

Start-up in ICT Simple (for real)



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Table of Contents

[2 Lesson 1 – Introduction to the course 3](#_Toc161303336)

[3 Lesson 2 – Basics: Entrepreneurs 5](#_Toc161303337)

[4 Lesson 3 – Basics: J-curve, RL, Startups 8](#_Toc161303338)

[5 Lesson 4 – Problems and Solutions 12](#_Toc161303339)

[6 Lesson 5 – Problems and Solutions 2 18](#_Toc161303340)

[7 Lesson 6 – Scaling Up 19](#_Toc161303341)

[8 Lesson 7 – Scaling Up 2 20](#_Toc161303342)

[9 Lesson 8 – Business Modeling – BMC 21](#_Toc161303343)

[10 Lesson 9 – Business Modeling – LC 22](#_Toc161303344)

[11 Lesson 10 – Pipes and Platforms 23](#_Toc161303345)

[12 Lesson 11 – Platforms continued 24](#_Toc161303346)

[13 Lesson 12 – Startup Equity Management 25](#_Toc161303347)

[14 Lesson 13 – Funding 26](#_Toc161303348)

[15 Guest 1 27](#_Toc161303349)

[16 Laboratory – The Pitch 28](#_Toc161303350)

[17 Sample Questions 29](#_Toc161303351)

**Disclaimer**

# Lesson 1 – Introduction to the course

The creators of tomorrow are between us; investing in young people bring startups, looking out for problems and then solving them in a new way. There can be *innovation vectors*, which are technologies improving the society and bringing new solutions. For example, there are:

1. IoT and beyond
2. Blockchain
3. Neural Networks/AI
4. Simulation / Digital Twins

These will be presented by startups themselves, talking about experiences and how to do money with them. Building a startup means finding a fit between *having big problems with stupid solutions*, becoming wrapped in a product then solved via the means of a company. There are many methodologies to do that; we don’t care about those, we go out finding problems.

Theory lessons are held via talking, then laboratories are made with the idea of meeting new people (*and going outside of the building*, as you will hear many times during the course). We will have to present ourselves in front of the class then gathering idea of general problems to solve, betting on the best ones. Groups will be made by 3 people for the projects.

Consider the example of university, which is made up of *Three Missions*:

1. High education / Teaching
2. Scientific research
3. Bringing innovation/outcomes of research to the masses/market 🡪 Progress

Technically: “share culture, knowledge and transfer results of research outside of University, contributing to overall social growth and cultural path”. In a word: *progress*. We’re actors bringing this to the society itself (so called “third mission”).

Immagine che contiene testo, schermata, diagramma, Carattere

Descrizione generata automaticamenteConsider the problem Amazon solves: bringing convenience to customers, even with the burden of higher prices, but with buying as fast as possible, with less clicks/taps as possible. There is an example of a startup building around services like Amazon to help local shops buying/purchasing stuff in as less clicks as possible.

A start-up is the innovation vector allowing to bring progress to the society and many big companies are doing this, e.g., Microsoft/Intel. There are different means of research (consider the comparison university vs startup):

* *fundamental research*, done with laboratories, papers, experiments
* *applied research*, crafting Proof of Concepts and demos to test the market
* *market uptake*, seeing what will happen in the market

Immagine che contiene Carattere, testo, schermata, linea

Descrizione generata automaticamenteThe above *research/innovation loop* tries to describe the connection between university and start-up, considering the figure above.

The switch between university and startup is us. The best way to transfer knowledge to the market is a *brain with a motivation* (know-how/IP/tech transfer). There will not be anybody else doing this: a driving force keeping you awake and motivated. Just do it: this is the fastest and most effective way possible. To drive change, we want to be uncomfortable, and drive change new ways.

There is direct interaction with the professor:

* Subscribe to his WhatsApp Group (all communications will be given there) – top priority
  + group changes every year and it’s displayed via QR code within first slides of course
* Send him private WhatsApp messages whenever you need info / help on anything
  + he will reply asap
* Send him emails at [fabio.dalessi@unipd.it](mailto:fabio.dalessi@unipd.it) – lower priority
* Setup a one-on-one meeting: contact him by WhatsApp

The exam is composed of two parts:

* Theory: Written exam (with math also, but not that difficult) – 0 to 30
  + 30 questions yes/no
  + 50% of the final mark
  + for particular reasons: can be oral (3 questions with the professor)
    - happens 5% of cases
* Group work (startup) – 0 - 30
  + 50% of the mark
  + Result of a job done during the course
  + Teams – Pitch (done within investors) – Interviews with real people
    - The interviews part depends on the problem to solve

These will be summed and then divided by 2 rounded by excess.

# Lesson 2 – Basics: Entrepreneurs

Startups are not about lectures and entrepreneurship is not about grades. This is reality: nobody teaches what to do and how. Do it your own way, just like happens in life. *Go outside and discover*.

* We will not use a reference textbook
* Our course is about learning how to act “Outside the Building”
  + and where to focus in building our startup
* A good reference for the course contents: SteveBlank.com

Consider MIT = Center of Technology Engineering:

* they have 10000 students and 6000 of them are PhD
* 25% of them founded a startup
  + Consider UniPD: 63000 and only 6% of students are PhD
* In Italy a PhD is thought to be only about teaching; in USA, it’s useful to open a company

Some data about them:

* MIT Alumni launched
  + 30.200 companies
  + that employ 4.3 mln people
  + and generate revenues for 1.9 trillion US $ per year
    - these are higher than states themselves
* Innovation comes from unknown people in unknown places
* Some data about MIT Impact on Economy
  + 11% of the Alumni who graduated from the 2010 decade launched a company compared to 8% of the previous decades
  + the median age of the alumni launching a company has been steadily declining and in the 2010 decade dropped to 27 from 30 years old of the previous decade
  + 80% of the companies launched by the alumni survived for more than 5 years

The Italian problem is simple: static mentality and will to avoid change. Students are more understood as resources in other states (e.g. USA). Movement is a constant and dynamism is what is needed in order to improve and make a change. Our problem is the “sofa effect”: getting the habit of being in the comfort zone and avoid changing. In entrepreneurship, we definitely want to avoid that.

Overtime, in MIT:

* companies have increased in number over decades
* participation rate have been increasing overtime
* serial entrepreneurs have increased in number and companies
* median ages have been decreasing slowly

We define entrepreneurs means taking the risk of what nobody has done before, meaning doing something new or was never tried before.

* It can be “any person who doesn’t know how will come out, taking a risk”
* That brings *progress*
  + Means believing in people and resources enough to bring new things

Some more textbook-like definitions:

* “entrepreneurs are individuals who exploit market opportunity through technical and/or organizational innovation” – Schumpeter (1965)
* “entrepreneurship is about taking risk” – Drucker (1970)
* “an entrepreneur is a person who habitually creates and innovates to build something of recognized value around perceived opportunities” – Bolton and Thompson (2000)
* “an entrepreneur is a person who sets up a business or businesses, taking on financial risks in the hope of profit” – Dictionary
* “Entrepreneurship is the creation or extraction of value; [...] entrepreneurship is viewed as *change*, generally entailing risk beyond what is normally encountered in starting a business, which may include *other values* than simply economic ones” – Wikipedia
* “Entrepreneur is “a Hero”... one that accepts risks to pursue a bigger value, often “destroying” what is known” – prof. definition

Money is a measure of how much value it’s actually created: it can be cultural, social, mental, economic, etc. Progress is a consequence of a few: only 4% survive while others 96% die badly.

Where to start then? Consider the Monomyth theory (also called “hero’s journey”)– the stories of religion, movies, adventures always revolve around a hero who goes on an adventure, is victorious in a decisive crisis and comes home changed and transformed.

This theory comes from Joseph Campbell from “The Hero with a Thousand Faces” and was used by him to compare religions.

It works this way:

* In the *departure* part of the narrative, the hero or protagonist lives in the ordinary world and receives a call to go on an adventure
  + The hero is reluctant to follow the call but is helped by a mentor figure
* The initiation section begins with the hero then traversing the threshold to an unknown or "special world", where he faces tasks or trials, either alone or with the assistance of helpers
  + The hero eventually reaches "the innermost cave" or the central crisis of his adventure,
  + He must undergo "the ordeal" where he overcomes the main obstacle or enemy, undergoing "apotheosis" and gaining his reward (a treasure or "elixir")
* In the return section, the hero must return to the ordinary world with his reward
  + He may be pursued by the guardians of the special world, or he may be reluctant to return and may be rescued or forced to return by intervention from the outside.
  + The hero again traverses the threshold between the worlds, returning to the ordinary world with the treasure or elixir he gained
  + The hero himself is transformed by the adventure and gains wisdom or spiritual power over both worlds

The hero will come to a point in which the known and the unknown come to a *threshold*. When you go across from this border you go to the unknown. All of sudden you die, or you are going to die: this point is the *abyss*, where transformation occurs after the realization of change, getting to what he wants.

Immagine che contiene testo, cerchio, schermata, diagramma

Descrizione generata automaticamenteImmagine che contiene testo, diagramma, linea, Carattere

Descrizione generata automaticamenteAll of us have common principles and common ideas which drive the actions of human beings when studies psychologically (Jungian analysis), compared to the previous one:

Linking Jung with the previous concept, we might briefly characterize the following:

* *Idea*: The initial spark of inspiration or realization, often arising from the unconscious mind
* *Movement*: The active pursuit or exploration of the idea, which involves engaging with it consciously
* *Encounter*: Confrontation with the unknown or shadow aspects of the self, representing challenges and obstacles
* *Revision*: Integration and transformation resulting from the encounter, leading to personal growth and understanding

Trying and insisting continuously is what actually drives us towards goals: consider gold miners in California. That is the place where most of innovation and startups are present, because there is the most risk-taking mindset there.

# Lesson 3 – Basics: J-curve, RL, Startups

Running a start-up is like a love story: you have no defined bounds and no guidance.

Consider a plot with time on and cumulative profit/loss on .

* The curve starts going low (spending is immediate – customers are not there yet), then every month money is spent, going steadily down
* At one point customers increase and there is a curve steadily going up
* Consider all moments
  + : incorporation/kickoff
  + : first customers and expenses
  + : costs=revenues
  + : breakeven point 🡪 from that point, things get good
* The curve has a j-shape, so it’s called j-curve
  + It basically reflects a phenomenon in which a period of unfavorable returns is followed by a period of gradual recovery that rises to a higher point than the starting point
  + Put bluntly, it shows that things are going to get worse before they get better

Immagine che contiene testo, lavagna, calligrafia, gesso

Descrizione generata automaticamente

In that particular graph, there is a point called VOD (Valley of Death), in which failure is reached. The curve can be considered good because we don’t know exactly where we are (how steep is it – don’t know the parameters). This business model is more of a “find a way” rather than being immediately profitable – find the right model and secure alignment according to phases and stakeholders.

Immagine che contiene lavagna, calligrafia, gesso, testo

Descrizione generata automaticamente

Immagine che contiene calligrafia, testo, lavagna, gesso

Descrizione generata automaticamenteThe curve might be actually steeper than that because we don’t know what comes next, going day by day. We are just looking at the trend (j-curve), decreasing and increasing.

* We know how things should be, not how they precisely are
* It’s a leap of faith: you don’t know where you are going, you just keep going and having trust in goals to reach (even in uncertainty – “fog” times

Immagine che contiene diagramma, linea, testo, Piano

Descrizione generata automaticamenteMore precisely, the curve is like the following. Like start-ups, consider the people who fail: they have more experience and even in *valley of death* – fail, fail and try again, learning from mistakes.

Immagine che contiene testo, linea, diagramma, Diagramma

Descrizione generata automaticamenteImmagine che contiene testo, diagramma, schermata, linea

Descrizione generata automaticamenteThe j-curve considers the development curve, compared against product maturity. We could consider a j-curve talking about funding. Consider other examples of j-curves:

When there is failure, we don’t have to give back all the money. This is because it’s called risk investment, so you expect the risk to be there. Consider the case of banks: they give you money in order to buy something, say an house.

* Even if you lose, there will be return of investment (ROI)
  + if you lose 100000, you will have to give 110000 back
* Investors already account for failures
  + but even with a small share, return will be great if it will happen
* The rate of failures of startups is 95% on average
* It’s the same case with family: you find one girl/boy and you grow up a family with them
* If you lose all the money, the company fails, not you

There can be different kinds of companies say in Italy with different responsibilities (written just to consider the effects of failure, not strictly asked) – ones with joint ventures/obligations for obligations, other with limited shares, others with shareholders and jurisdictions, etc.

Immagine che contiene testo, diagramma, linea, Diagramma

Descrizione generata automaticamenteWhenever there is failure, we have no definite choice. The market simply destroys without no precise reasons. In a company, there are different responsibilities and who directs has bigger ones, in order to make the company to go well (but an owner has no responsibilities – you decide if you want to put money or not). Shares allow to get pieces of the company and it’s useful until you have customers, otherwise it wouldn’t work.

Additional information on the typical venture path can be added by looking at the Sales and Business Development stage.

This brings us to a very important concept: in a startup, technical & product maturity, interest for investors and business model maturity are intrinsically linked.

Immagine che contiene testo, schermata, Carattere, numero

Descrizione generata automaticamenteThere needs to be a specific unit of measurement: with euros it’s easy but, quoting Lord Kelvin, “you cannot improve what you cannot measure”. You cannot trust specifically start-uppers, because they will have their own perception, which might not be objective and real.

The specific unit of measure it’s TRL – Technology Readiness Level, which allows for estimating the maturity of technologies during the acquisition phase of a program in a consistent way.

* That is the most important one; more generally, there are different Readiness Levels, called RL indexes
* Derived from aerospace tech assessment methodologies at NASA
  + scales ranging from 1 (lowest) to 9 (highest)
  + describing the maturity of specific features

We discuss the single points more practically;

* We start from the bar idea (level 1)
* There needs to be a concept behind (level 2)
* There needs to be a demo in a form of a Proof of Concept (level 3)
* Real demos will come later (level 4)
* Validation happens with testing (level 5)
* It needs to be done inside a relevant environment (level 6)
* It will be demonstrated in an operational technological environment (level 7)
* It will be working on a full and complete system (level 8)
* This will be proven in a real operational environment (level 9)
  + Beta testing will be between 8 and 9

Other scales deal with Manufacturing, Investment, Integration in complex systems, etc. Investors will evaluate the success based on the deployment phases.

Immagine che contiene testo, linea, schermata, diagramma

Descrizione generata automaticamenteTRL is linked to Valley of Death, which represents the often neglected addressing of TRLs 4 through to 7, where neither academia nor the private sector prioritize investment.

# Lesson 4 – Problems and Solutions

We define what a startup is:

* a new company
* high risk
* new ideas
* based on technology
* small in dimension and employees
* *grow quickly*
* *repeatable model*
  + this is useful in order to make *industrialization*

More specifically, a startup is “a temporary organization used to *search* for a repeatable and scalable business model”, according to Steve Blank.

* They will never live forever – fast growth, extreme uncertainty, intrinsic innovation
* The real difference between a startup and a real company it’s what they do
  + Immagine che contiene testo, calligrafia, lavagna, gesso

    Descrizione generata automaticamenteThe first year they *search* things, they don’t do them

We can split the j-curve into three sections:

* searching
* validating
* scaling up

A startup is always inside the valley for death, dying and growing for finding a repeatable business model. More in general, they can be grouped into 6 categories:

1. *Designed to be scalable* (and to do it *quickly*)
   1. Scalable startups tend to group together in innovation clusters
      1. Silicon Valley, Shanghai, New York, Boston, Israel, etc.
   2. They make up a small percentage of the six types of startups, but because of the outsize returns, they attract all the risk capital (and press), with goal of expanding
   * Examples: Facebook/Tesla/TikTok/Amazon AWS /Airbnb/Uber/Netflix
     + made from the start to always improve and grow
     + tend to group together in innovation clusters
2. *Family business* (Small business)
   1. They work as hard as any other entrepreneur and hire local employees or family
   2. Most are barely profitable. Small business entrepreneurship is not designed for scale, the owners want to own their own business and “feed the family”
   3. Examples: home based food services, plumbing, restaurant, small niche markets
   4. Other example discussed: UNOX – build professional ovens
      1. goal of maintaining the family
3. *Lifestyle business* (also called Lifestyle venture)
   1. A business run by its founders primarily with the aim of sustaining a particular level of income and no more
      1. or to provide a foundation from which to enjoy a particular lifestyle
   2. A lifestyle business’s goal is *to provide a great quality of life to its owners*
      1. It's meant to be a business which adjusts to the lifestyle - so that the founder can live their life as they like – also, try to survive is a goal
      2. Typically with limited scalability
   3. e.g., Moderna – the ones with the vaccines, working in lab with very little money
      1. typical entrepreneur, with goal to make the most money
      2. the first to sell it as fast as possible and expands among existing businesses
      3. it requires time and infrastructure to do that on the market
4. *Startups designed to be sold quickly*
   1. Their goal is not to build a billion dollar business, but to be sold to a larger company
   2. The goal of the management is different than that of building a profitable business
   3. Examples: pharma, hi-tech, entertainment-related companies, software/game devs
5. *Social startups*
   1. Usually they are charitable initiatives, their goal is to make the world a better place, not to take market share or to create to wealth for the founders
   2. Expanding and offering things to the market receiving donations, sponsorships, etc.
   3. Saving people, dealing with diseases, handicaps, third/unindustrialized countries
   4. Profits are thanks to charities or donations
6. *Spin-off from existing companies* (Startup from large companies)
   1. Company generated from a very big one, generating as a small company
   2. There is a proposal to go away from big company, abandoning the wage and getting help from the main company
   3. The company could easily buy back the idea if the idea succeeds
   4. Changes in customer tastes, new technologies, legislation, new competitors, etc., can create pressure for more disruptive innovation
      1. requiring large companies to create entirely new products sold to new customers in new markets
   5. They are “transformational innovation projects” of large companies
   6. Some reasons
      1. failure 🡪 there is always the risk to do that
      2. branding 🡪 spoil the main brand with a product to not detach reputation
      3. speed and flexibility
   7. Main reasons
      1. *speed* 🡪 not dependant to the times of big companies for time and resources
         1. things are always done to not freeze practices
         2. works with processes and shares themselves
      2. *motivation* 🡪 you either die or succeed
         1. because of less resources and salaries

So, where do we start from?

* We can’t start a company without knowing what it does
  + We don’t start from only giving it a name, some code or whatever
* We look for problems to solve and bringing progress, achieving success
  + Find a niche and go there
  + Those are the problems that don’t make you sleep

As of now:

* next week (half of March) we will introduce ourselves – also, if you want, with already ideas of problems which can be solved
* the week next after, we’ll be introducing the problems we want to solve

What’s the *call to the adventure*?

* What kind of startup are you going to launch?
* What’s your *purpose*?
* What do you want to become?

We define the purpose as the following:

* What *change* do you want to bring about in the world
* What is the *reason* your organization exists
* Your purpose is the fundamental message that fires your people up
  + brings them to work for more than just a paycheck
  + and gives meaning to their efforts
* It is often the very idea that launches a company in the first place
  + sustaining and guiding it through the earliest stages
  + It’s not a technical idea, it’s a passion

*How are you going to make it?*

* What makes your approach *unique* and *recognizable*? What is your characteristic “way”, how will you bring about the change envisioned in your purpose?
  + To be immediately recognized as something new and different
* It’s inspired by your organization’s culture, strategy and "core values”
* Your first stakeholders will be your cofounders, family and friends

*What Is your impact going to be?*

* What impact will your business have on the lives of others and what the world will look like when you've accomplished your purpose?
* The impact statement should be more aspirational than the Purpose Statement – more of a stretch – because you may never quite get there, but it will keep people motivated and sustain the organization in its later stages of growth

The following are the three “magic words” for companies:

* *Vision*
  + Statement: describes, in a simple, immediate way, the major aspirations of an organization – what is hopes to achieve or become
  + E.g., Google with the vision of “giving access to knowledge for free”
    - Consider all the Google products: Maps, Gmail, Project Gutenberg (free books)
      * All easily accessible, powerful tools, completely for free
    - Information to merge and not to divide people
* *Mission* 
  + Statement: describes, in a simple, specific way, how the organization is going to achieve its Vision
    - Medias and infrastructure to get to know things
* *Values*
  + Statement: defines what the organization believes in and how people of the organization are going to act and behave. This can be defined as Code of Ethics.
  + The whole company is structured around this

Some examples about that:

* Google:
  + Vision: “Providing an important service to the world, instantly delivering relevant information on virtually any topic.”
  + Mission: “Organize the World’s information and make it universally accessible and useful.”
* Twitter:
  + Vision: “We believe in free expression and think every voice has the power to impact the world”.
  + Mission: “Reach the largest daily audience in the world by connecting everyone to their world via our information sharing and distribution platform products and be one of the top revenue generating Internet companies in the world.”

We define ideas may come from academic projects or industry experience or any other experience which may *spark* of a *need*.

* Not having “an application/a product doing X” – everybody does that
* But starting from “I feel there’s problem X to be solved”
  + Define the problem very well
* Ask people if they see the same problem as you and their opinion
  + Problem validation

Ideas are often associated to assumptions and assumptions are what make great ideas fragile or vulnerable. And, ideas, alone are “*worth nothing*”, putting the problem picture on the wall.

* Innovation is associated visually with a lamp, sparking an idea
* It’s wrong, this is just 50% of the idea to solve a problem
* The idea might work, but to make it become innovative it *needs to go into the market*
  + *Commercialization bring progress*
    - Not inside a laboratory but accessible to everybody

More specifically (Bill Aulet, professor at MIT):

Commercialization is often forgotten, and it is just as hard: it is a *research objective*, it *requires experimentation* and, if totally neglected, brings the whole Innovation equation to zero (“worth nothing”). To have a working idea, talk to everybody and find interest; nobody cares anyway.

* There is the novelty factor, which bring progress
* “Be sure that there’ is a market that wants your product. Before you build it.”
  + Lean Manifesto – Founder Mantra

Companies start from a *problem worth solving*:

* “the product is the final destination of a path, it’s never the starting point ... nail down the inner motivational factors, somebody’s pain points identification is the beginning”
  + Steve Blank
* the search of problem/product/solution

The following are the concepts to keep:

* Possible intuition of a need
* *Problem / Solution Fit* 
  + Go with a problem
  + Demonstrate it
* *Market / Product Fit*

Immagine che contiene testo, schermata, Carattere, Policromia

Descrizione generata automaticamenteThe lowest problem is present in Maslow’s Pyramid/hierarchy of needs, the better it is:

As a humanist, Maslow believed that people have an inborn desire to be self-actualized, that is, to be all they can be. To achieve this ultimate goal, however, a number of more basic needs must be met. This includes the need for food, safety, love, and self-esteem. Maslow believed that these needs are similar to instincts and play a major role in motivating behavior.

* We never care for the needs unless it’s something affecting our basic ones – psychological
  + Find the big problems which can affect your life
  + Facebook had the success it had because it was working on basic psychological needs
* There are all the other needs to have love/company/esteem and self-realizing goals
  + Financial security, health/wellness/safety, friendships, social/community groups
* Going up in the pyramid means lesser amount of money/value and progress
* The Covid vaccine was on the lowest level (red)

(Before the next theory lesson: notes on students presentation)

Basically, everyone in rows is selected and is not forced to speak, you can say whatever you want, just to have you presented in front of everybody and say your passions, your goals, even reasons why you follow the course, again, improvise or prepare a speech, it will be very easy and the professor, yet again, will make you feel very comfortable in any case.

People who will not be able to talk will present themselves the next lesson, in a very pleasing and welcoming way.

# Lesson 5 – Problems and Solutions 2

# Lesson 6 – Scaling Up

# Lesson 7 – Scaling Up 2

# Lesson 8 – Business Modeling – BMC

# Lesson 9 – Business Modeling – LC

# Lesson 10 – Pipes and Platforms

# Lesson 11 – Platforms continued

# Lesson 12 – Startup Equity Management

# Lesson 13 – Funding

# Guest 1

# Laboratory – The Pitch

# Sample Questions