
There are operations that involve only the balance sheet.
But there are no operations that involve only the income statements.

Questions for the Oral Exam

Va in ordine alfabetico, non di registrazione.
Mostrare il Badge/ID.
Vi fa condividere lo schermo per evitare che imbrogliate.
Fa 3 domande: una innovation, una entrepreneurship e una finance.
Se sapete bene le cose (cosa vuole sentirsi dire) rispondete in 2-4 minuti a domanda. Sennò vi aiuta cercando di farvici arrivare.
In media dura 15 min.

INNOVATION:

- Definizione di innovazione, Differenza tra innovazione ed invenzione
- Incremental vs Radical Innovation.
- Matrice dell'innovazione per il cliente e Matrice dell'innvoazione per l'azienda
- Descrivi la curva a S della tecnologia.
- Cos'è la discontinuità tecnologica.
- Definizione di Dominant Design.
- Cos'è il crossing the chasm: da early adopters ad early majority. Con percentuali.
- Motivi per cui la Kodak non è riuscita ad essere leader delle fotocamere digitali nonostante le hanno create loro. (Hanno capito il potenziale ma redditività all'inizio era bassa e crossing the chasm problem)
- User behavioral change
- Cos'è il design thinking, come funziona.
- Product concept e fallimenti
- Intellectual property right: cos'è cosa vuol dire. (Trademark, copyright,…)
- Definizione di brevetto.
- Tipi di brevetto: utility, design plant
- Perché il brevetto è un negative right
- Quali sono i requisiti per chiedere un brevetto.
- Perché bisogna descrivere un brevetto
- PCT cos'è, cosa significa, cosa comporta.

ENTERPRENEURSHIP:

- Differenza tra imprenditore e manager
- Che differenza c'è tra Startup e Piccola/media impresa.
- Cosa sono gli information goods.
- Cos'è il Network Effect e come si crea.
- Come è organizzato il business model di Ikea.
- Come è organizzato il business model di Zara
- Come è organizzato il business model di blockbuster.
- Come è organizzato il business model di Netflix.
- Come è organizzato il business model di iTunes-iPod.
- Come è organizzato il business model di ZipCar.
- Come è organizzato il business model di Ryaner. (Argomento non fatto nel 2020)
- Come è organizzato il business model di Google Glass. (Intenzioni di google e perchè ha fallito)

- Differenza tra Angel investor e VC
- Come funziona un VC (limited/general partners, management fees,...)
- Tipi di finanziamento per una startup
- Cos'è un progetto e in cosa differisce dalle operazioni. (Argomento non fatto nel 2020)

FINANCE:

- Differenza tra costi fissi e costi variabili.
- Strategie di Prezzo: Quali fattori si prendono in considerazione per la scelta del prezzo di un prodotto?
- Cosa dice la curva della domanda e come la possiamo utilizzare. (Cambio idi prezzo cambia la domanda, PED elastico, inelastico)
- Margine di contribuzione.
- Come è strutturato il conto economico, e cosa ci dice.
- Qual è l'informazione più importante nel CE? Net income, che viene messo nel retained earnings dello stato patrimoniale (equity)
- Come è strutturato lo stato patrimoniale, e cosa ci dice.
- Cos'è il Break even.
- Che differenza c'è tra Account Receivable e Payable, dove si trovano nello stato patrimoniale, perchè sono in relazione tra di loro? (Problema di liquidità sul breve termine)
- Current assets vs current liabilities. Perchè si chiamano "current".
- Shareholder equity: dove si trovano e cosa significano
- Quali voci sono in comune tra CE e SP? la più importante? (Net income->Retained eranigs è la più importante perchè genera o fa perdere valore agli owners, tasse, ammortamento)
- Cos'è e come funziona l'ammortamento, in quali voci di bilancio si inserisce. (CE: non comulativo, SP: comulativo,…)