Business Innovation Strategy

How to create, implement and manage strategy and an innovation department in organizations

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Index

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ABOUT

Research question

How to create, implement and manage strategy and an Innovation Department in organizations

Research hypothesis

A practical guide on how to create, implement and manage an Innovation Strategy and Management within organizations allows the establishment and promotion of innovation as a fundamental pillar in business strategy, while facilitating the competitiveness of companies in this digital world globalized.

Research justification

Hard times, they all say. And in fact, I agree. Two major crises in the last two decades have complicated lives, businesses and economy. All sectors are affected such as health, culture, industry and many others: the global economy and society have been harmed so now, more than ever, we have the need to be very competitive with innovative solutions.

It is obvious that globalization brings benefits, but it also expands the problems of the region to the whole world. Everything is connected, for better and for worse, it is the dark side of globalization.

By taking a step back and looking at the world in perspective, we can see the importance of digitization in our lives. It does not matter if you are a government, company, institution, organization or citizen, internet connectivity has changed the world of business, the economy and how we relate to each other. It is extremely important to have digital policies that allow, regulate, transmit and impact the digital society in an immersive and protective key, serving in turn as a lever for the transformation of territories for the new digital era.

One of the biggest challenges is to bring innovation to everyone equally, it is necessary to avoid the digital gap between social classes. Not only the rich should have access to the latest technologies, because this would aggravate social differentiation. We need accessible innovation: for companies, to compete equally; for the population, to enjoy the products.

But first, companies must focus on investing in innovation. But what are the reasons why many companies don't?

- Companies do not know exactly what innovation is and how important it is.
- They associate bad meanings with innovation (e.g., play, experiments, waste time, throw money).
- Companies need short-term results. They are under pressure from the binomial of royalties and shareholders.
- Usually, CEOs are not in the same company for a long term, so they seek the best possible balance between their OPEX / CAPEX during their tenure.
- Especially in crisis, companies already have enough problems to pay their payroll each month to think about investments.

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- They definitely don't have a clear step-by-step innovation guide.

With the goal of helping companies become more competitive in this global and digital world, I have designed a guide for organizations to create an innovation strategy for their businesses. The guide shows the steps that need to be taken to implement an Innovation Strategy and Department, how to implement it and how to manage it.

A brief and direct guide would help introduce the culture of innovation into the day-to-day running of organizations, facilitating their competitiveness and helping them on their digital transformation roadmap. A business-oriented applied innovation but with responsibility and fundamental values.

Objective, methodology and scope

Objective.

The aim is to define a practical model for the creation, implementation and management of innovation as a fundamental pillar of business strategy, all transmitted through an innovation department.

Methodology.

Initially I have used my own professional experience as I have worked in innovation with different roles (engineer, consultant, manager and director) and from three different environments where I have created three innovation departments. It has allowed me to see what works and what doesn't, what are the motivations, the levers, the ecosystem, the opportunities, etc. These three environments of expertise are:

- From the point of view of IBEX35 international company.
  - There I was the "Corporate Innovation & IT Planning Global Manager".
- From the point of view of an international IT services provider company.
  - National IT Director (CSO).
- And from the point of view of a Research and Innovation Center.
  - Director of Digital Innovation.

However, I have complemented the Master Thesis with information based on innovation strategies and processes from specialized books, also taking reference information on the main websites of innovation, emerging technologies, etc., and in research publications (articles, magazines, etc.).

Scope.

This Master Thesis (MT) has a specific application framework basically due to the time limit of a MT (one semester only), and is based on the hypothetical case that an innovation department is created in a new company belonging to an international group.

What points are out of scope due to time constraints?

- General guide:
  - It is very complicate to create a universal innovation guide for all companies because depending on the type of company, or

sector where it operates, we will find differentiation in its way of facing innovation (for example, it is not the same to manage innovation in a startup, or introduce the concept of innovation to a SME or an Enterprise, especially if the company already has an old structure). It is also very different how to manage innovation in the public or private sector.

- Other real use cases analyzed:
  - o At the same time, I consider that it should be very interesting to complement this document with information related to other real use cases (both successful and those that have not given the expected results in order to draw conclusions), especially analyzing the competence.

Therefore, due to these limitations, perhaps I could continue this project in an in-depth study like a doctorate that includes all the points out of scope here and more.

About the author

I am a Computer Science Engineer (UOC), Executive MBA in Innovation and Entrepreneurship (UOC), Master in Innovation and Digital Transformation *(after this thesis)(UOC)*, Postgraduate in Advanced Communications Systems (ICT) and Technical Engineer in Management Computer Science (UPC).

I have been Corporate Global Manager of Innovation and Strategic Planning in multinational company of IBEX35; National IT Director in a multinational IT Services; and Director of Digital Innovation Management Office in a Research Center, responsible for the design of Innovation Solutions, the management of Innovation Projects and the management of Digital Ecosystems.

Currently, I am the Director of Innovation and Business Strategy for a company that belongs to a large International IT Services Group.

All these experiences have allowed me to know the innovation processes from different points of view, always understanding that business without innovation makes no sense, and vice versa.

ABSTRACT

Labels: #Innovation, #Strategy, #Business, #Technologies, #competitiveness

This Master's Thesis has two main parts: first, it contains definitions, general steps or classifications mainly in innovation and digital transformation. All the points discussed are a collection of knowledge, experience and information supported by books, research publications or specialized websites. Here we will discuss the main reasons why companies distrust investing in innovation, why it should be a pillar in business strategy, how to implement a strategy, what is the digital revolution we are experiencing or the key points for companies to innovate. In addition, we will reflect on the paradox of innovation, how companies can find sources of financing for innovation, how to promote it through laboratories and how to work with new and emerging technologies.

With all these definitions and concepts, together we will embark on a journey in guide format on how to create an innovation strategy, considering questions and discovering answers in this step-by-step journey.

Once all the points have been addressed and the GAPs identified, we will enter the last block to define the strategies of the objectives and their lines of action in this simulated case.

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1. PART ONE – GENERAL CONTEXT AND BASIC REFLECTIONS

1.1. Business Strategy

1.1.1. Fundamental strategic elements

We live in a very changing environment where economic borders between countries are disappearing. Businesses develop in an environment of uncertainty and high complexity due to a multitude of elements and circumstances, both external (competitors) and internal (stakeholder interests).

To ensure its continuity and respond to the challenges of the environment by making the company more competitive, it is essential to develop a business strategy where all the pieces that make up a company must fit together in the most appropriate way. For this, three fundamental strategic elements are necessary: analysis, formulation and implementation.

- **Strategic analysis** defines the future direction of the company. It performs a diagnosis of the environment to discover its opportunities and threats, and an internal diagnosis to find its strengths and weaknesses through the identification and evaluation of its resources and capacities.

- The **formulation** deals with the design of possible strategies at different levels that allow achieving the objectives set, adapting them to each sector in which the company operates (restructuring, mergers, internalization, etc.). Management faces challenges that require strategic leadership, as in many cases a cultural change is necessary.

- For a correct **implementation** of the strategy, a planning, control and information systems are necessary.

These three elements are associated to strategic (for the growth mission), tactical (for execution), and governance (operational, at the project level).

1.1.2. What is strategy?

The **strategy** is the way to link the company with the environment, therefore, it represents the actions it undertakes to respond to the challenges that arise. These actions are aimed at improving the performance of the company to better serve its stakeholders.

There are four important concepts that will help to plan the strategy:

- The environment presents both **opportunities** and **threats** for the company. Opportunities are environmental variables that promote business activity and success, and threats are environmental factors that hinder or jeopardize performance improvement.

- The **strengths** are the aspects in which the company is very competent, and the **weaknesses** are the aspects in which the company has deficiencies or difficulties.

Based on this analysis, the strategy represents the actions that the company takes to improve performance. It can be analyzed at three different levels: corporate or company; the competitive or business and the functional.

The key is to achieve a sustainable competitive advantage over time, which is created and maintained mainly through the correct management of resources and capacities. The advantage is reflected in the improvement of profitability or in the creation of more value than the competitors. Especially when the sector suffers a crisis is an opportunity to get ahead of the competition developing new products and services.

All business uses **The Business Model** (TBM) that describes what the company offers to its customers, how it reaches them, how it engages with them and, most importantly, how the company makes money.

To verify TBM reliability it is necessary to answer several questions in each of the points on the canvas, for example:

- Value proposition: What are the needs of our clients that we satisfy? Can the competition improve our offer in terms of prices and / or quality?
- Customer segment: Who are our customers? What are they need and common characteristics?
- Customer relations: Do we have customer feedback? Do they think positive of us?
- Distribution channels: Are the distribution channels covering the market efficiently? How?
- Income streams: Is the current flow sustainable? Is the business diversified?
- Key resources: How many are the key resources? How do we use them?
- Key activities: Do we know the importance of the key activities? Are we efficient?
- Network of contacts: What relationships do we have? What will happen if we replace them?
- Cost of the structure: Where are the highest costs? Can they be reduced?

One of the musts in the company's strategy is check continuously the business model. Remember, nothing lasts forever.

- Competitors: Your competitors can upgrade their added value, or new competitors can appear with nothing to lose and much to gain.
- Technologies: New technologies could kill your business.
- Markets: new markets could change or eat yours.
- Needs: customer needs can change in a few days.
- Expect the unexpected (i.e., pandemics)

1.2. Innovation Strategy

1.2.1. Why is the innovation strategy important?

A transformation plan using innovation is key for the company's strategy, especially in the digital era. We must recognize the changing reality of customers, markets, and how their competition is adapting to it. The big and fast technological changes can give the companies the opportunity to improve substantially the value offer (maybe with new products, services, improving current processes, new business models, etc.). For this reason, it makes sense to incorporate these threats and opportunities into the current strategic approach.

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But something internal has to change. The evolution management is a tool to increase the survival probability of companies, and it complements the strategic planning methodology. Therefore, the management of evolution is a methodology of management, not an innovation theory. In fact, the innovation is not a formula, but **companies must change the MBA culture (Administration) to the new MBI culture (Innovation).**

Society needs to learn the values of innovation to take on the "yes we can" role. The United States has the role of the place of creation and China the role of the place of making. What will happen to China in a few years if it also takes on the role of creation? So, what about Europe or its countries? Will we continue to be followers, or will we change? Learn and practice (*Susanne Ollila and Anna Yström, 2020[1]*).

Aristotle's Nicomachean ethics emphasizes the role of habit in behavior. It is the basis of training to achieve the goal, and innovation must be in your habits. It may be possible to reconfigure the culture through talent, worker soft skills, processes and methodologies, KPIs and many others, which we will see in the next chapters.

The use of new technologies gives us competitiveness and efficiency, in addition to being a tool with which we can add various solutions from other industries and sectors, we can develop and attract talent, as well as being a tool for social progress.

The impact of technology is global and produces chain changes: first, there are technological changes (they can be basic or high-tech). Then, pushed by technological changes, economic changes occur, then social changes continue, and then political or legal changes. Here, smart companies can improve their competitiveness by using technologies during the transition between states. Obviously, emerging technologies are not for everyone, and every company has to know how to select the best moment to innovate with new technology according to the degree of maturity of both. But companies must use the technologies that have available because customers are now users thanks to the democratization of smartphones and internet connectivity. Never before in history have companies had the opportunity to be so close to their customers, know their preferences, have real-time feedback on the performance of their advertising campaigns, or even interact with customers instantly. Naturally, it is a double-edged sword, but there is no doubt that it is the channel par excellence of this century.

Although companies are committed to innovation, they usually cannot adapt quickly enough to changes in the market, technology and society. So, it depends on the type of company it is: is it a new company? Or is it an "old" company that has a large organizational structure in charge? Clearly, the approach will be very different, it is not the same to start from the beginning or redesign an entire story, neither private company nor public sector. In other words, they will not have the same rights or the same obligations. Anyway, an organization should attempt to systematize advancement by making the proper culture, structure, frameworks and procedures that empower the rise of development (*Rahul Reddy Nadikattu, 2020[1]*).

1.2.2. What is and how to start an innovation strategy?

One of the best-known quotes that unites business strategy with innovation strategy could be that of *Thomas A. Edison*:

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[1] Information about this paper in the References sector (Annex)

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"Anything that won't sell, I don't want to invent. Its sale is proof of utility, and utility is success".

Based on the past chapter, innovation strategy is a structured set of activities in order to support the future growth of the company. These activities are often grouped together as a commitment by all participants to a common mission.

Good innovation strategies are simple, clear, and easily understood by everybody involved; to achieve the goal, buy-in from stakeholders is key. It is very important to avoid any probability of misunderstandings, since expectations can be very diverse in innovation. As *Albert Einstein* said, *"Insanity is doing the same thing over and over again, hoping for different results".*

One of the best ways to start the innovation process is with a market opportunity analysis. It is essential to know what the market needs are in order to develop the innovation that satisfies them. If you can't do it, there is a risk of developing an innovation that nobody cares about. This implies knowing which are the axes of change and which are the sources where opportunities can be found. But, always there is a but, it has to do as quickly as possible. As Keith Hoffman said: "If you're not embarrassed by the first version of your product, you've launched too late", that matches *Albert Einstein's* idea: *"If a first the idea is not absurd, then there is no hope for it".*

The **strategy must go beyond the intentions and visions, it must make decisions and plan actions**. One way to get started is to be able to answer the following three simple questions:

- Where are you now?
- Where do you want to go?
- How are you going to get there?

There is a lot of information in the books on how to start defining your strategy, here I outline some common general points (and very academic) that could be used for some companies:

- A good first step is to compare what is already working well in the organization and what can be improved.
- Next, define the current state (AS IS) to define how far away the desired result is.
- Now is the time to visualize business impact and return on investment (ROI).
- It is time to define where you want to go (TO BE) and calculate the risk. Where to go has to be aligned with the corporate vision, culture and values.
- A good point is to generate an innovation matrix to build a balanced innovation portfolio in accordance with the corporate strategy.
- Finish with blueprints, defining scope, investment needed, governance KPIs, etc.

All products have waves of adoption and maturity, so the innovation process must follow these waves to keep the company always in the best possible state. The optimized situation is to have consecutives waves in order to have a wave that rises when the previous goes down. For this, the company needs different and suitable people who allow to initiate continuous innovation.

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Figure 1. Ideal situation, where companies have continuous product curves in the market, combining R&D times (lower waves) with commercial product launches (higher waves)
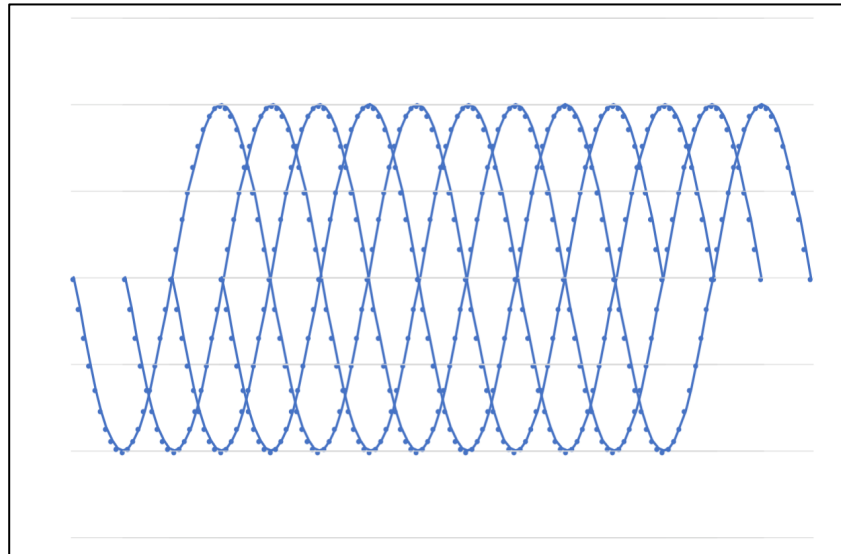
Source: Self-made.

As I have commented in the previous sections, we have to keep an eye to different points at the moment to make our strategy. We can see most of them in *Peter Drucker's* books, where he recommends controlling the sources of innovation opportunities to achieve the desired systematic innovation:

- Unexpected in positive and negative (successes and failures).
- Incongruence between reality and what we would like to "be".
- Innovation based on the needs, transforming it into requirements.
- Changes in the structure of the industry or in the structure of the market.
- Demographics (changes in population).
- Changes in perceptions, fashion, etc.
- New knowledge (scientific and non-scientific).

It is important to note that innovation is driven by goals or curiosity: the former generally leads to limited solutions, the latter to unique discoveries. Remember, solving current problems never creates solutions for future problems.

1.2.3. Innovation types

Why does innovation cause misunderstandings? It's curios, but **there is no international definition of innovation that is accepted by everyone**. Depending on the country, I have found a small difference but enough to cause misinterpretation. In fact, it not only depends on the culture, the sector and, obviously, also influences the experience and knowledge of the interlocutors *(Nico Wunderlich and Roman Beck, 2018[2])*.

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[2] Information about this paper in the References sector (Annex)

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One of these definitions is "Innovation is the process which generates value from the creation, development, and implementation of new ideas, technologies, products, and services" *(Mark Angelo Badiola, 2021(Dance, 2008), (Kennard, 2018)[3])*.

One of the questions I use to reflect on:

- Do you think the first iPhone was an innovation? And what do you think of the latest iPhone?
- What is your opinion if I say *carplane*? Or a teleporter?

The problem is the expectation that people have. Some expect disruptive innovation all the time, absolutely new products, it is not worth it if you join a car and an airplane to create a *carplane*, for them it already exists. These people don't really know about innovation, they just wait for new inventions, and creativity is not enough *(Ataollah Taleghani and Mohammad Taleghani, 2021[3])*.

For this reason, it is important to look at some types of innovation from a definition point of view, using for example the information published by *Harvard Business Review*:

a) Incremental innovation. It consists of reusing the current business model and it is based on current technical competences, improving parts of the product.
b) Disruptive innovation. Requires a new business model.
c) Radical innovation. Requires new technical competencies, so, investments in new technologies.
d) Architectural innovation. Requires new disruptive technologies and new business model.

Figure 2. The Innovation Landscape Map
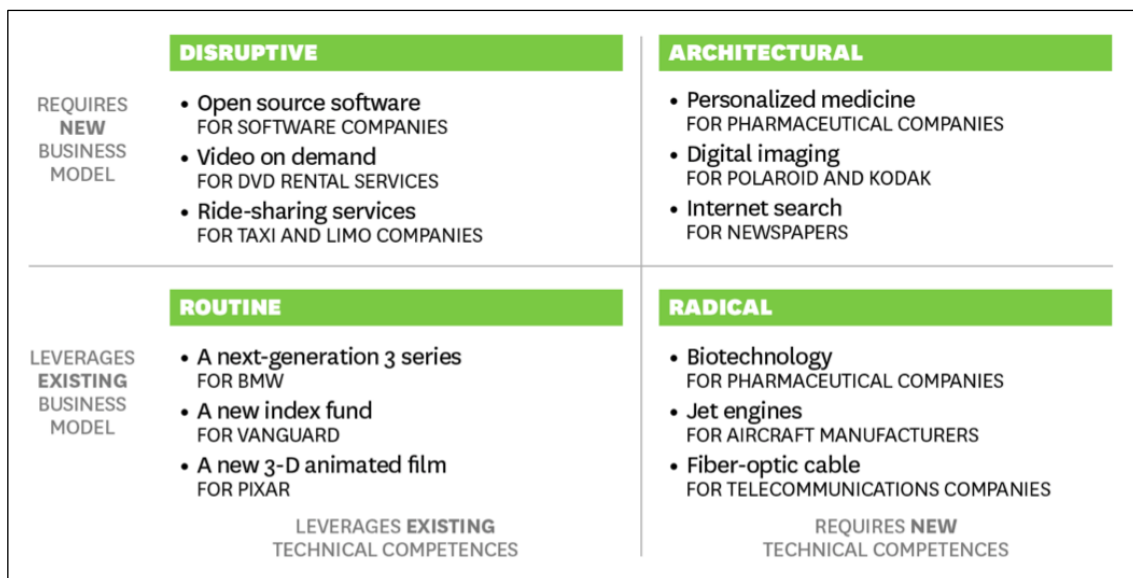
Source: Harvard Business Review article "You need an innovation strategy"

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[3] Information about this paper in the References sector (Annex)

But no matter what the experts say, in the end the winner is always the business point of view that tries to simplify the definitions for customers into just two: incremental innovation, for the continuous improvement of something that already exists, and disruptive innovation for the rest.

1.2.4.   Open Innovation and Intrapreneurship

Organizations have traditionally developed their innovation processes in a closed manner, that is, using specific own resources and raising security measures to extreme levels to protect their intellectual property and competitive advantage.

Among other things, the globalized world has brought us a new dimension of collaborative work where there are many benefits of working openly, without borders or limitations of the business structure to which we are subject. That same globalization has accentuated competitiveness, where many CEOs prioritized the adjustment (or total cut) of investment in R&D as the main (and mistakenly, only) cost saving measure. On the other hand, this factor also helped the proliferation of open innovation as an innovation strategy through which companies can develop their research based on external collaboration due to internal limitation of resources, time or knowledge. Sectors as diverse as banking, industrial, healthcare or services, work today with an open approach to collaborative innovation.

But this does not end here. Now we have intrapreneurship on the rise, a good way to encourage innovation within the company. Many are the initiatives that allow employees to dedicate time during their working hours to rethink business processes, propose innovative ideas, propose new tools, ... All of this internally promotes a culture of innovation that increases collaboration in all areas of the company, creating values and laying the foundations for the cultural change that companies need for their digitization *(JinHyo Joseph Yun, Xiaofei Zhao, KwangHo Jung and Tan Yigitcanlar, 2020[4])*.

It's really a shame, but many companies talk about intrapreneurship, but in the end they don't. Employees are hired to do a specific job and usually don't have time to stop and think. Yes, another war to win, another value to add.

1.2.5.   Innovation paradox

The **innovation strategy is a paradox when the word 'business' is in the middle**. It is very difficult to accept that disruption is necessary when incremental innovation is working well in the organization, especially when operational excellence is optimal.

We can define that **incremental innovation focuses on improvements, while disruptive innovation focuses on discoveries**, so balance is key here: the pursuit of operational excellence and incremental innovation eliminates the possibility of creating disruptive innovations, and the opposite also happens when companies that focus on disruption may lose their edge over companies that simply perform better their projects.

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[4] Information about this paper in the References sector (Annex)

Business Units are built on ongoing business and will be the strongest advocates of incremental innovation as long as this structure remains stable. They balance risk with motivation by promoting current strategies and avoiding disruptive ideas, limiting creativity because results dominate goals. Innovators need time and resources to figure out what works and what doesn't.

The management is different for both types of innovation: **while incremental management involves knowledge management** (it drives current strategy forward to maintain competitive advantage), **disruptive innovation** is about managing risks and uncertainties, it **is about redefine paradigms**. It can be achieved by combining the knowledge of the entire company and its networks and, therefore, some companies have an intrapreneurship culture driven by the corporate startup spirit to develop disruptive projects. This combination makes it possible to take advantage of the strengths of the company and the agility and freshness of the startups.

As mentioned before, disruptive innovation promotes a cultural change in the company because it is focused on having many small failures but some important successes. Typically, it's less about long-term planning and more about short-term experimentation. An easy way to promote disruptive innovation in companies that have old and large structures from their past is to create an internal corporate startup as a sub-company, or create a corporate venture capital. We can find several examples of similar successful initiatives, investing ideas as capital risk, or focusing on the first steps by copying and combining ideas from others; learn in the fastest and most economical way possible; manage risks effectively; and run and lead with transparency. Derived from this and speaking of the business environment, the definition of creativity is like the act of connecting things, and innovation (especially disruptive) is like the art of copying and combining existing solutions to create new ones. In any case, companies often use open innovation to identify disruptive opportunities through collaboration with universities, startups and research centers, for example.

Perhaps there are misunderstandings between disruptive innovation and strategy based on emerging technologies, and for this reason the Business Units fear investing in innovation that smells of risk. With emerging markets, companies examine vital emerging trends and structures to project potentially large future markets based on trends and structures that could become a majority in ten or more years. For this, it is necessary to clarify what we understand by trends and emerging technologies, the implications are totally different. In general, emerging technologies are confused with new technologies that are not yet widespread, with the definition of emerging trends that could normalize in the medium or long term. I will talk more about this in the next sections.

But what is common to all is how to enhance creativity. Companies bring ideas from other industries by making things happen: think and execute, design and test. *Thomas Edison* once said, *"I haven't failed. I've just found ten thousand ways that won't work"*. Try again, do not be afraid of failure, the learning process is the right way.

The last activity necessary for the success of innovations is the business integration, that can be done in three ways: insert the innovation into an existing business unit; separate it from it; or keep it as a separate division. If the innovation is disruptive, it will reconfigure the business unit or, even, replace it. Spin-offs are those that do not fit within the business strategy and need to emerge as an independent company with a life of its own.

When innovation reaches the execution phase, it has to move from the entrepreneurial point of view to the management of the organization. It is the primary goal of any strategic discovery and it can be done once the prototype has discovered a scale model.

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1.2.6. *Innovation methodologies*

At the same time there are different variations of the definition of innovation, there are many options without a well-defined path formed by various tools and methodologies that help the innovation process (creation, development, management, technology and knowledge transfer). It is not clear which of them is the best since, according to the company, some work better and others not so well. Although there are many options like Kanban, Kaize, SAFe, and more, I have selected some that I have worked with that I consider interesting:

- There are some techniques that helps to observe the customers and how they relationship with the products, identifying the necessities the current product does not satisfied. One of the best known is **Design Thinking**, used in multiple areas as a single methodology or as part of others. It is about promoting a new way of thinking always in search of creativity, focused on understanding the real needs of users to solve them. Therefore, empathy and teamwork are vital for this methodology, guiding the capacities of each of the members to develop a prototype that can be validated by the client from the beginning. The whole process is wrapped in a fresh environment to facilitate creativity and with an attitude full of observation and curiosity to discover those little details that only a designer knows how to exploit.

- Another known method is **Lean Startup**. Although it is initially focused on entrepreneurial environments, large companies also use it to launch their products. They try to overcome the uncertainty in the creation and future of the product to find the way to a sustainable business. This is done by shortening the development cycle, avoiding wasting money on endless plans and allowing the company to change course in an agile way. Therefore, it focuses on creating the famous MVP (Minimum Valuable Product), a version that with minimal effort allows the development team to focus the product on what the customer expects and demands. Sometimes, to save time, multiple versions are offered at the same time. The creation and learning process is done iteratively.

- Naturally, we cannot forget about **Agile**. As with Lean Startup, Agile initially focused on the software environment, although it is now used in other areas. It is based on a series of points that make up its manifesto, in which the method, priorities or requirements, among others, are described. As we can guess from the name, its priority is to continually deliver an early version of the product to the customer. Each change that is made in the different cycles is used to provide a competitive advantage, short cycles but with fully functional deliveries. Simplicity is essential.

- We have **Scrum** as well, a methodology focused on complex environments (non-cohesive teams, insufficient quality, exceeded costs, endless dates, etc.). With Scrum, partial and regular deliveries are made, where the client prioritizes the objectives taking into account the value they provide compared to their cost. In this way, those points are distributed in the different iterations.

1.2.7. Key Performance Indicators

A **Key Performance Indicator (KPI)** is a measurable value that demonstrates how effectively a company is achieving key business objectives. There are a lot of types of KPIs that the organizations using to evaluate their success at reaching target, for example, using this metric to understand the innovation capacity and the business performance (*Egberi Agbarha Kelvin, 2020[5]*).

A standard way of working with indicators is to set goals and objectives first. Subsequently, the company establishes **Critical Success Factors (CSF)** based on these goals and objectives. Third, the company establishes the **KPIs** from the CSF. The company then collects the measurements during the execution program to finally calculate metrics from the measurements that allow action to be taken based on the results.

This process shows that the choice of KPIs is intrinsic to the business and its strategy, and the **ROII (Return of Innovation Investment)** will depends on each company. In any case, below are some examples of standard indicators that help innovation management (*Davila, Epstein and School, "Making Innovation Work"*):

- Magnitude of the innovation (Financial contribution / Number of successful ideas).
- Innovation success rate (Number of successful ideas / Total number of ideas explored).
- Investment efficiency (Number of ideas explored / Total capital invested).

Some additional KPIs that are common and I have used are:

- Input indicators:
  o Percentage of spending on innovation over billing.
  o Number of people involved in innovation projects.
  o Number of ideas generated in a year.
  o Number of ideas that have given rise to new concepts.

- Process indicators:
  o Percentage of ideas that become projects.
  o Percentage of projects that end.
  o Deviation in the time of the projects.
  o Deviation in the project budget.
  o Average percentage of deviation in time with respect to the forecast.
  o Average percentage of budget deviation from the forecast.

- Exit indicators:
  o Number of new products introduced thanks to a substantial contribution of technology or redefinition of key processes (compared to previous years).
  o Percentage of achievement of objectives.
  o Degree of novelty of the completed projects.

- Results indicators:
  o Innovation project billing percentage over total billing.
  o Percentage of turnover of innovation projects over sales.

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[5] Information about this paper in the References sector (Annex)

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1.3.   Digital Revolution

1.3.1.   Digital revolution

The digital revolution represents an extraordinary opportunity to improve the well-being of societies. The deployment of new technologies can significantly increase productivity and make new goods and services accessible at lower costs, improving the rent per capita.

The advances in regenerative medicine, biotechnology, artificial intelligence and many others, are very positives. However, it can also be accompanied by negative side effects, depending on how the transformation process of our societies is managed. New technologies can end up destroying more jobs than they create or including increasing jobs but inequality.

All scenarios have defenders and detractors. There are people who believe that robots and new technologies will facilitate a better life and a new generation of disruptive innovation will arise, and others think absolutely the opposite.

So, what could be the effects of digital disruption?

If we combine all possible situations, we could draw the following options:

- The **first scenario** could be the most pessimistic, where technology destroys more jobs than it creates.
- The **second**, where technology does not advance affecting employment (especially, older population).
- The **third** possibility is when technology is disruptive and unemployment is massive, which causes inequality.
- And probably the **most optimistic scenario** is when technology, productivity and employment grow at the same time allowing sustainability among all factors. This is where we need to pay special attention to make sure we reach the entire population fairly.

Are we ready for any scenario? Should innovation stop its development to protect employment? What is the role of companies? We are facing a new humanity and, instead of being for the best, will it be the worst?

1.3.2.   Keys for organizations to innovate

Innovation is the engine that drives the growth of companies, and there is no doubt that it is a determinant of competitive advantage. Its capacity of an organization is a condition that makes it possible to take advantage of resources to **obtain greater benefits, whether economic, social or reputational.**

One of the most basic cycles of business innovation consists of just three steps:

- The generation of an idea
- The conversion of the idea into value
- The transformation of value into a positive economic result

What could be the keys for an organization to innovate?

- **Raise awareness**: it is essential to create a proactive context for change. We cannot deny that the word "innovate" is associated with risk and not everyone is ready or willing to step out of their comfort zone. Every business (including profitable) will reach a point of decline that will require innovation to continue. We no longer only have to worry about our lifelong competition, large organizations must pay attention to startups since they are competitors that can generate disruption (they have everything to gain and nothing to lose).

- **Leadership**: it is imperative that the Management Committee, led by the CEO, leads the change. Innovation will require long-term investment, perseverance, and only with leadership can it be carried out successfully.

- **Strategy**: innovation must be aligned with corporate strategy, which is mainly to generate more business. The more definition and clarity in the strategy, the better the opportunities framework and the creation of new projects. We will gain greater creative effectiveness adjusted to the needs of customers and the market. Customer orientation is usually the most used attitude where the entire project channels a key value proposition for the customer.

- **Culture**: it is the basis of innovation in the company. It is for the entire company, not just for a specific department, that you must cultivate a "test and learn" environment without fear of punishment for failure. Obviously with the appropriate security measures, but it is preferable to fail to do nothing. Internal dynamization with agile methodologies, lean culture, design thinking, or others, can be tools that help flexibility and multidisciplinary communication between teams.

- **Method**: innovation is not a gift that appears in a divine way, perhaps a brilliant idea yes. The innovation process requires observation, analysis, measurement, monitoring of indicators, results ... it will be necessary to measure its impact, return on investment, choose the right tools, etc.

- **Need**: the objective is to cover a need; the client must be willing to pay for it. That is why we must establish empathic mechanisms that help us identify needs and motivations: we must transform the necessity into a requirement and give it a solution.

- **Diversity**: we must not limit ourselves to a specific area or focus only on looking for a specific contribution of value, we must seek inspiration both inside and outside the organization, and a good option could be to use open innovation.

- **Learn**: test and learn, test and learn, as many times as necessary. You have to reward the attempt and not penalize the error. It requires management and control and, in turn, agility and adaptation. It is not complicated but requires attention to allow flexibility for innovation in a regulated framework.

- **Ideation and conceptualize**: the ideation process must be plural and diverse, without limits within the strategic parameters of the organization. The more ideas the better, it will be cut later. Once we have the ideas, we have to think about how we visualize them in progress, implications, etc. In this conceptualization process, we will see which ones have the longest path, viability, ... definitely, future!

- **Continuous improvement**: every process must include continuous improvement in its application methodology and identify what works and what doesn't. Team frustration, high costs, long deadlines and other negativities must be avoided in order to focus the project on a mission, a hopeful illusion of success and satisfaction for a job well done towards a common purpose.

Figure 3. Keys for organizations to innovate
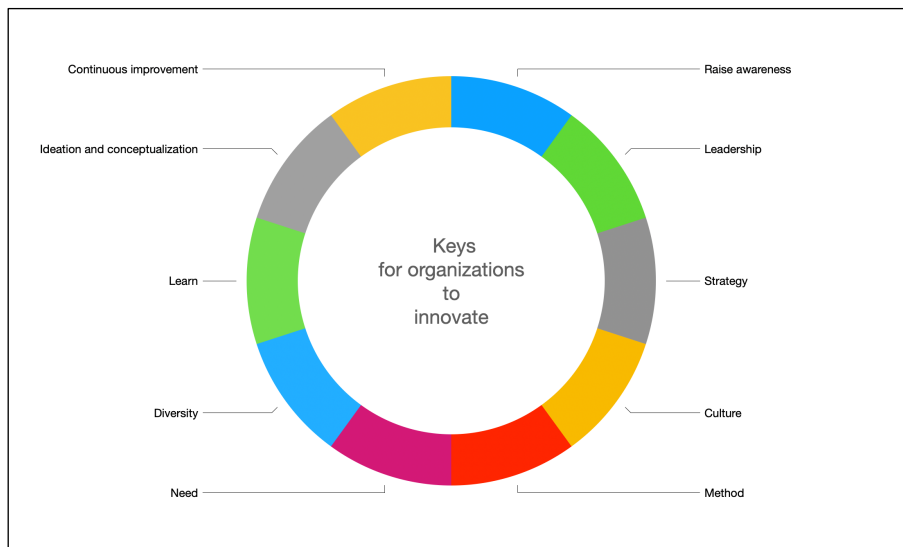
Source: Self-made

1.3.3. Digital Business Transformation

If we look for an academic definition, we can say that Digital Transformation is the improvement of processes and the creation of new business models in a coordinated way with the company's operating model. This model includes the people, processes, technologies and governance indicators that will facilitate control to achieve the strategic objective of the organization. So, transformation is not about digitalization, it is about re-think the processes. Yes, we can apply technology to build new business models and processes to result in more profitable revenue, greater competitive advantage and higher efficiency, always thinking that the strategy is before technology (*K. Schwertner, 2017*[6]).

It is common to confuse two different concepts: **digitization and digital transformation. The first is the enabler of the second**. Making processes standard and digital are operational tasks, and will reduce costs, thus providing efficiency and scalability. Instead, digital transformation uses technology to create customer-centric added value, thereby providing talent attraction, billing growth, customer loyalty, and more. **Digitization brings efficiency, and digital transformation delivers customer value.**

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[6] Information about this paper in the References sector (Annex)

The main reasons for companies that want to make a transformation in their business have a common denominator: improvement. The main improvement groups demanded are innovation, the efficiency of the processes, customer experience and loyalty, make business decisions, and a transformation of the business itself.

But what drives digital transformation in a company? There are four important reasons that are usually the most common for companies to promote their transformation, which are: **competitiveness, the creation of new opportunities, efficiency, and changing consumer demand**.

Depending on the type of transformation, the strategy, and the length of time the change has been operating, we can classify organizations into **four levels of digital maturity**: those that are digitally active, digitally engaged companies, the digitally competitive, and digitally mature companies.

The process of change through innovation is complex since it is always associated with a high technological content and not all challenges are easy to achieve, so risks and mitigations must be managed very efficiently. The most important barriers that organizations encounters are: the use of traditional systems and their dependency, poor or non-productive collaboration between IT and business areas, not having a clear corporate culture defined and shared by teams, not having the ability to manage change, and not having the talent to make the change.

Therefore, and given that the transformation affects several or all of the company's business areas, the key to success is to have maximum collaboration between areas and to have the leadership promoted by the General Management. **Organizations must understand the customer experience, focus on understanding the path that the consumer follows to make his purchase, his motivations.**

During transformation, it is highly recommended to apply something like "agile project management" methodologies. This flexibility will help show a faster result than you can benefit from. At the same time, it is advisable to implement quality management processes so that the result is as expected, where the optimization of the user experience as the basis of our digital strategy is part of a much larger life cycle.

One of the most used methods in design and development is the well-known **design thinking**, which we can define as an iterative process focused on the user that consists of five steps: **empathize, define, devise, prototype and test** (for more information about methodologies, please, go to the corresponding section of this document).

Innovation is key to creating new opportunities, either through innovation processes (ideation phase, conceptualization, etc.), or through the use of new digital systems that facilitate this discovery. Many companies carry out applied innovation and few succeed in disruptive innovation. Disruptive innovation is often defined as a process by which a small business with limited resources is able to challenge businesses that are already established in the market.

The main differentiation between innovation and transformation is basically the pace with which the different initiatives are executed. Innovation usually comes from an idea, instead, the transformation requires time to make the change from one state to another and requires a digital strategy for its implementation.

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Digital transformation provides the company with the skills to compete effectively against the competition; accelerate go-to-market initiatives; develop knowledge, models and business operations to outperform the competition; develop disruptive and innovative products and services; and deliver much more value to the customer and a better experience.

The true transformation of the business will only come thanks to the **collaborative effort of all areas of the company**, where innovation will cover the needs of the market and help to adapt to new trends. In any case, organizations must control their business ambition very well and take into account its context (status, brand, limitations, etc.).

Interesting to see the skills needed for digital transformation and the skills available in companies. For example, the top three needed are digital security, mobile technologies, and business change management; the first three available in companies are social media, cloud computing and mobile technologies *(Patrick Hoberg, Helmut Krcmar and Bernd Welz, 2017[7])*.

Phases of Digital Transformation in a company

The transformation happens when a variation is made from an initial state to a final state. So, the phases of digital transformation are nothing more than the stages that companies execute to reach the desired state. Below is an example of possible phases:

- The company is in a comfortable phase of mechanized execution and rejects any change because it is already doing it well. Flee from any unnecessary risk and resist any innovation, experimentation and internal entrepreneurship are inhibited.

- Internal agents recognize new opportunities, thus supporting initiatives to test new solutions and services. In order not to wait for global approval, some departments conduct their tests in isolation and push new technologies.

- The need for digital transformation is visible and they focus on key areas of exploitation and experimentation.

- Now it has the support of C-Level and transformation is a priority for the company. A roadmap is established with short and long-term objectives, with monitoring indicators and defined results. Instead of basing processes on technological capabilities, technology has a purpose and is used to drive goals.

- The transformation is already underway under new operating models, teams, roles and processes. It goes beyond the customer experience, encompasses the entire company and affects the entire organization in its functions.

- Being digital is no longer a state, but part of how the business competes. But it is a non-perennial situation, as the transformation will continue as technology and markets evolve. Here we already have innovation as part of the DNA of the company. A high motivation for change is achieved because investments in people, processes and technology form a single block and are aligned with the business areas.

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[7] Information about this Research Report in the References sector (Annex)

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1.3.4. Digital European initiatives

Knowing the importance of digital tools and the impact on society, the European Commission is promoting different initiatives that **every company must consider**.

One of them is the **Digital Society**, which will play an important role in the coming years (as consumers of services and as producers of these service requirements), therefore, it is not possible to forget the importance of the civil society in the digital age. It is one of the most relevant elements in the **Quintuple Helix** for our future, not only from the point of view of consumers, they (we) will have an important role as producers of innovation *(Elias G. Carayannis, Evangelos Grigoroudis, David F. J. Campbell, Dirk Meissner, Dimitra Stamati, 2018[8])*. The industry has to participate like the rest of the helix to create the desired products from the needs of the end user.

Figure 4. The Quintuple Helix
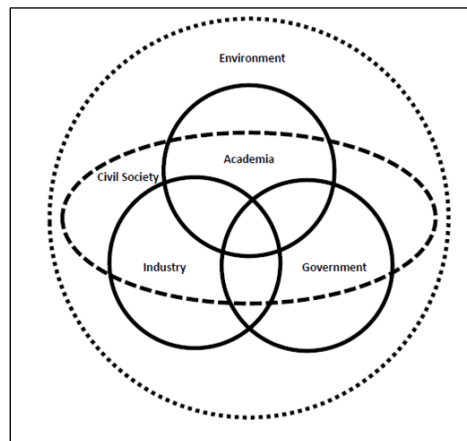
Source: Wikipedia, Quadruple and quintuple innovation helix framework

Empowering citizens is one of the most famous slogans. The Digital Citizenship Laboratory aims to generate rights and responsibilities as a digital society, develop sovereign identity, design and promote open innovation citizenship, and design and launch new courses for the training of agents of the territory. The ideal would be to achieve a universal innovation system open to all citizens, with a plan to integrate the use of technologies in SMEs and a learning path for citizens. These laboratories have to be in line with local and European initiatives like European Network of Living Labs, European School of Social Innovation, or Digital Future Society, for example.

Other important movement is the **Digital Innovation Hub (DIH),** as a tool to advance in the digital transformation. DIH was born with the aim of helping companies take advantage of digital opportunities. Acting as a **one-stop shop**, it provides access to knowledge and structures for companies to try out before investing. DIH not only presents tools, but also offers financial

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[8] Information about this paper in the References sector (Annex)

advice, training and many other services for the digital transformation journey *(Antonio Crupi, Nicola Del Sarto, Alberto Di Minin, Gian Luca Gregori, Dominique Lepore, Luca Marinelli, Francesca Spigarelli, 2020[9])*.

Figure 5. Digital Innovation Hubs scheme
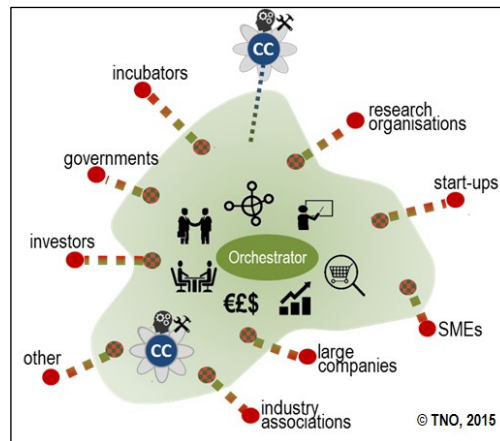
Source: DIH, European Commission

Another LAB is the **European Community Business and Innovation Centers (EC BIC**), which are support organizations for SMEs and innovative entrepreneurs. They are recognized by the European Commission and offer a range of integrated services for the guidance and support of innovative SME projects. The BICs are grouped into a **European network called the European BIC Network (EBN)**. To expand this information, you can consult the section dedicated to "Innovation laboratories" in this document.

1.3.5. Silicon Valley

It is impossible to talk about innovation without talking about **Silicon Valley**. Instead the secrecy around business, in the most famous Valley in the world there is a shared feeling of changing and improving the world. This spirit aims for people to collaborate and work openly, where failure means you are on the right track and where time is the only enemy. That is why companies adopt management models based on agility and innovation, where they are away from the influence of ties, banks and politicians.

Is it a utopia? No, it's not. Now we can say that this model is a world benchmark in companies.

It is not within the scope of this Master's Thesis to talk in depth about Silicon Valley, although it is highly recommended for anyone who loves innovation and the culture of entrepreneurship to seek information about its history. Anyway, let me paste the main Wikipedia-based description just as a snack:

"Silicon Valley is a region in the southern part of the San Francisco Bay Area in Northern California that serves as a global center for high technology and innovation. [...]

The word "silicon" in the name originally referred to the large number of innovators and manufacturers in the region specializing in silicon-based MOS transistors and integrated circuit chips. The area is now home to many of the world's largest high-tech corporations, including the headquarters of more than 30 businesses in the Fortune 1000, and thousands of startup companies".

Why am I talking about Silicon Valley on this MT? Well, all over the world there are many places that have tried and continue to copy the formula in their "local" Valley, and Barcelona would like to be the center of European Innovation. Why not, it will be one of my strategic pillars.

1.4. Funding sources for innovation

Not all companies have the possibility to invest in innovation with their own resources. To solve this problem, there are various sources of financing that can be used to subsidize all or part of innovation projects. Now I am going to comment on some programs that we could use, keep in mind that the media are not the only ones that exist, they are simply the most common with which I have worked in my professional career:

COUPONS

The Catalan Government Agency for Business Competitiveness (ACCIÓ) has coupons to finance SMEs companies that want to carry out an innovative project, an improvement in a production process or a new service or product. The coupons are direct financial discounts that can be exchanged for an expert innovation service offered by ACCIÓ-accredited entities (TECNIO label). Currently we can found four types of coupons, for example, Industry 4.0 or Innovation and strategy (approx. 20K€).

INNOTEC

ACCIÓ has a program to finance R&D projects, in this case between 50K€-200K€ and it can be subsidized up to 70% of its cost. These projects must be carried out with organizations with TECNIO label, as well.

RIS3CAT

Through the European program, Catalonia has the Smart Specialization Strategy of Catalonia (RIS3CAT), which defines the framework within which the Generalitat de Catalunya establishes research and innovation actions and programs for the generation and development of innovational projects.

CERVERA

Cervera R&D Transfer Projects is a financing line, granted by the Center for Industrial Technological Development aimed at research and business development projects for the creation or significant improvement of a production process, product or service. Here the minimum budget is 175K€ and the duration is between 1-3 years.

RED.ES

Red.es is a public corporate entity belonging to the Ministry of Energy, Tourism and the

Digital Agenda (MINETAD), and which depends on the Secretary of State for Information Society and Digital Agenda (SESIAD). They develop programs to stimulate the digital economy, innovation and entrepreneurship, and they also deploy programs to implement technology in Government public services. Some of the projects receives European funding (ERDF and ESF).

ENISA

ENISA supports viable business projects by offering source of finance. ENISA works with young entrepreneurs (max. 75K€), entrepreneurs (max.300K€), and experienced companies (1,5M€).

SPAIN DIGITAL

It is the Spanish program to promote the digital transformation of the country aligned with the European strategy. The public and private sector will collaborate with the country's economic and social agents in this program.

The program is for 2020-2022 with €70KM: €20KM from Next Generation EU and €50KM from the public sector.

As it is defined in Spain Digital 2025 will focus its objectives on promoting the country's digital transformation as one of the fundamental levers to relaunch economic growth, reduce inequality, increase productivity and take advantage of all the opportunities offered by new technologies, with respect to constitutional and European values, and the protection of individual and collective rights.

PERTE

PERTE is the acronym in Spanish of Strategic Recovery and Economic Transformation Projects. It is the mechanism with which Spanish Government will manage part of the money from the European Funds for the recovery of the Covid-19 crisis with the "Spain can" program. Spain will receive €140KM in the form of transfers and loans for the period 2021-26.

PERTE is a recovery instrument based on three fundamental pillars:

- The adoption of instruments to support recovery plan.
- The adoption of measures to boost private investment and support companies in crisis.
- Make the market stronger and more resilient, accelerating the dual ecological and digital transformation.

HORIZON EUROPE

As the European Commission defined, Horizon Europe is the EU's key funding program for research and innovation with a budget of €95.5 billion.

It tackles climate change, helps to achieve the UN's Sustainable Development Goals and boosts the EU's competitiveness and growth. The program facilitates collaboration and strengthens the impact of research and innovation in developing, supporting and implementing EU policies while tackling global challenges. It supports creating and better dispersing of excellent knowledge and technologies.

Due to its importance, this program has a few lines after a dedicated section in this

document.

ERDF

> The European Regional Development Fund aims to strengthen economic and social cohesion in the European Union by correcting imbalances between its regions. They concentrate investment in innovation and research, digital agenda, support for small and medium-sized enterprises (SMEs) and low-carbon economy.

VENTURE CAPITAL / BUSINESS ANGEL

> There are investors like to invest capital in start-up companies or innovation ideas with a long-term growth perspective. Sometimes it is a non-refundable investment with high-risk operations. The investors, can be called Business Angels, are people who invest their money in the initial phase of startups, in exchange for a participation in capital. They also usually carry out the role of a mentor to entrepreneurs.

CROWDFUNDING

> There are many other funding initiatives that the companies can raise money, like the crowdfunding. It is the process of raising money from a large number of people in order to fund a project, for example. The people give an altruistic donation, or they get rewards, equity and more.

1.5. Research and innovation strategies to be reference

It is mandatory to know what is doing the **European Commission** to support the future. A good strategist must count on it for his own development.

The European Commission has the program "**Horizon Europe**", called the *Next EU Research & Innovation investment Program (2021-2027)*, with the goal for investing to shape the future. It has the vision to create a sustainable, fair and prosperous future for people and planet based on European values: tackling climate change; helping to achieve Sustainable Development Goals; and boosting the Union's competitiveness and growth.

The Commission is managing over €100 billion for Horizon Europe. The program follows to improve and led these three pillars:

- Pillar 1: Excellent Science: EU's scientific and technological bases, European Research Area.
- Pillar 2: Global challenges and European industrial competitiveness.
- Pillar 3: Innovative Europe.

Other mandatory, for the environment of this MT, is the *Spanish Strategy for Science, Technology and Innovation (EECTI, 2021-2027)*. This Strategy is based on a **SWOT analysis** and on the weaknesses shown by our science, technology and innovation system in international indices. We must highlight the position number 14 of 27 for Spain in 2020 thanks to the **European Innovation Scoreboard**.

For example, in the document it will find the "tenure-track", that is the development of a research career based on international standards, programs structured in missions, or strengthening of innovation ecosystems, for example. In a few words, it aims to strengthen public-private

collaboration, promote technology transfer, create an attractive environment for talent, gender equality in R&D and more.

1.6.   Innovation laboratories

D-LAB is a term that has been adopted by various institutions around the world. Most of them collect the same meaning and purpose although, logically, each one with its particularities.

MIT created the concept and name of D-LAB. As they explained in its website *(d-lab.mit.edu) Founding Director Amy Smith* wanted to avoid the first idea that going to mind when you listen the word laboratory (scientists in white coats and test tubes). Instead of this, Amy wanted placed *"with students eager to collaborate with communities on addressing developing-world challenges, and with hand tools to construct low-cost devices that could make a difference to people living in poverty"*.

Let me reproduce the reason for using the letter "D", which is also available on the MIT D-LAB website:

"As for that D - Amy likes alliteration and the first tagline was "development through dialogue, design, and dissemination." Those were also the names of some of the early D-Lab classes. These three Ds also telegraph our process and something about our values: talk with people and collaborate, do good design work, and then ensure it gets out into the world and makes a positive impact […]".

This concept has been adopted around the world and there are now many custom variations because innovation is influenced by different aspects (country culture, local economy, government, companies, citizens, etc.).

However, innovation labs with different names and shapes are present all over the world evolving from the **4-H model** to the Quintuple-Helix model. The **5-H model** also has some different specifications depending on the country, but they all have vertices as a **political system (public sector), education system (lead by university), economic system (industries/companies), society (culture and customs), and sustainable development (natural environment)**.

Therefore, the goals of these innovation labs are to have a place to develop through discovery, design and dissemination. Some labs are more oriented towards entrepreneurship, others towards empowering citizens and others towards business *(Ferney Osorio, Laurent Dupont, Mauricio Camargo, Pedro Palominos, José Ismael Peña, Miguel Alfaro, 2019[9])*.

Business-oriented labs are generally used as a platform to demonstrate technologies, design innovation solutions, create new applications, hold brokering events, workshops, and many others, definitely to generate business. For this reason, these types of laboratories are also known as **Business Innovation Center (BIC)**, a place where the needs and solutions exposed by supply and demand are concentrated, and companies find innovation agreements.

For this reason, the innovation present at BIC also has the Enterprise side with the latest technologies from manufacturers, not just commercial products, but prototypes and beta

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[9] Information about this paper in the References sector (Annex)

versions too. Here clients can test prototypes and the latest solutions so the company that promotes or owns BIC has good changes in business success.

BIC connects a global partner network of executives, industry leaders and best-of-class innovators of all kinds. The ideal is to have different spaces in the Innovation Center, covering the most important activities of the innovation ecosystem (encourage entrepreneurship, support the creation of new companies, assist companies, perform research in deep technologies, promote immersive experiences, manufacture new hardware, develop mobile applications, etc.). Covering different parts allows unicorn-ideas to down-to-earth into a pragmatic strategy.

This type of initiative has the support of the European Commission (EC). **The EC created the European Business and Innovation Centre Network (EBN)** that homologates the Business Innovation Centers. EBN is over 25 years old and currently has over 250 BICs in Europe. As part of the same policy, BICs cooperate with other SME support networks promoted by the EC, particularly: **Innovation Relay Centers (IRCs)** and **Euro Info Centers (EICs)**. In relation to collaboration networks, we can find the **European Network of Research and Innovation Centers and Hubs (ENRICH)** as a global network of centers and hubs that promotes the internationalization of European science, technology and innovation (currently in Brazil, China and USA).

1.7. Technology Scouting, emergent technologies

Companies are using technological advances to gain competitive advantage by identifying opportunities and threats generated by these technologies. This concept is what is known as **Technology Scouting**.

We can find in the conferenced offered by *Professor René Rohrbeck* (from Edhec Business School), that the Technology Scouting has four main goals:

- Early identification of technological trends and disruptions in the industry
- Raising awareness of the disruption and technological solutions available
- Show how innovative technologies can transform the company
- Facilitate the sourcing of external technologies through a network of scouts.

As we can imagine, the process of scouting is complex. It has two main phases:

- First: **Technological roadmap**. As general steps of our strategy, you must identify which are the main corporate strategic lines and which are the problems that you will focus on solving. It is the moment to look for the suitable technological solution.
- Second: **Implementation**. The next step is the development of the business model around these technologies. That means it will be necessary to have technology experts and innovation consultants.

Sometimes Technology Scouting is associated with **Emerging Technologies** (ETs). In fact, the ETs are technologies whose development and / or application in real cases have not yet been largely realized. The ETs are still growing technology, not yet in the age of maturation, for this reason they are also called fledgling technologies. Usually, each year, many companies publish the list of emerging technologies under their own criteria where, obviously, do not coincide exactly. Then I list some of the breakthrough technologies selected by MIT for 2021:

- Messenger RNA vaccines
- GPT-3
- Data trust
- Lithium-metal batteries
- Digital contact tracing
- Hyper-accurate positioning
- Remote everything
- Multi-skilled AI
- TikTok recommendation algorithms
- Green hydrogen

The classification that makes *Gartner* is also interesting because it has a different orientation and is more specific beyond the typical AI, Blockchain, etc., examples that can be read in most technological blogs. In this case, they have two separate reports according to the size of the company (medium or large size). The reports are known as "2020 to 2022. Route of emerging technology for [medium-sized/large] companies," and technologies are divided into four groups:

- **Monitoring** (i.e. Distributed Ledgers, disaster recovery as a service, virtual assistants, etc.).
- **In planning** (NLP, biometric, micro-os, RPA, etc.).
- **In pilot** (cloud migration tools, work stream collaboration tools, big data security analytics, SD-WAN, ML platforms, etc.).
- **In deployment** (FW as a service, network traffic analysis, team collaboration devices, network orquestation, public cloud storage, Wi-Fi as a primary network, etc.).

1.8. Research, IPR, patents and tech-knowledge transfer

Few companies have a team dedicated to research. It is normal, they focus on generating business and for that reason they move in the world of applied innovation.

In general, pure research is carried out by Research Centers and Universities where their research groups are generally sponsored by European and local financing (yes, they also have private funds from companies generally through their Foundations).

We can also find pure researchers where their main objective is to publish ***papers*** and contribute to science. On the other hand, we have researchers who investigate to generate assets with the aim of transferring and monetizing the discovery.

It is very complex and deep to speak of **Intellectual Property Rights (IPR)**, but we can consider that commonly the researcher maintains the label of creator and normally property or exploitation rights can be negotiated if it is totally transferred to another for time, licensed for use, ... or if it can be used only in a certain sector, country, assigned to a third partner and many other things. All of this it can be possible and is related to the associated patent, which has to exist, of course. Here *pure* researchers who openly publish their work must be aware of the limited conditions that exist with the binomial of publications and patents, before sharing their discovery altruistically.

If everything is all right, a win-win is produced between the researcher and the company. The agreement is materialized through technology / knowledge transfer with the conditions signed by the parties, in this way, the researcher can continue his/her passion and the company can develop a commercial product.

2. PART TWO – THE GUIDE

During the first block of this document, we have reviewed the theoretical part of innovation, the context of globalization and competitiveness, the importance of innovation and how it is needed for business strategy.

Now is the time to start and apply all these concepts.

> **Application case**: For this Thesis I am going to follow a hypothetical case where a new Catalan company has been created that belongs to a large international group, so the Department of Innovation does not yet exist. In this simulated environment it is necessary to hire a new Director to create the new Department, so I will assume this role using this guide to describe all the summarized steps. To do this, I will show questions and sample answers that will be the basis of my strategy and recommended actions.

How do you get started? What are the first things to do? What are the best KPIs for governance? And the best strategy? These and many more points will be covered in the following points.

Normally it takes at least 3 months to understand the company, get to know the teams, discover the capabilities, strengths and weaknesses, and then have enough information to act. Due to this Thesis and the business itself, this is an example of express general planning: (*)

Figure 6. Express planning

May				June			
Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
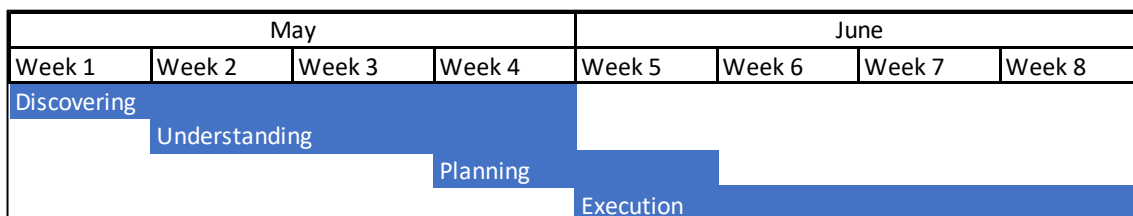
Source: Self-made

(*) As it is compressible, discovering-understanding are tasks that never end in this type of large companies, especially in the global and dynamic liquid era in which there are new things and conditions every day. But in normal planning they stop painting because they become background tasks.

2.1. Discovery: Questions, information search, analysis and learning

2.1.1. Group and company organization chart

The first thing to do is to know **who is who** in the organization, locally and within the Group. This will also helps to see the relevance of innovation internationally, and who are the people I should contact.

In this case, the Group's organization chart is still in process. The Group does not have a consolidated structure because it is still in the process of merging companies. One of the great novelties is that the Group's Chief Innovation and Digital Officer is the Group's Vice President, which means that innovation has the presence and importance that corresponds to the Group.

2.1.2. Group strategy

Strategy is the succession of cause-effect relationships, and the plan to achieve the vision consists of determining the actions to close the gap between the current situation of the company and the one to be achieved.

As a large Group, it has defined the strategy, mission, vision and values that it is the first to check. Reading the last "General meeting of shareholders", normally is a good point to start and know a general overview of main business lines, its results, objectives, budgets per sector, etc. A good mission confirms that you are on the right track. The vision must be viable, focused, flexible and communicable. A deadline should be set to achieve the vision, set intermediate goals, and review the vision periodically. Once vision is achieved, the cycle must be restarted. I'm going to highlight the points on which my strategy will be based.

Key results of this section and my conclusions

Key results:

- Innovation is key to the business.
- Beyond the economic result, it is important how we do it.
- Business sustainability, social responsibility, equality and care for the planet.
- The Group is proud to have Innovation LABs (aka, Business Innovation Centers).
- The Group is multisectoral (automotive, insurance, telecom, industry, ...), and works with public and private sectors.
- Latest technologies are familiar in the documents (IA, Blockchain, IoT, Cybersecurity, X-reality,..).
- The portfolio is defined: Innovation, Business digitalization, IT Excellence.
- The Group operates in different countries divided in four geographical areas.
- Objectives and KPIs are defined (Group).

My conclusions:

- Our strategy will seek impact on society and the planet. The famous phrase of the popular hacker movement of the 80s, will be our motto: Change the World!!

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- Our innovation has to generate money but paying special attention to doing it responsibly.
- Good news, multisector means the playing field has no limits. Anyway, I will have to verify which are the lines of business to work first.
- News technologies: nothing unexpected. I really love the lasts technologies and I have experience with most of them.
- Different countries, big news! That's means I could work with multidisciplinary team, I will join the learning process with the continuous improvement. The multicultural teams could vitaminize the innovation proposals but warning with cultures and customs, international crossover teams often don't perform as theory expects.
- I will check after the objectives and KPIs.

2.1.3. Group Innovation strategy and methodology

Huge Group, infinite options and lines of action in each of the solutions, especially when the Group is continuously merging companies. It is very complex to know who is really in charge of something because there are several depending on the country and the sector.

Key results of this section and my conclusions

Key results:

- There is a person who is concentrating the documents of innovation, and therefore, the methodology, processes and definitions about innovation.
- All official documentation must be reviewed and approved by the Communication and Marketing Department. The brand image is very important for the Group.

My conclusions:

- I have enough experience in global consensus and these issues move very slowly.
- In the same way, due to culture, knowledge and how people understand how to do business, the global definition of innovation (what we do, what it is, etc.) may be similar with some common pillars, but it couldn't be general. I will have to discuss it.

2.1.4. Business objectives for Catalan company

Quite simple: Increase business, increase profits.

This is the simple objective of the Catalan company. The Group is committed to the Catalan territory, so we have to return this trust with business growth.

We will have to grow in people and make a good dissemination plan for the brand.

Key results of this section and my conclusions

Key results:

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- Increase business.
- Increase profits.

My conclusions:

- Grow in people, attract talent.
- Make a good plan to disseminate the brand.
- Any cross-collaboration will be fine, but it will not contribute to our direct results.
- It is possible to use "resources" from other companies of the Group.

2.1.5. Understanding the business and current activities

Understanding how the business works is mandatory, so there are some questions to be answered. How the business works, where are the margins, who are the collaborators, if there are commercial agreements, know the 80/20 billing rule, who are the best clients, who are the clients with the most innovative spirit, what are the projects carried out in the past classified with innovation label, and many more.

At the same time, the environment analysis has to be done. This will give you facilities to detect and list the strengths, weaknesses, opportunities and threats.

In addition, we have to know what type of activities the group is carrying out (periodic meetings, special events, regular collaborators, projects, etc.). It can be easier to know if there is something forbidden in the group than what kinds of things to do. But keep in mind that everything the group does is only a reference, never a limitation.

Key results of this section and my conclusions

Key results:

- Not only the Innovation Business Line innovate, this capacity is also found in the rest of the departments.
- The Accounts Managers for the biggest clients are not comfortable to introduce "experiments". It is common not to want to risk the relationship.
- Weeklies, Biweeklies and Bimonthlies meetings to attend (Executive Committee, Innovation meetings, Innovation Committees).

My conclusions:

- It is necessary to interview all those responsible for the area.
- The innovation department should act as a hub for initiatives to maximize knowledge, efficiency and investment.

2.1.6. Discovering the GAP

We have to know the soft and hard skills that our company has. It is a basic point to create the innovation strategy. If you know how your team can play and how you want to do it, you will have the GAP to cover. With the help of the Human Resources

Department, a map of employee interests and capabilities is needed to create the professional learning and development path. Perhaps part of this task has been carried out by the Commercial Department, because what the team is doing and what they can do is essential for Account Managers. Anyway, a series of meetings with the responsible of dev teams and tech leaders are mandatory.

Key results of this section and my conclusions

Key results:

- There are good professionals and extensive knowledge of most of the technologies that I am interested in promoting.

My conclusions:

- The Group is still building the professional career.
- On demand: there are many people working in the company, I will look for the right team when I need it. In the meantime, I assume that I have unlimited capacity to develop what I can imagine. Learn by doing.

2.1.7. Glossary

There are many books, courses and professionals on innovation, but, curiously, there is no common definition accepted by all. Innovation does not have a standardization of the definitions involved, so it causes misunderstandings with customers and even with our co-workers. Therefore, we have to create corporate definitions to understand them internally and, above all, have a consensual message to the client.

What is the limit of a prototype? Does everyone understand the same for proof of concept? No, I'm sure.

Key results of this section and my conclusions

Key results:

- There is no official innovation glossary published and accepted by all. As also expected, it's normal that a global document has to be approved before to publish it.

My conclusions:

- Create a global glossary will be very difficult and it doesn't in my functions.

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2.1.8. Methodology

There are foundational steps and documents that it could consider as a methodology around the concept of innovation. As the Business Lines are doing their own innovation projects, they manage their own projects with their own music.

<u>*Key results of this section and my conclusions*</u>

Key results:

- There is no official, published and global methodology. Each country and BL acts at its own criteria, it is logical, different cultures different ways to work.

My conclusions:

- Thinking only of my Territory, I have to create a standard methodology for account managers and offer proposals (coordinated with my innovation colleagues, of course).

2.1.9. National and international strategies

It is important to review the strategies that local and national governments have, because the company will have to deal with that. So, it is normal that both strategies are aligned. It will allow better cooperation, alignment of interests, establish new collaborations and share the same goals. On the other hand, the same happens with European strategies, which will probably already be aligned with national ones. This could also open facilities to work with public funds.

Just in this moment, we are living a special moment because an historical milestone is about to come true: The Next Generation Funds.

Before COVID19, the European Commission and Spain were very clear about the strategy in some technologies (artificial intelligence, big data, 5G and many others). At the same time, other important strategic lines are sustainability, equality, transparency that fit perfectly with our mentality.

<u>*Key results of this section and my conclusions*</u>

Key results:

- National and international strategies fit perfectly with us.

My conclusions:

- Any problem to follow European path in Research & Innovation.

2.1.10. Act at short term, plan a medium, and think a long

Some of the two common practices in business strategy guidelines are:

- Create your own team. You have three months to create a trusted team and delegate operational tasks.
- Design your path, plan your strategy, identify and milestones, think about KPIs and create your own vision.
- It is very important to demonstrate a result in a few months (for example, six). No more ppts with strategies, guides, methodologies, etc. Results.
- From the beginning, it is good practice to use OKR (Key Objectives and Results). OKRs are a collaborative goal setting tool used to manage measurable goals, track progress, and foster engagement.

Key results of this section and my conclusions

Key results:

- All account and business line managers are open for assistance. "If it helps to sell more, it is welcome!"

My conclusions:

- At the beginning, there are a lot of things to do and demonstrate that a team is needed to execute all the tasks. I don't count to have own team at least this year.
- I have to define my own strategy and lines of action.
- I have to choose a line of action for each line of business to earn their confidence, starting with the largest.

2.1.11. Strategic alliances

A famous proverb says: "If you walk alone, you will go faster; if you want to go far, go together."

It will be very difficult to turn all your ideas into reality alone, life is complicated enough to avoid traveling companions. Think in terms of efficiency, strengths and weaknesses, favors and connections.

It will depend on the needs, but in general, open innovation is a good strategy almost if your department is starting from scratch. At least, it will be necessary to work in the following fields:

- Public Administration.

- Universities.

- Research Centers.

- Companies associations, like local SMEs.

- Enterprises (from IBEX35, for example).

- European consortiums and lobbies.

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- Local lobbies.

- User associations.

- HUBs, Innovation Centers, etc.

- Innotech Media (News papers, magazines, tech sites, influencers, etc.)

Be open my friend.

Key results of this section and my conclusions

Key results:

- Very important. It will be in the definition of my goal.
- Strategic alliances open the way to new projects, discounts, competitive advantages, access to the latest technologies, laboratories, etc.

My conclusions:

- It is needed:
    - Research Center for research purposes.
    - Universities to attract talent.
    - Companies to make PoCs and use cases.
    - Manufacturers to learn about their latest technologies.

2.1.12. Innotech Media

Any possible channel will be useful to share our message with the rest of the world. Not only to publish information and make yourself known, at the same time it can be useful to attract talent.

If the activities are published and commented on by expert sites or influencers, the initiatives will reach a lot of people. This will also arouse the interest of potential future collaborators, who should quickly become a benchmark in the sector.

Key results of this section and my conclusions

Key results:

- The company is opened to using publications to increase the brand image and associate it with innovation.
- All communications must be reviewed and approved before the publication.

My conclusions:

- Possibilities for blogs, podcast, YouTube channel, twitters and more.

2.1.13. Business Innovation Center

The Group currently has innovation laboratories around the world called Innovation LAB.

Key results of this section and my conclusions

Key results:

- The group is investing in labs because they work well.
- There is an international guide to what a new LAB looks like, meters needed, location, tech-corners, etc.

My conclusions:

- As far as I can read, the intentional guide does not fully match my idea of the lab. I will try to customize it according to the culture and needs of the territory.
- As far as I know, the LABs are not certified and do not belong to the European Network of Business and Innovation Centers.

2.1.14. Scouting Technologies & Emergent + Patents

Key results of this section and my conclusions

Key results:

- Most of the people on the research team are PhDs. They publish articles, talk about events and patent some of their discoverers.
- The research team does scouting directly or indirectly in their work.
- Also, it is not officially regulated how to sale innovation.

My conclusions:

- I have my point of view on how to sell innovation (to be exact, innovation cannot be sold, products can).
- Maybe in the future, I will try to have a person dedicated to the scouting.

2.1.15. Own innovation initiatives

Key results of this section and my conclusions

Key results:

- The company is opened to listening new innovation proposals. There are opportunities to materialize ideas and receive investments to create products.

My conclusions:

- Let's do it. I have several ideas; I could try to conceptualize some of them.

2.1.16. Planning

Key results of this section and my conclusions

Key results:

- Planning is not a requirement for the company, but necessary for the way I work.

My conclusions:

- Let's do it.

2.2. Conclusions and execution

From now on my conclusions. It is based in what I've learned during years mainly from books, research papers, university, competitors and personal experience. Obviously, the best practices that I consider have to be adjusted to the environment where they will be applied, without forgetting the responsibilities, functions and limitations of my position in the company and that it belongs to an international group.

With all the **hypothetical context**, information, and environment, I'm going to define **my proposal strategy**.

2.2.1 New Innovation department: Vision and Mission

Guidelines: Increase company profits.

Main focus: Helps business growth.

I will pay particular attention to how. For me, innovation must have a purpose and will be represented by values such as transparency, professionalism, ethics, responsibility, sustainability, fairness and equality.

Vision: Create innovative solutions that improve people's lives.

With the ambition of having the department where any innovator wants to work.

Mission: Offer innovative solutions to our clients to enhance their efficiency, productivity and competitiveness.

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2.2.2 Business Innovation Strategy: Objectives

Guidelines from CEO: Strategic alliances (companies, universities, R&D, etc.), associations (innovation hubs, clubs, etc.), internal procedures (methodology, standards, etc.), entrepreneurs / start-ups

So, this is my proposal:

Objective 1: Internal Innovation method

Objective 2: Generate impact in the territory

Objective 3: International positioning of Catalonia as a global innovation HUB

Objective 4: Promote digital innovation initiatives with the Public Administration

Objective 5: Increase innovation projects in the private sector

Objective 1: Internal Innovation method

Lines of action:

> O1A1 - Definitions, methodologies and processes
>
> O1A2 - Technology scouting, emergent technologies, patents
>
> O1A3 - Research, development and innovation projects through internal and competitive funds
>
> O1A4 - Strategic alliances with Manufacturers (new products and labs)
>
> O1A5 - Promotion of the Innovation Catalunya brand

Objective 2: Generate impact in the territory

Lines of action:

> O2A1 – Innovation LAB, a laboratory as a nexus of business, social and technological innovation
>
> O2A2 - Mapping the Catalan digital ecosystem
>
> O2A3 - Strategic alliances with local centers (universities and R&D) and entrepreneurship environment
>
> O2A4 - Sector challenges & brokerage events (local offer-demand)
>
> O2A5 - Generate Spin-off from our technologies

Objective 3: International positioning of Catalonia as a global innovation HUB

Lines of action:

> O3A1 - Agreements with vendors and manufacturers
>
> O3A2 - World-wide alliances with Universities and Research Centers
>
> O3A3 - Made PoCs and prototypes, dissemination

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O3A4 - Host in BCN an international innovation event

O3A5 - Attract talent

Objective 4: Promote digital innovation initiatives with the Public Administration

Lines of action:

O4A1 - Include innovation in public tenders

O4A2 - Participate in the Advanced Digital Technologies program, Catalan Government

O4A3 - Formalize an agreement with Catalan Public Administration to participate togethers in NexGenEU

O4A4 - Support social innovation and citizen empowerment

O4A5 - Innovation Days, PoCs

Objective 5: Increase innovation projects in the private sector

Lines of action:

O5A1 - Collaborate in the generation of clients RFIs

O5A2 - Host and participation in Innovation events

O5A3 - Promote innovation in clients RFPs (bank of hours / added value to the offer / specific items)

O5A4 - Test and work with the latest technologies from manufacturers with clients

O5A5 - Research, development and innovation projects through competitive funds with clients

2.2.3 Business Innovation Strategy: Execution

Objective 1: Internal Innovation method

O1A1 - Definitions, methodologies and processes
Example of content:

Innovation is the pillar for **strategy development and competitiveness** of enterprises, especially in the digital age where everything happens very quickly, we must recognize the changing reality of customers, markets and how the competition is adapting to it. Large and rapid technological changes can give companies the opportunity to substantially improve the **value offer**. For this reason, it makes sense to analyze these threats and opportunities in today's strategic approach.

The innovation is considered as a science, a process or even a state, for us it is the conjunction of **analysis, knowledge and creativity** with which we try to solve the problems and needs of the clients, using the advantages offered by the latest technologies. Sometimes the result will improve existing products and services, or create new ones that will even require different business models.

We can collaborate in the entire **value chain** of the innovation process, from

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the ideation, design and implementation, to the maintenance of the production solution.

Processes, methodology and tools

We have established processes to help our clients innovate. Listening, understanding, analyzing and collaborating are some of the many characteristics that we use to discover needs or problems to solve.

Our innovation process is focused on the customer, who really knows how works and what their business needs. Innovation management is carried out through our Innovation Offices where we are with clients and guide them with methodologies, design and the latest technologies.

We use different tools for groups in the **InnoFunnel** where we generate new ideas, discuss the pros and cons , and explore their feasibility with the right business models.

Own innovation initiatives

Innovation is in our DNA. Our Innovation Department works closely with the Lines and Units Business to provide the best solutions to customers. Catalunya company also is coordinated with the Group to benefit customers of all capabilities.

At a global level, we have a team dedicated to research in new technologies with a clear vocation to bring new products to the market. We create our own solutions (hardware and software) in our laboratories, both for use internal and commercial.

Open innovation

The globalized world has brought us a new dimension of collaborative work where there are many benefits of working in an open way, without borders or limitations of the business structure to which we are subject.

The open innovation has been lodged as innovation strategy through which companies can develop their research based on external support , either by internal limitation of resources, time or knowledge. An open innovation also allows bringing the benefits of solutions from other sectors in the era of collaboration , especially in companies like us where its network of partners and clients is very extensive.

Collaborations with startups

Our company has a wide network in the ecosystem of startups, that offers exciting emerging products and solutions. We are committed to promoting new companies that want to create solutions to improve people's lives , our relationship generates a win-win where the entire ecosystem wins.

Change the World !!

Technological and emerging scouting

With exploration, we want to identify technology trends and industry breakthroughs early on . We share with our customers how innovative technologies can transform their businesses , while facilitating connection with the first proof of concept to gain

competitive advantage in their business.

To do this, we identify trends and innovative technologies that are in different stages of maturity (monitored, planned, tested and implemented).

Patent control

We carry out patent control since it is important to identify the first movements in the advancement of technology that could become a trend in the medium or long term.

At the same time, we protect some of our innovations turned into assets with intellectual property rights.

Network of digital ecosystems

We are member of numerous clusters and associations of the digital ecosystem. Manufacturers, suppliers, public institutions, research centers and universities, among others, are part of our network of contacts.

We extend to our clients all our capacities to fit innovation and dissemination in the most suitable environment.

Strategic alliances

Our spirit of open innovation is present in the strategic alliances we have in sectors such as research and innovation, education, health, industry, space, or telecommunications , to name a few.

This allows us to access other laboratories and train ourselves in the latest pre and commercial technologies, with a global vision of the market that offers attractive benefits for customers.

PoC, prototype, MVP

For applied innovation in a company, our team works on the analysis of the environment, analyzes the circumstances and co-designs a solution with the client in the ideation phase. If the conceptualization is approved, we are ready to validate the idea in a laboratory with a proof of concept , prototype or minimum viable product.

Business solutions

We have the capacity to develop commercial solutions, deploy it in a production environment and carry out its maintenance, including any level of Service Desk .

The support is multilanguage and 24x7x365 with SLAs adjusted to the client's needs.

Continuous learning

Our team is continually learning new skills and knowledge. This is done from formal training or social learning. Our sources such as universities, manufacturers, research centers and our own innovation laboratories, provide us with information and test platforms to complement our knowledge and experience.

Our teams have numerous certifications in many technologies, standards ISO and methodologies.

Events

We love innovation and technological events. We attend to major global conferences thanks to our continuous learning process, but we also organize different types of events (public and private) through our network: congresses, masterclass, hackathons, webinars, events challenges, brainstorming sessions, co -design, etc.

Catalog of use cases

We have a large amount of PoC and products, so our teams have wide vision of use cases in the different sectors. At the technological level, for example, we work with Artificial Intelligence, Computer Vision, Chatbots, Robotics, Virtual and Augmented Reality, Blockchain, IoT , biometric systems, and many others.

Innovation LAB

The Group has innovation laboratories around the world: Catalunya will have one in 2022.

For us the Innovation LAB is a Business, Social and Technology Innovation Center, the best place for creativity and learning, attend motivational talks, test concepts, see emerging technologies, collaborative work and, of course, to innovate !!

O1A2 - *Research, development and innovation projects through internal and competitive funds*

We have an internal team dedicated exclusively to researching and developing new products. All of them are not related to the business, so their hours are not computable in client projects, but to assign them a research topic it must be exposed and approved in the Global Innovation Committee. I will follow the usual processes to defend my proposals (objectives, assets, estimated efforts, planning, innovation business model, use case, possible applications, market alternatives, technological maturity, customer service, etc.).

For competitive funds, the Group has an internal process where the project has to be defended as a normal project, instead to have investment from client the investment comes from State (Europe, Spain, Catalonia). Depending on the type of project it will have different percentage of funds (for example IA or RIA).

O1A3 - *Strategic alliances with Manufacturers (new products and labs)*

Worldwide and during these days, the Group closed an international commercial agreement with Google and Microsoft. Therefore, the Territories must take advantage of the agreement and that is why these two giants have been introduced in my strategy, specifically I've defined three lines:

- o   Use of both clouds, for Artificial Intelligence services.

- o Development of applications for both stores (cloud apps).
- o Visit to their laboratories and brainstorming sessions on innovation with specialists from both companies.

O1A4 - Promotion of the Innovation Catalunya brand

- Creation of a section dedicated to Innovation in the weekly newsletter of the company.

- Attend the most representative events and congresses on technology, science, and innovation.

- Creation of innovation posts on the intranet dedicated to innovation (monthly).

- Use of social networks, promoting projects and initiatives.

Objective 2: Generate impact in the territory

O2A1 – Innovation LAB, a laboratory as a nexus of business, social and technological innovation

My objective is creating the Catalonia Lab, but meanwhile if it is needed I can use other LAB company to do co-creation and collaborative sessions with Catalonia clients.

O2A2 - Mapping the Catalan digital ecosystem

It is mandatory to have the ecosystem mapped for different reasons (finding alliances, accessing clients, knowing the competition, identifying research groups, learning about new products from manufacturers, collaborating with startups, listening to user associations, being a member of clusters, etc.).

Universes and main contacts of: Supply, demand, university groups, freelancers, SMEs, service companies, etc.

O2A3 - Strategic alliances with local centers (universities and R&D) and entrepreneurship environment

Most of talent, knowledge, ideas and technology are coming from the R&D centers and R&D universities groups. We have to stablish collaboration agreements to:

- Create a channel to improve the transfer of technology and knowledge from the academic world to the business world.
- Agreement to be a platform for the master's and bachelor's thesis.
- Be an official place for the development of students' practices, validating their official credits.
- Creation of a Chair with local University

In the entrepreneurship environment:

- Stay close, become a member or participate in any of the startups stages (incubators, accelerators, business angels, venture capital, ...).
- Participate as a company (buyer role) in intermediation events (supply-demand matchmaking)
- Participate as a judge in the best startup challenges and contests.

O2A4 - *Sector challenges & brokerage events (local offer-demand)*
- Organize events as a host.
- Participate as a company (buyer role and vendor role) in intermediation events (supply-demand matchmaking).

O2A5 - *Generate Spin-off from our technologies*

Sometimes companies create a solution specifically for a project or customer, but this solution is not found natively in the company's core business. Generating a local company that comes from one of our assets would mean doing things well because its innovation product or service has an interest in the market.

Obviously, this task will only be possible if we are able to create an asset that is interesting enough for the market. My goal here is to assist in the process of starting a business, not in creating discovery assets (tasks on the research team).

Objective 3: International positioning of Catalonia as a global innovation HUB

O3A1 - *Agreements with vendors and manufacturers*

I will use the O1A4 for this task taking advantage of current Enterprise Agreements. It does not mean that it has to be limited to that, the idea is to have the support of different activities of global manufacturers, creating an attraction pool and positioning the company and the territory.

O3A2 - *World-wide alliances with Universities and Research Centers*

It is necessary, and I would say mandatory, to make the agreements with local actors a reality. But if you are looking for international recognition and expanding your brand and prestige, you don't have to limit yourself to your borders, especially when collaboration is easier than ever.

Taking a reference that MIT claims contracts to 5 years and 1M $ per year, I can play with the rest of the Research Centers and Universities worldwide.

However, it is convenient to take advantage of the Group's international presence because they probably have local agreements, so it will be easy to cross agreements Therefore, this is going to be my first line of action, so I will have to find the person in charge in the desired countries.

O3A3 - *Made PoCs and prototypes, dissemination*

Innovating is not just creating, it is developing and bringing the product or service to the real world. For this, we have to promote all the Concept and Prototype Tests that we can, multisectoral, multicultural, multidisciplinary.

Proper dissemination of projects is also very important because it provides marketing and recognition, attracts talent, opens a reputation to international consortia, opens doors to clusters and associations, and more, while addressing business opportunities and solutions for society.

I am contacting the Public and Private sector to, in addition to submitting project

proposals, to be able to carry out proofs of concept without a specific project behind. The hook is to create a win-win relationship where the customer can try new solutions and we can develop a product under real needs.

O3A4 - Host in BCN an international innovation event

We have to recognize that Barcelona is very attractive to the rest of the world, in fact, Barcelona is number eight in the *Best Cities ranking*[10].

It is an incredible city that combines excellent weather, food, beach and cosmopolitan citizens, and, since the last decade, it is recognized for its talent, hospitality, knowledge and pioneer of smart cities.

So, we have the environment and the professionals, that is why we have to choose an excellent theme and collaborators to host one of the best congresses in the world.

Some questions to be transformed in tasks:

On-site or on-line? Main topic? Collaborators? Sector? Type of audience? Promoters? Partners? Funds? Date? One or more days? Etc.

O3A5 - Attract talent

Hiring people is not easy, especially if you want the best team. I want people who don't work, I want people who develop their passion during working hours. A group of people who act as a team and think globally.

These types of people do not work only with salary. It is true, we have to be competitive in this, but we have to be the place where all innovation wants to be.

Some of the points to develop:

- Excellent working conditions.

- Challenge projects.

- Oriented to Impact Innovation.

- Possibilities of temporary exchanges with other departments and companies of the Group.

- Internal promotions

- Collaborations with startups, universities and research centers.

- Effective dissemination

- And more.

Objective 4: Promote digital innovation initiatives with the Public Administration

O4A1 - Include innovation in public tenders

This strategic line requires the inclusion of a special chapter on Innovation in any Public Administration tender. From now on, any project regardless of its purpose will include

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[10] https://www.bestcities.org/rankings/worlds-best-cities/

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innovation services. These services will be adapted to the circumstances, of course, but I mean, for example, co-creation sessions, Innovation Office service, bank of hours for development, consulting, technological evaluations, scouting, testing, invitations to visits laboratories, attendance at events, etc.

O4A2 - Participate in the Advanced Digital Technologies program, Catalan Government

I personally collaborated in some of the ideation processes of the *ADT*[11] projects, now I would like to contribute in their implementation.

O4A3 – Formalize an agreement with Catalan Public Admin. to participate togethers in NGEU

In fact, this goal is broad because applies on any competitive project, regardless of its nature (Horizon, Next Generation, etc.).

Municipalities are usually open to showing new solutions for smart cities and other ideas that can improve their services or the relationship with citizens; Also, the government used to be interested in health, education, security, and more.

To face consortiums to present their proposal for European funds, it is very important to have the support of the local public administration.

O4A4 - Support social innovation and citizen empowerment

As we have seen in the first part of this document, Europe is promoting the idea of empowering citizens, and different Horizon initiatives, for example, come to reinforce social innovation to avoid gaps in technology, financial position, culture, race, sex or religion.

As equity and equality are in our values, we have to be close to these types of movements and join in projects such as Digital Innovation Hubs.

O4A5 - Innovation Days, PoCs

Co-creation days are actually business days, because the customer shares their problems and needs with you. Innovation Days spawns a set of initiatives that will hopefully turn into PoC, and who knows if it will turn into a product.

This initiative is specified in Innovation Workshops already defined in this document.

Objective 5: Increase innovation projects in the private sector

O5A1 - Collaborate in the generation of clients RFIs

In business there is a saying that if you receive an RFP from a client in which you have not participated, it means that you are not well positioned and, therefore, your participation is for "filler".

As I mentioned before, especially in innovation it is very important to be present at the moment of co-creation, the moment in which the ideation and conceptualization of these

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[11] http://smartcatalonia.gencat.cat/ca/projectes/tecnologies/tecnologies-digitals-avancades

ideas is taking place could precisely become an RFI. Part of this strategy is to give away the co-creation service (that links with the O5A3).

O5A2 - Host and participation in Innovation events

At the same time there are open events and conferences where clients attending, some clients use this format to create their own internal events (health sector, or industry, or retail, ...) and promote some ideas or processes (yes, they are large companies).

The goal here is to partake in an association or lead one. I have to discuss with account managers whether it is appropriate to create individual sessions or whether it can be productive to sit together with certain clients with the same concerns to increase knowledge. If they don't see themselves as competitors, some clients like to do joint open sessions to chat with their namesakes and see how they face the same challenges (for example, universities. On the opposite side, the pharmaceutical sector).

O5A3 - Promote innovation in clients RFPs (bank of hours / added value to the offer / specific items)

It is similar to O4A1, but in the case of a purchase request, the innovation part should fit the scenario with the following preferences:

- Specific innovation proposal.

- Innovation as a value offer.

- Bank of hours for the development of PoCs.

As I mentioned earlier, client co-creation sessions are included by default in any proposal.

O5A4 - Test and work with the latest technologies from manufacturers with clients

For some clients, the innovation is to use the latest firewall, for example. They are absolutely geared towards using the latest manufacturers' products because they like to test and include the new benefits that the new released products offer them. They are early adopters, but, are they innovating in any way?. Yes, they are, what if the latest firewall includes artificial intelligence algorithms that can handle new ways of creating rules in real time?

This objective is for them, because we are in contact with the latest technologies and we have access to the laboratories and pre-products of the manufacturers.

In this objective I will include some of the products of the manufacturers in our laboratories.

O5A5 - Research, development and innovation projects through competitive funds with clients

Clients generally cannot do all the projects they would like to do due to financial constraints, especially if the project has a "risk" component (because *it is innovation*). One way to make it happen is to win a competitive project and, for us, it is the direct way to do a research project with some clients.

Here, the strategy is to find the right clients to present some projects together.

The idea is to present some projects, the objective is to win some.

2.2.4 Innovation Department Organization

For this specific case, I don't think it is necessary to have a specific innovation team in Catalonia, at least for an immediate period. The reasons are several, mainly because we are just starting and we still do not have tangible projects, and the Group has an international team with different roles in which I can work.

Anyway, I am going to describe the main ideas that should be part of my department but, at this time, they will be distributed to the Global Innovation Business Line.

Figure 7. Innovation Department organization
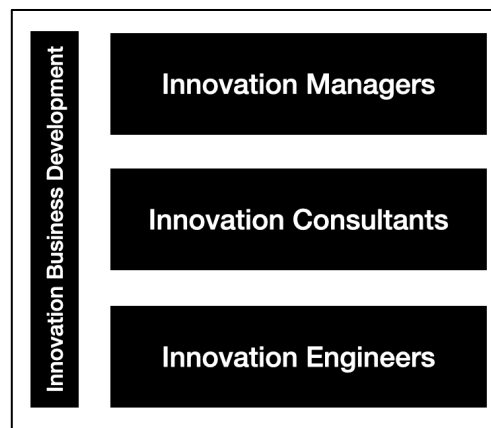
Source: Self-made

Innovation Engineers. They are specialists in their areas. They are usually the most technical team, and perform different tasks such as technological scouting. Here we can find developers, AI engineers, etc. The team is balanced with Juniors and Seniors.

Innovation Consultants. It is usually a multidisciplinary team, that is, it is not necessary to be just an engineer, in this type of team we can find sociologists or anthropologists as well. Their main task is to organize and attend co-creation events, they are very creative and social people. Seniors have more presence than Juniors on the team.

Innovation Managers. This team manage the projects and is responsible of the proposals. They are the architects and have wide knowledge of new technologies and business. The team is composed by Seniors.

Innovation Business Development. Here the team is specialized by sectors in the ecosystem. One responsible for each group: public, private and entrepreneurship. Also they are completed Seniors.

Teleworking?

Due to the controversy of teleworking, I have to admit that innovation is one of those things that requires presence if you want all the juice. Yes, I have worked a lot with collaborative tools but innovation is not that simple meeting, it requires sensations that are still so far away through the screen. The mixed situation (remote and presence) is and will be the new era for people who have the possibility of combining the scenarios. In my opinion, the remote workers will be the workers of the company, leaving for the presence (and mixed) team the label of those identified by the culture of the company. For example, I see the people in the support departments teleworking 100%, but the person who organizes the brainstorming doing, at least, a mixed solution.

Open space?

Derived from this, the next thing is to know how many desks we need in the office. Internally, the Group has estimated that 30% of people will always be away. The rest of us will combine the options. One thing for sure is that the new offices will be open spaces without private offices to maximize space and create a collaborative environment. The office will be the place to meet, not to work.

International team?

Yes, of course, that is not even asked! In fact, ethnicity, gender, skin color or religion cannot be parameters of choice. Instead, enthusiasm, passion, curiosity, respect, creativity and many others are important.

Management?

Yes, with Agile Team Management, and probably with OKRs (Objectives and Key Results). One of my recommendations that works for me is the Weekly Planning meeting, where each team member (regardless of role) has one minute to explain what happened in the week and one more minute to explain planning for the next week. Synergies, understanding, the ability to synthesize and more are the benefits of this type of meetings (when they were in *presence* they were standing meetings).

Applications?

We will need specific tools for our services, but they are not defined yet. For example, tools for webinars, to record sessions, where and how to take notes from brainstorming meetings, how to catalog it, classification or database with all ideas (proposals, rejected, accepted, ...), technological repository- news and solutions (exploration), collaborative tools (virtual post-it, whiteboards), forms, surveys and more.

2.2.5 Associations, clusters, agreements

To be or not to be, that is the question. You have to be in the associations, you must have agreements. The business world works at this way, particularly the innovation ecosystem. The win-win relationships is *by default* for me, always is possible to collaborate with someone and, even if you don't want it, it will be beneficial for you.

2.2.6 Technologies

Now, I am going to comment very briefly on the technologies that we will focus our attention on:

- o **Artificial Intelligence**
  - ▪ I like to say that AI is not a technology to apply, it is the basis of everything. No matter what part of AI you are applying (machine learning (ML), deep learning (DP) and their famous neural networks), each application will switch from conditional algorithms (if X then Y) to machine learning processes. One of the biggest beginnings here is natural language processing (NLP), which combined with text-2-speech (and vice versa) promotes the use of chatbots and assistants (especially with GPT3). Another technique that is also very common is computer vision, and now, the last projects that I am designing have been with Generative Adversarial Networks (GAN). In any case, I think the world is already lagging behind technology: AI is more advanced than laws, and regulation is still one step behind.
- o **Digital twin**
  - ▪ I have been defending for three years that Digital Twin (DT) is the solution to many of the problems we have. I like the concept, but I recognize that it is difficult to get it right. This type of project shows the power of data, that if applied with sense, we can generate environments to understand the reactions of possible variations helping in management, design and more. Incredible possibilities with DT, especially when combined with other technologies.
- o **Robotics**
  - ▪ With AI, robotics enters in new paradigm. With intelligence they can do many things as vigilance (security), social care (health), receptionist (building), guide (tourism), teacher (education), etc. We have to recognize that the projects are using robots have futuristic vision with marketing plus, I suppose it because it is something physical to see.
- o **Immersive environment**
  - ▪ I remember when I studied in my first grade the subject "Virtual Reality" because I was a fan of 3D-Studio (yes, totally influenced by the movies Tron and The Lawnmower Man). Virtual reality (and variations such as mixed or augmented reality) is a technology that has not yet found the right way to be popular with widespread and common use. Now, with the speed of networks and computing power, immersive technologies are ready to be essential in entertainment and professional life. Use cases such as e-learning, remote assistance, tele presence or immersive experiences, are possibilities that we are exploring at this time.
- o **5G**
  - ▪ 5G is not just about speed, it is about new services. 5G will allow security, low latency, high capacity or use of private networks, for example, and will open services, such as data control, building automation and infrastructure, smart agriculture, logistics or fleet management.
- o **V2X**
  - ▪ Vehicle to everything will be present in a massive way in a few years. It is a vehicular communication system that can interact with V2I (vehicle-to-infrastructure), V2N (vehicle-to-network), V2V (vehicle-to-vehicle), V2P (vehicle-to-pedestrian), V2D (vehicle-to-device) and V2G (vehicle-to-grid). Many services will be around the vehicle, with special attention to road safety, traffic efficiency and energy savings.

- **Cybersecurity**
  - I cannot understand how security is maintained as an add-on in projects. Actual security must be designed from the ground up and not as an add-on before the product is up and running. For these bad practices, the word has security holes!
- **IoE**
  - Internet of everything. We are on the path that everything will be connected, sending and receiving data, accepting orders, allowing control, doing what and when we want, … Yes, we will live in an intelligent world, but observed? It seems that the same thing that we are living with the software on our mobile phones where we are constantly monitored, is going to happen with the physical world (washing machine, coffee machine, dishwasher, etc.). We must pay special attention to ethics and cybersecurity.
- **Blockchain**
  - It is a technology that fights against capitalism. Try to escape the control of large companies with the idea of decentralized network, transparency, security, consistency and more. Bitcoin could change the economy and universal identification could change governments. There are some examples where one bit could impact the world. I'm really interested in the transformative possibilities that Blockchain offers.
- **Space**
  - During the last years, Generalitat de Catalunya is promoting the projects of New Space, they called New Economy. Strategic technology with the politician's support, and with huge possibilities of new services

2.2.7 Own initiatives

This section is for my own initiatives. I really enjoy creating ideas and designing possible projects, that is why I usually gather all the ideas in a single *Powerpoint* to centralize this type of information, because at the same time it facilitates the presentation. I recommend this practice because we have to manage innovation, but we also have to create it.

The content is very simple: title, summary in one sentence, description (4-6 lines), an outline and target market / user. Only one slide per idea, it has to be simple to understand the problem (or need) and the proposed solution. The idea that I like I share with the team and then I work to conceptualize it.

2.2.8 Why Catalonia?

Figure 8. Innovation consolidated ecosystem, Catalonia
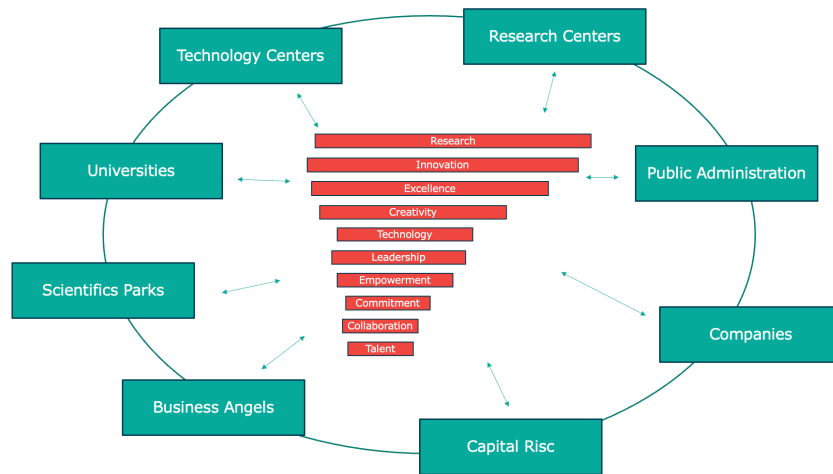
Source: Self-made

Ministry of Digital Policies and Public Administration

Smart Catalonia, NewSpace, Center of AI, Cybersecurity Agency,…

Mobile World Capital Barcelona

MWC, Startup Business Platform,…

Research Centers (#40)

i2CAT, Eurecat, ICFO, IEEC,…

Patents (+180K)

1st region in Spain (EPO 2020)

Universities (#12)

UOC, UPC, UPF, URL, UB, UAB,…

Entrepreneurship and HUBs (+1500 companies)

Catalonia Startup HUB, BarcelonaTechCity, UrbanTechHub,..

Foreign investment

+365M€ (30% TIC 2019), +6K new employees

Companies

Facebook, Amazon, Microsoft, Siemens, Oracle, Satellogic, King,..

22@ (+200 hectares)

The Innovation Business District

Figure 9. Some *businetch* news in Catalonia

Source: Self-made

2.2.9 Summary and next steps

Summary

As the process is extensive, I could summarize all the steps it in two big blocks:

- Block one. Information.
    - o Collect information, read about the company on social media, website, public financial reports, etc. Also good information (not written) comes from the receptionist, personal assistants or staff members in general.
    - o Meetings with the teams. Get to know as many people as you can, first the key people detected in the previous point. Understand the capabilities, discover the illusion, and detect the concerns.
    - o Know the procedures and the environment, when are the main meetings, who is part of the internal lobbies. Look for strategic meetings where innovation can help and be part of them. In turn, it is necessary to find the people who move the rest of the people, keep in mind that sometimes they do not appear in the organization chart.
    - o Join head-to-head meetings that are relevant to your goals (eg Executive Committee and Global Meetings).
    - o Maximize the relationship of trust in the General Manager. If innovation is the true lever of the company, understanding must be total. In many organizations the Director of Innovation acts as the Deputy General Manager.

- Block two. Work.
    - o Work sessions with the Business Line, especially with those with more business.
    - o Detect an opportunity and make it happen. It is important to have a result in the first three months, it will position the message.

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- o If you cannot hire employees for your team, create your own alliances with current employees.
- o Develop external relationships. Make organization agreements for general collaborations but make a few for specific use cases (public and private sectors).
- o Be part of the entrepreneurial environment. Hackathons or Challenges events are a good starting point. If possible, do business with the startup.
- o Detect an internal asset and promote it (from the internal Business Line).
- o Detect an external asset and try to transfer it (from the University Research Group or the Research Center).
- o Create your own definition of Mission, Vision and Values for the Innovation Department.
- o Create the objectives and lines of action to achieve it. Define KPIs for governance and task planning.
- o Schedule a weekly meeting with the General Manager and create a report with two parts: important points about what happened last week and main objectives for the following week.
- o Make the conceptualization of one of your own ideas.
- o Be a volunteer. Step forward to lead an action if an opportunity appears, especially if it is international.

Next steps

The following steps are clear:
- o Establish KPIs for the governance of the lines of action.
- o Plan the lines of action to achieve the objectives, and
- o Make it real.

I have to work in parallel with continuous learning and work with Business Lines (dynamizing clients, improving offers in managed services and tenders), while I establish strategic alliances and think about the CATLAB in Barcelona.

My recommendation here is clear: clean thoughts, listen, collaboration, go straight to your goals, and …, innovate!

2.2.10 One more thing

Is it possible to have a "R&D Foundation"?

The world of innovation is closely linked to this type of initiative that provides both economic and professional advantages, it is a very interesting option that could be explored at the corporate level.

I want to promote impact innovation, where part of doing incredible projects for the business world, we must contribute to making a better world. As a company it is clear that we must increase profits, but how we do it is very important. I mean, I want to be able to use computer vision made for a bank to improve cancer detection; or use a traffic management algorithm developed for a transport company, in the efficient food delivery solution of an NGO, for example.

If we had an R&D Foundation within the Group, much of the research, development and innovation that we do could be channeled through it.
I list some of the advantages I have found in the last three years working for a nonprofit research foundation:

- It would open a lot of **contact doors** for us since we should have key people on the board (normally they are personalities from other entities such as large companies, governments, city councils, universities, clusters, etc.).

- We would gain in **reputation and brand image**. Large corporations have a Foundation, for example La Caixa, BBVA, Abertis, Repsol, Naturgy, Vodafone, Telefónica, etc. In our sector, the main competitors also have Foundation, for example Accenture and Everis. The relationship with the media is much more fluid when it comes to a Foundation.

- We would gain **recognition, visibility and influence**. Private companies would look at us with different eyes when approaching us to carry out innovation projects, since clients see service companies as "sellers" and Foundations as "collaborators". The values of respect, equality, commitment, etc., are promoted through a Foundation. If we really want to do impact innovation, this is the way.

- It would improve the **relationship with the Public Administrations**. Not only because of the Board's contacts, but also because the Public Administrations have collaboration agreements with Foundations without going through the purchasing and bidding processes that a private company has for the transparency of public funds.

- It would help the **Group's CSR**. In addition to the social responsibility actions carried out by the Group's companies, the Foundation would be the spearhead and the emblem of our commitment to society and the environment.

- We would have **tax benefits**. There are taxes that are not paid, in addition to the contributions that the Group could make to allow deductions. For example, the group of +130 people dedicated to innovation at a global level could be part of the Foundation.

- It is exempt from **payments and fees** for collaborations or taking advantage in certain associations / clusters. For example, the Alastria (Blockchain) fee where we are already members as a company, for a Foundation is free.

- Foundations can **easily access grants** in competitive projects, especially European projects (eg Horizon program), as the EC has preference when it comes to investing in research groups rather than private companies. This point is important since, as I mentioned before redirecting knowledge and assets from the business world to the social good, the path is totally reciprocal. In other words, the knowledge generated in subsidized projects could be used in business projects without investment on our part

I'm not talking about philanthropy or charity, I'm talking about a way to drive **business, brand, and impact**

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ANNEXES

REFERENCES

Throughout my professional career I have had the opportunity to learn from each environment in which I have worked and from their teams. Some of them have been mentors not only in technical matters, but also in ethics. For this reason, my personal and professional growth has been growing along with results that I am proud of.

This knowledge, made up of experience and official training, is complemented by one of my hobbies: reading. For many years now, I use to read several books a year, so with this and my long hours of reading on websites, papers, magazines, etc., it is very difficult to list all the references that have contributed to my thinking that has finally been the engine of this thesis. For this reason, the list below is only the recent material that I have consumed during the thesis period.

A.1 Books

(1) Direcció de la Innovació; (2) Transformació Digital; (3) Gestió d'implementació de la innovació
Various authors
Editorial UOC, Master Innovation & Digital Transformation, 2020
University documentation

Fundamentals of Strategic Management
J.E. Navas-López, L.A. Guerras-Martín
Editorial Thomson Reuters, 2018
ISBN: 978-84-9197-760-5

Making Innovation Work: How to Manage It
Tony Davila, Marc Epstein, Warton School
Editorial Pearson FT Press
ISBN: 978-01-3309-258-5

Cómo dirigir la innovación: Una metodología para gestionar la evolución de una empresa
Julio Enrique Anleu
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La paradoja de la innovación: Por qué las buenas empresas mueren de éxito y qué hacer al respecto
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Por una España Digital
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A.2 Internet resources

Board of Innovation
https://www.boardofinnovation.com

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Action research for innovation management: three benefits, three challenges, and three spaces
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2017, Pages 5-6
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The Culture for Open Innovation Dynamics
Yun, Jinhyo & Zhao, Xiaofei & Jung, Kwangho & Yigitcanlar, Tan, 2020
https://www.researchgate.net/publication/342365657_The_Culture_for_Open_Innovation_Dynamics

A.4 Tools used

These are the main tools that I have used for this study:

- Apple Keynote
- Obsidian
- Microsoft Word
- Microsoft Excel
- Amazon Kindle
- eBiblio
- Web browser
- Spotify
- Notebook & pencil
- Post-it

- MacBook Pro M1
- Apple Keyboard & Magic Mouse
- Samsung Ultrawide 34

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Of a son
who will always love you,
mom