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Innovation and Technology Management

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Nowadays, in high-tech industry, innovation has an important role in the process of developing successful products and services. In this thesis, innovation is described as the creation of revolutionary ideas in the technology and business areas where the objective is to improve the existing products or to develop new products or services that will provide the company with a good position in the market.

In the sense used in this thesis, innovation does not refer to using or creating new technologies. Instead, it is a complex process where many external and internal factors are involved such as the technological research, marketing strategies, distribution strategies, intellectual properties, competitors, needs of society, learning capacities and adopters of innovations.

The goal of this thesis is to show the key aspects of innovation in order to obtain a clear idea of the field of innovation. Before starting an innovation project, it is very important that the targets of the innovation are very clear, such as the innovation's rules, the different types of innovation, the learning innovation systems, the different stakeholders involved in the innovation process, the diverse innovation systems or the various innovation strategies.

Therefore, this thesis will help potential entrepreneurs get a closer approach and to understand the key points of innovation to create a robust innovation strategy and to develop successful products and services.

Keywords	Innovation rules, types of innovation, innovation strategies, innovation systems, S-Curve innovation, categories of innovation adopters, open innovation.

Contents

1 Innovation and High-Technology

Innovation is the way through which a new idea can produce new successful products or services through diffusion, based on the market needs. Innovations are the key point of the economic growth and they can change the way an industry or a society gets transformed.

Innovations can appear by chance or through a systematic search via research and development; however, all kind of innovations have the same point of view: they are new, they produce changes and they provide competitive advantage.

This chapter introduces the different eras of industrialization and technology. Then, it defines the main concepts of this thesis: innovation, technology and high-technology.

To have a first contact with the innovation process in the companies, this section shows a very useful tool that many companies use to develop their new products, the %technology mapping+ and it will finish discussing a high-technology industry classification.

1.1 Eras of Industrialization and Technology

From the beginning of the sixteenth century, with new scientific advances in sectors such as physics and mathematics through innovation, humanity has created new technologies that have changed societies drastically and ruthlessly. Through creating new technologies, society has progressed from the feudal era to the industrial age, and nowadays to the globalization epoch. This huge change is denominated "The Technology imperative" and no society has been able to resist. [5, 5]

During the 1300s and 1400s in Europe, new technologies appeared such as the gun and the printing press. These new technologies were invented in China but it was in Europe where they were innovated. At this point, it is important to indicate that there is a notable difference between invention and innovation [5, 4]. Innovation is an invention that becomes implemented and taken to be marketed. So, with these new technologies (guns and printing presses), the feudal age finished making it easier to advance to a

new age with a different society, the modern society. The modern society became possible because, as mercantile societies increased and the printing press was invented, books became cheaper making the secularization of knowledge easier. [5, 4]

After the fifteenth century, European countries, North America and Japan fought in order to obtain more power. The necessity to improve the army and be superior economically made it possible to create new scientific technologies.

Nevertheless, when did the development of scientific technologies begin? Science developed dramatically in Europe in the seventeenth century when scientists such as Isaac Newton combined the old ideas about physics (from Galileo, Copernicus, Kepler) with the mathematics ideas from Descartes and others to create the new theories of space, time and the Newtonian paradigm of physics. Figure 1 illustrates the evolution of science, technology and economics through the centuries. [5, 5]
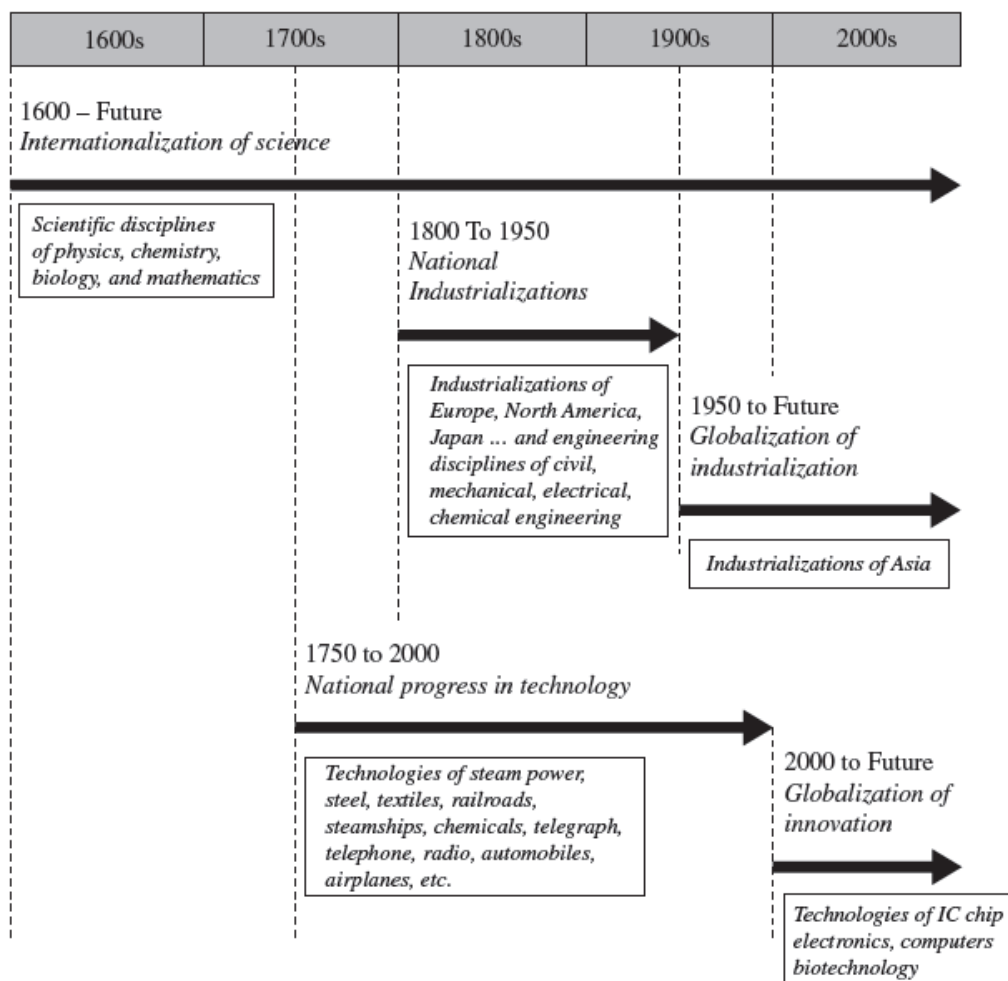

Figure 1 Timelines of science and technology

Data gathered from Managing Technological Innovation [5, 5]

Figure 1 shows the evolution of science as a period of four centuries, and the interna-tionalization of it by continents and nations can be noted. In the eighteenth and nine-teenth century, with these new theories, there were important advances in physics, mathematics, and with these advances, new disciplines like chemistry and molecular biology appeared. In the twentieth century, there were important advances in electron-ics, computer technology and biotechnology. Also, it is possible to observe that the science and industrialization development of the nations occurred in different times. From 1765 to 1865 (the first hundred years), the main industrialization occurred in Eu-ropean countries like Germany, England and France. From about 1865 to about 1965 (the second hundred years), other European countries began industrialization but the most powerful industrialization was in North America. By the 1940s, North America had huge industries and this is one reason for determining the conclusion of the Second World War. For the second half of the twentieth century, North America continued with this huge process of industrialization and innovation whereas European countries that were destroyed in the Second World War, had to rebuild their industrial capabilities. From 1950 and to the end of the twentieth century, Asian countries such as Japan, South Korea and Taiwan, also became industrialized gaining a lot of power upon entry into the competitive global market. [5, 6]

In the twenty-first century, China has had several economic reforms that led them to be the major manufacturing nation in the world. India also began to further industrialize more specifically in the computing and software engineering. [5, 6]

In summary, there is a pattern of world industrialization in three different phases of a hundred years each when different regions began to develop competitive industries [5, 6]:

- ″ Europe . The first hundred years (1765-1865)
- ″ North America . The second hundred years (1865-1965)
- ″ Asia . The third hundred years (1965 - 2065)

For the industrialized nations technological progress was a national asset. As the sec-ond half of the twentieth century began, a new pattern emerged that would change the world; the beginning of globalization of technological innovation. [5, 6]

In present times, world trade and industrial production is a global matter. In the 1980s, global markets had 17 percentage of the total economic activity and were still growing; in the 2000s they held 26 percentage. Global trade has increased a lot since the 80s as companies have decided to spread around the world to minimize cost and maximize benefits; multinationals came about through this increase. [5, 7]

Most of the nations of the first and second world wars developed their industries but not always with the same result or efficiency. At this point, it is important to identify the features a nation may have to adopt to be successful in the act of industrialization. According to Michael Porter (Professor at Harvard Business School and leading authority on company strategy and the competitiveness of nations), there are several factors in all the success of the industrialized nations: political forms, domestic trades, national and industrial infrastructures, an effective research structure in technologies, a good educational system, police and judicial system, public health, energy systems, transportation systems and of course, good communication systems. [5, 7]

Another important feature identified with bringing success in this global market is having good interactions between the universities of the sciences, high-tech companies and invested capital companies. The most famous example of this model is Silicon Valley, in the north of California in the United States. This area developed a huge market in chip industry and computer industry. Stanford University, University of California and Berkeley played an important role in the creation of this area as have the venture capital firms that are investing a lot of capital in this sector. [5, 4]

1.2   Technology, High-Technology and Technology Mapping

In the current age, technological innovations are, with doubt, the most important field in changing our society. To better explain the meaning of technological innovations, it is a good idea to discuss them separately. As a result, the goal of this section is to describe the meaning of technology and its most important features. [5, 4]

The word technology comes from a Greek term meaning %of art, skilful, practical+. In modern terms this concept relates to how society uses tools and knowledge in order to find solutions to problems or needs. High-technology refers to advanced technology

that changes with time. [5, 13] For example, when the company Apple presented its first computer, Macintosh 128K, in 1984, it was viewed as high-technology. As technology can advance with time, the Macintosh 128K is no longer consider high-technology as Apple has since then developed newer technologies. This term changes very quickly because companies are investing in a lot of resources in R&D, science and technical personnel in order to get patent rights.

To identify which industries are involved in high-technology, finding the next features in them is required [6, 2]:

- ˝ High demand for scientific research and intensity of R&D.
- ˝ High levels of innovation.
- ˝ Fast diffusion of technological innovations.
- ˝ Fast process of obsolescence of the prepared products and technologies.
- ˝ High levels of employment of scientific and technical personnel.
- ˝ High capital expenditure and high rotation level of technical equipment, replaced by more modern and innovative devices.
- ˝ High investment risk and fast process of the investment devaluation.
- ˝ Intense, strategic domestic and international cooperation with other high-technology enterprises and scientific and research centres.
- ˝ Implication of technical knowledge in the form of numerous patents and licenses.
- ˝ Increasing competition in international trade.

One of the most important tools that companies use to monitor the technological trends and manage the company's resources is a technology map. It defines the entire new product that companies are interested in developing as well as their development incremental. It is very useful to redefine the plans when there are some confusions, contradictions or problems. Companies that design the next-generation products use this tool to determine the decisions amid technological and market incertitude. This map is not static and has to be updated and checked regularly. Sometimes companies can have influence in the technology map over their competitors because this tool can change as the functions of innovations of others companies change. [4,272]

A clear example of this can be seen in the huge competitive industries of semiconductor chips (AMD and Intel) from 2003 to 2006. In 2003 AMD struck Intel presenting its new microprocessor with a 64-bit processor, the Opteron. In 2005 AMD had stolen a

huge part of the Intel market and carried on in this way with the presentation of new innovations in the energy efficiency of Opteron. This made Intel change its technology map in order to find new products to compete with AMD's products. Finally, with the suitable changes in its technology map, Intel was able to launch on 2006 November a powerful and energy-efficient microprocessor, the four-core microprocessor. [4,272]

Figure 2 shows the principal technology mapping cycle. This process is a cycle; when the last step finishes, step 1 begins and all the processes are straightaway reviewed and improved.

Capon and Glazer provide the following steps in developing and managing the technology resources:

1. Technology Identificaton

4. Ongoing Product Management
-Modularity
-platforms and derivatives
-Customizing Complex products
-killing projects
-Intellectual property issues

2. Decide on Needed Technology Additions
- Internal development
- External acquisition
- Partner to co-develop

3. Decide on "What-to-Sell" Strategy
- License versus and commercialization

Figure 2 Technology Mapping.

Data gathered from Marketing of High-Technology Products and Innovation [4,273]

1. **Technology Identification.** In the first step, it is important that the company elaborates an inventory with the know-how technologies that it has in order to find the most important value of its products or process technologies. Firms use process technologies to develop the routines and procedures that follow in their development process. These processes can include manufacturing technologies that the firm has innovated, marketing innovations, lab equipment or scientific processes used in R&D. [4,273]

   In this part of the map, firms are most concerned with their current core competencies. This situation benefits the innovation process related to incremental innovation but is also an important focus in other competencies that are not of the core business interest to increase the radical innovation process. [4,273]

2. **Make Decisions about Technology Additions.** In the second step, a firm needs to decide which new technology trends are appearing and which ones will influence its business.[4,274]

   The goal in this stage is to identify areas of weakness in the company's technology portfolio allowing them to make informed decisions on how to solve them. When a firm finds, through technological process and researchers, new products or services to round out its offering, it must make a technology addition decision. A company may decide to develop the new services or products itself (investing money in the R&D department), buy the company that has implemented the new technology (external acquisition) or collaborate with firms in order to get common goals (partnering). The key issue is how to make the right decision. This can be done through the following guidelines [4,274]:

   A firm could use internal development if:
   - ˝ The R&D area is close to current corporate skills.
   - ˝ The firm wishes to keep its technological thrust confidential.
   - ˝ The firm's culture fosters the belief that only good technology is developed internally.

   In other cases, external acquisition makes sense if: [4,274]
   - ˝ Someone has already developed the technology and acquiring the firm may save money and time.
   - ˝ The firm does not have all the skills to develop the technology.

˝ The firm looks to advance competitively over a potential competitor that is using the same technology.

˝ The firm wants to obtain the distribution channels or use the name of the brand of the other company.

Between internal development and external acquisition there is another strategy; making an alliance with the competing firms or firms that can make a piece of the product solution for the product development. [4,274]

3. **Make Decisions about Commercializing, Licensing, and So Forth.** After deciding upon which kind of technology addition will follow the firm, it is important to think about how much time is needed to develop their products. Starting with commercialization, here are some examples on designing a commercialization strategy: Should they sell the knowledge or license it? Should the firm make the marketing strategy or distribution process of the product? Should the firm offer solution services and support? Should the firms manufacture the complete product or should they contract other firms to create subsystems? These aspects have to stabilize at this stage. [4,275]

4. **Ongoing Management**. This is the last step in the mapping technology cycle. After make decisions about commercializing, licensing and so forth, the firm needs to manage its entire technology asset base. Issues such as **modularity**, which aims to build a complete product through small subsystems that work as a whole, create new **platforms and derivatives** in order to develop the ‰next-generation+ products (platforms) and improve their features with time (derivatives). [4, 277]

A clear example of this is how Intel develops its microprocessor chips. Initially, Intel creates the platform and then, with time, they launch it onto the market with new derivatives to improve the features of the initial platform (see figure 3). [4, 284]
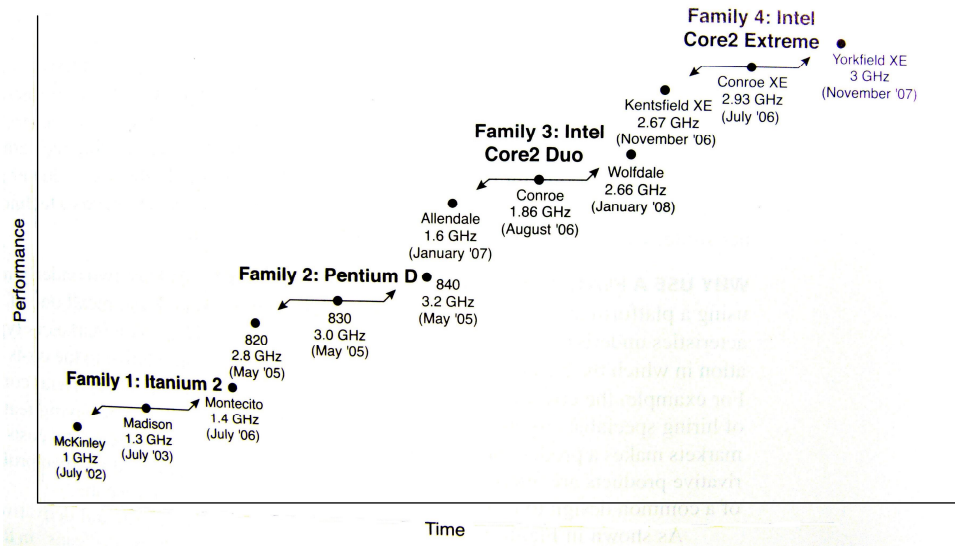
Figure 3 Product Platform and Derivatives, Intel's Case.
Data gathered from Marketing of High-Technology Products and Innovation [4, 284]

Customizing complex products is the way in which companies sell their products to customers depending on customer needs. For vendors it is easy to customize products if the customers have knowledge about the technology that the company is going to use. **Killing projects** is another issue that should be considered in ongoing management. Managers try to collect objective information about the situation of their products in the market. The problem is that sometimes the information gathered is incorrect. Here is some advice that the manager could follow to make sure the information is correct [4, 285]:

i. Managers should find different kinds of courses of action to identify problems and advantages. Creativity is an interesting skill to identify new options and is advantageous for the company as it promotes a work environment where all the employees can express and suggest new ideas freely. It is important that a group holds different people with different skills to allow skeptics and enthusiasts to make objective conclusions. Also it is important to have an "exit champion", someone that can make difficult decisions when there are hard objective evidences. [4, 285]

ii. Managers have to prepare key stakeholders for an imminent change and try to manage impressions. Trying to delete the project from the core of the firm will help. [4, 286]

iii. Biyalogorsky, Boulding and Staelin say that managers should [4, 286]:

˝ When a new manager (without previous beliefs) coordinates the project, he or she takes the decision to continue or kill it.
˝ Use stop rules found from objective information.
˝ Use and develop policies and procedures that affect decisions.

Intellectual property issues are another task referred to in this step. In this case, the company tries to work on issues such as patenting its inventions, deciding on the management of each patent depending on the country and forming internal issues of licensing agreements. [4, 287]

1.3   What Is an Innovation?

The word innovation derives from the Latin word %novates+which means %o renew or change+. According to Peter Drucker (one of the most influential people in management corporations), %nnovation is the effort to create purposeful focused change in an enterpriseq economic or social potential+[18]. This statement positions innovation as a robust tool for every CEO but it does not catch the idea about competitive survival. An innovation is the practice of commercializing an idea or a practice that is perceived by the market or society as something new, whereas invention means the creation of a novel idea or practice. [2, 11]

Innovation provides the opportunity to grow faster, better and smarter than competitors through constant evolution, developing new services and products.

For some companies, innovation means not only the opportunity to grow and survive in the global market but it provides the chance to influence the directions of the industry just as Apple computers did when the company presented ITunes and the IPod. ITunes is a platform that has changed the way in which producers sell and consumers buy music in the music industry.

The adoption of different innovations is distinct depending on the product or service. For example, smartphones only have needed a few years to reach widespread adop-

tion but in the case of seat belts, it took decades before they caught on. The features of innovations help to show the dissimilar rate of adoption:

- ˝ *Relative advantage* shows how the innovation is perceived by the user, most importantly how beneficial the innovation will be for the individual. The greater the perceived relative advantage, the faster its rate of adoption will be. [2, 212]

- ˝ *Compatibility* shows how the innovation is compatible with the moral values, religious and other social variables. If the innovation respects these factors, it should not have problems being adopted in a short space of time so it presents a relative advantage. [2,224]

- ˝ *Complexity* shows how the innovations are understood by most members of society. Simple innovations that do not require new skills and understanding from the individual are quicker to adopt. On the other hand, innovations that are very complex and difficult to understand have a slower adoption process. [2,242]

- ˝ *Trial-ability* is the degree to which an innovation can take trial experiments by term. If new innovations can be checked in this way, the adoption process could be successful. Many software applications use this method to be presented in the market, applications such as Gmail or smartphone applications, on platforms such as ITunes or GooglePlay. [2,243]

- ˝ *Observability* is how the adopters observe the final results before they adopt them. If the individuals that adopt the innovation can easily see the results, they may share the results with other potential adopters and with time, the innovation adoption will grow quicker. A good example of this is the smartphone. Many people are now changing their regular mobile phones for smartphones because it is easy to observe all the new functionalities that smartphones have and how these new utilities will help them day by day. [2,244]

In conclusion, if an innovation represents a clear relative advantage that is easy to observe, if it is simple to understood, compatible with the moral and social values of the individual and is possible check before being adopted, then the new product or service

should have a lot of opportunities of being adopted and is likely to succeed in the market.

1.4 High-Technology Industry Classification

This section shows the areas of industry which are in high-technology and are growing, showing data based on employment of scientific and technical personnel in the United States. It is possible to understand which fields are more demanding and also, which ones will have a high development in the future.

Industry	Forecast 2012 Employment	Percent change 2002-2012	Median annual Wage, US$ 2004	Employees R&D Per thousand
Pharmaceutical and medicine manufacturing	361	23.2	43,930	137
Computer and peripheral equipment manufacturing	182	-27.1	61,830	170
Communications equipment manufacturing	201	5.4	45,520	264
Semiconductor and other electronic component manufacturing	452	-14.9	39,210	180
Navigational, measuring, electro-medical and control instruments manufacturing	396	-12.2	47,960	126
Aerospace product and parts manufacturing	386	-17.6	51,990	43
Software publishers	430	67.9	69,880	245
Internet publishing and broadcasting	49	41.1	53,470	98
Other telecommunications	8	-21.9	45,470	--

Internet service providers and Web search portals	233	64.2	52,780	98
Data processing, hosting, and related services	430	40.8	45,570	98
Architectural, engineering, and related services	1,306	4.3	48,570	104
Computer systems design and related services	1,798	54.6	63,350	259
Scientific research-and-development services	573	6.7	57,890	302
Forestry	10	4.0	--	--
Oil and gas extraction	88	-27.8	49,290	--
Electric power generation, transmission, and distribution	405	-7.1	53,330	2
Basic chemical manufacturing	140	-18.0	45,970	54
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	89	-22.6	42,730	97
Industrial machinery manufacturing	125	-4.7	39,480	72
Commercial and service industry machinery manufacturing	141	6.6	35,940	72
Audio and video equipment manufacturing	38	-7.7	32,460	171
Manufacturing and reproducing magnetic and optical media	63	11.1	35,720	171
Professional and commercial equipment and supplies, merchant wholesalers	790	19.8	41,770	84
Management, scientific, and technical	1,137	55.4	45,610	28

consulting services				
Federal Government, excluding Postal Service	1,972	2.6	--	--

Table 1 High-Technology Industry Classification

Data gathered from Marketing of High-Technology Products and Innovation [4, 41]

As the table shows, areas related to information technology such as software publishers, Internet publishing and broadcasting, Internet service providers and Web search portals, data processing, hosting and computer systems design have grown hugely since 2002. This data gives an idea of which sectors are strengthening in development and the areas in which strong development is in the close future.

2   How to Leverage Innovation?

This chapter focuses on innovation aspects, different innovation strategies, how the best strategy can be chosen, the rules that all innovation projects have to follow and the different types of innovation. Also, it shows the importance of learning, how companies become better at innovating, discussing different innovation models and systems of learning.

2.1   The Rules of Innovation

One way to be successful in the innovation process is to focus on aspects that need more attention. It is interesting to discover that some companies have effective diagnostics about their innovation activities. These diagnostics provide starting points for innovation projects and help to separate the symptoms of their problems and help to identify the causes of them. A sense of complacency can appear because the organization is not focusing on checking and monitoring the innovation process. [1, 9]

A long list of good habits and key successes behind an innovation could be listed but a list that long may not efficiently help because a decision must eventually be made in order to get things started. As a result, this section describes the most important rules that all CEOs and senior management teams should follow to be successful in innovation. These are the seven innovation rules [1, 11]:

1. Exert strong leadership on innovation strategies and portfolio decisions.
2. Integrate innovation into the company's basic business mentality.
3. Align the amount and type of innovation to the company's business.
4. Manage the natural tension between creativity and value capture.
5. Neutralize organizational antibodies.
6. Recognize that the basic unit (or fundamental building block) of innovation is a network that includes people and knowledge both inside and outside the organization.
7. Create the right metrics and rewards for innovation.

Table 2 illustrates the answers of basic innovation aspects of two different companies. Company B has several problems because its staff does not think that innovation can be measured. Also, it does not have periodic diagnostics to underline its problems and identify its mistakes. However, the organization continues to innovate with the wrong innovation program, considering that they are working in the right way.

	Company A	Company B
What efforts is top management putting in place to support innovation?	Top management praises and follows carefully most innovation efforts.	Top management talks about innovation but punishes failure.
Does everybody devote part of his or her daily attention to having a better business model?	Innovation may happen anywhere within the company.	Quarterly financial targets are the main focus.
Is it clear to everybody how the company intends to innovate?	The company has a clear focus, for instance "to enhance human-machine interfaces."	The company wants to grow through innovation.
Does creativity or bureaucracy crowd out innovation?	People have the freedom and the support to research their ideas.	Every process has operating procedures that cannot be changed.
What are the reasons, if any, why innovation is not as effective as you would want it to be?	We fail to capitalize on all the ideas that are generated.	There is a lack of talent and effort from employees.
How does your company leverage its internal talent and its access to external talent?	Through interest groups and alliances with clear objectives.	Innovation is focused on the R&D department and its collaborations.
How do performance measures and rewards affect innovation?	Measures are intended to help managing projects.	We don't believe that innovation can be measured.

Table 2 Different perspectives on how to execute successful innovation

Data gathered from Making Innovation Work [1, 10]

Exert strong leadership on the innovation strategy and portfolio decision

One of the most important skills for a CEO or senior management to drive the company to success is to have strong leadership. There are several commendable examples of strong leadership such as Steve Jobs of Apple, Bill Gates of Microsoft, Larry Page of Google and Paul E. Jacobs of Qualcomm that show how a good management from the CEO provides the company with a clear and robust strategy to achieve company targets, obtain a better position in the market over its competitors and drive its teams to the highest level of innovation performance. [1, 12]

The strength of the management team, the strength of the business model and the technology, are in that order, the most important factors to consider when a new investment is choosen according a Financial Times survey. [1, 12]

The CEO or senior management has to take decisions about which kind of strategy will be better for the company, risks and total amount of investment. Also, it is their responsibility to create a portfolio of the technical and business model. Later the fact will be discussed that there are different kinds of innovations (incremental, semi-radical and racial innovation) in two different fields, the technical area and business area. The senior management team has to balance the innovation investment in the different kinds of innovation to create a good balance among technology and business models. [1, 13]

Integrate innovation into the company's basic business mentality

To keep growing, the company needs to have innovation as a necessary aspect in the business mentality. When we are talked about innovation, we are had to think in two dimensions.

Firstly, the technology field (also known as the technology model) is where the research and development (R&D) occurs. [1, 15]

Secondly, it is the field related with the business model. The importance of the technology and business model aligning to achieve success in innovation processes; in other words, they need to be integrated in a continuous and constant process. [1, 15]

In this process, innovation does not need to be in an organised unit. Innovation requires resources and experience that resides in different parts of the organization. It is common for organizations to cooperate with each other to achieve common targets. Internal and external collaboration is an essential requirement of innovation.

External collaboration is an important requirement for innovation but outsourcing of core aspects of innovation, the new technology or the process of business that provide an advantage over the competitors is not recommended. Some manufacturing process steps or product delivery services can be outsourced but not the technology or business models that the organization needs to survive or be stronger than its competitors. [1, 16]

Align the amount and type of innovation to the company's business

The goal of the strategy is always to win and innovation is an important element in the long term success but does not always have the same importance. For a company, the importance of innovation fluctuates depending on several factors such as past displays of innovation, the strength of its competitors or the general strategy of the business. [1, 16]

The amount and the kind of innovation have to suit the business strategy. A company should decide what is more useful in terms of innovation strategy; it is the responsibility of the CEO or senior management team to make decisions depending upon its competitors, the external market, the internal company condition and other parameters, which will determine the success of the organization. [1, 17]

The innovation selection should be clear and should be aligned with the route of the business. It needs to be measured and recognized with rewards to know that it is heading in the right direction. With these measures the organization will probably never get poor results. [1, 17]

Not all companies need to invest a lot of money and resources to create new technologies. In others words, they do not always need to develop radical innovations. It is very important that the company knows its limits of innovation resources. It is generally uncommon to find organizations that are constantly creating and developing new technologies. This is because the market will change continuously meaning organizations would have to change their business model, a very complex process. [1, 18]

Manage the natural tension between creativity and value capture

Innovation is a business management concern that includes a large amount of creativity to find new ways of doing things and transform creative and abstract concepts into commercial realities. These two elements, creativity and commercialization are considerable features of innovation; the problem is that they do not coexist easily. Supplying a clear innovation strategy, well-designed processes and strong leadership make creative moves towards the commercialization, or vice versa. [1, 18]

For many managers, integrating the creativity aspects in the management processes is a hard challenge but not impossible. As can be seen in the leader companies, the creativity process can be managed and measured with good practices. The real challenge is to manage the creativity, creating additional value at the same time. That is the natural tension between being creative and delivering additional value. If the company focuses on delivering value, it can stifle the creative processes or vice versa. [1, 19]

Neutralize organizational antibodies

Sometimes, when organizations have been successful in the past, it is difficult to change the habits or processes that they usually use, but it is important to mention that with innovation, the process management that was useful for the company in the past might not be as beneficial for the current needs of the market. Thus, it is necessary that the companies are open to change. [1, 23]

In order to innovate, the organization has to be able to have the courage to change and explore other possibilities in the market. That requires an open culture and the CEOs have to understand that to achieve success in innovation, they have to adopt risks, closely observe results, learn from them and try again when they think they are ready to develop innovation. [1, 23]

To produce change, the company can get information not only from inside of its organization, but also from external groups. Not only are the clients a valuable source of knowledge but also the providers, universities, competitors or organizations of other sectors. Companies that reject external ideas have organizational antibodies and this problem should be resolved in order to achieve the innovation targets. [1, 23]

The culture of taking risks and continuing to learn is associated with metrics and rewards. [1, 23]

Recognize that the basic unit (or fundamental building block) of innovation is a network that includes people and knowledge both inside and outside the organization

The principal section of innovation is the network that the company has inside, like research and development (R&D), marketing or manufacturing and the network that the company has outside such as the customers, suppliers or partners. To have a healthy

innovation process, the company has to develop and maintain carefully these networks because it is a core competency of innovation. Before starting to create a new network, it is important to analyse what kind of network is needed to obtain a network with high-maintenance and low value. [1, 24]

Including innovation in business processes and creating external and internal networks requires innovation platforms. These platforms focus on one area of competition and they decide the amount of incremental and radical innovation, (kinds of innovation that will be defined in this chapter). The platforms include people networks (from inside and outside of the company) that have a robust knowledge of the field (customer insight, supply chain knowledge and technical expertise). [1, 25]

Some companies isolate the innovation process through incubators in order not to fall into organizational antibodies. That idea will be beneficial also if they develop and maintain a rich network with the core critical resources and the external partners but it is important to mention that it is difficult and many organizations fail because there is not a good integration among key resources and ideas. [1, 25]

Create the right metrics and rewards for innovation

In some organizations, measure techniques are not integrated with the innovation strategy, or if they are, they use unfavourable techniques. Some companies use a number of products or services launched as a metric to evaluate and reward the innovation. In they use the latter technique, it is common to find semi-radical innovations because the goal is a number. To achieve a higher number means getting higher targets. That perspective is easily understandable because at an individual level it is comforting to recognize continuous targets at short intervals rather than at long intervals as occurs with radical innovations. [1, 25]

Sometimes, the organization structures do not support the innovation environment. The business units are responsible for investing the resources in the projects that in their opinion provide the best return of investment. Some projects developed in the R&D department are not supported because they do not integrate very well in its business portfolio or simply, in the first moments, they do not give the company huge obvious profits. [1, 26]

The solution is that the company needs systems that will provide the motivation, incentives and rewards to promote the innovation inside the organization, integrating them with the innovation strategy. The organizations have to think that taking risks is a valuable process of learning to achieve the targets in the future. That perspective will help the organization to start to invest resources developing radical innovations and not only semi-radical innovations. When the company will have that carefully designed system to encourage innovation, it will grow more quickly, become healthier and it will have good market positions over its competitors. [1, 27]

2.2 A New Model of Strategy Innovation

One way to develop innovation products is to change the technology, invest money in the R&D labs of the company and create new products improving the features of the products that the company already has or create new ones developing new technology. This is an important step of the innovation but, if the company wants to be successful, it has to implement a robust strategy that includes more aspects like distribution, manufacturing and marketing. In conclusion, it has to create a solid business model. [1, 29]

In innovation, it can consider that there are six levers for change, three related to business model innovation and the others three related to technology innovation. The goal of this section is to describe each lever with its own features. Figure 4 illustrates the six specific levers of change that are in all innovations. [1, 30]
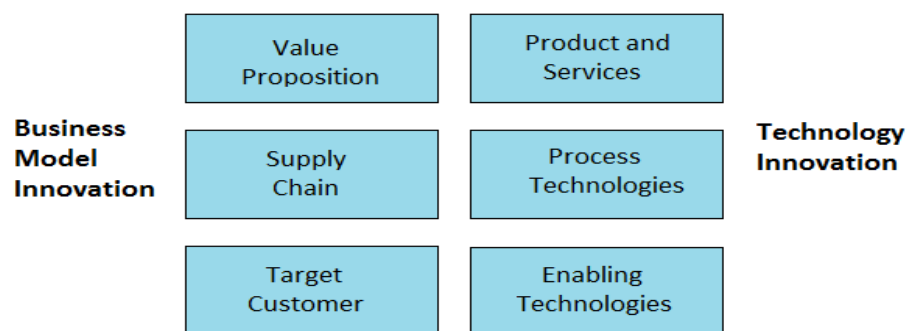

Figure 4 The Six levers of Innovation
Data gathered from Making Innovation Work [1, 31]

This new model needs to integrate the management of technology change and business model change inside the firm, but it always does not happen. A percentage of successful innovation depends on the success of integrating these fields, business and technology management. [1, 31]

2.2.1   Business Model Change

A business model is the strategy that a company uses to create, sell and deliver value to its potential customers. Business model change is driven by the following areas [1, 32]:

- ˝ Value proposition: what the company sells and delivers to the market.
- ˝ Supply chain: how the product or service is created and delivered to the market.
- ˝ Target customer: who the potential customers are, people that might be interested in the product that the company sells.

These are the most important points regarding all the business strategies and the focal points in innovation. [1, 32]

Value proposition

Changes in value proposition (what the company sells and delivers to the market) may be an entire development of a new product or service and, also, the improvement of products or services that the company is already offering in its portfolio. For example, automobile industries often present vehicles adding new features above the previous models and also offering new post-sales services. In the information and computing industry, a clear example of change of value proposition is IBM. From 1991 until 2005, the core business of IBM was technology manufacture focusing on hardware such servers and laptops. In 2005, the company decided to move away from the hardware business, doing a big change in the value propositions of its products and services and it started to focus on software and consulting. According to Gartner consulting group, IBM led the market in the areas of software and middleware in 2012. The change in the value proposition of IBM is an example of how companies can obtain success in their business implementing changes in the value proposition of their products or services. [1, 32]

Supply chain

The second aspect of business model change is supply chain, how the product or service is created and delivered to the market. These kinds of changes are never visible to the final customers. During this step, the company's goal is to gain and develop relationships with entity organisations or partners in order to improve manufacturing processes, distribution or sales processes. [1, 33]

Innovations can come from updating the contracts with the suppliers, involving them in participating in the successes and failures of the market. Also, the innovations may come from careful management relationships with complementary assets. For example, Microsoft started its business in the video game market with the Xbox console. Microsoft needed to obtain new relationships with game developers in order to produce these new assets, video games. [1, 34]

Target customer

Changing is the target of the potential customers of the company's products or services. This change usually starts when the company finds a segment of potential customers that are not related with its marketing, sales and distribution strategies into the market. This lever is not as common as value proposition and supply chain but the company should not overlook this possibility when it is looking for new opportunities to innovate because lever is an important trait of innovation. [1, 34]

2.2.2   Technology Change

Most of the time, new technologies are the result of investing money in innovation projects. Companies focus a lot of attention in the new technologies because these products provide the organization with the growth and development in the market. Technological changes influence innovation in three different ways [1, 35]:

- ˝ Offering Product and service
- ˝ Process technologies
- ˝ Enabling technologies

Product and service offering

A change in the company's products or services or creating a new product or service in the market is a kind of innovation that is really easy to detect by the customer. With fast-changing markets, consumers expect new features from innovative products. For example, in fields like smartphones or tablets, the customers want new hardware or software innovations. Thus for the company, this is the way to make the difference compared to its competitors' products. [1, 35]

This type of innovation has an important influence on the company's success but it is not the only model of technological innovation. [1, 36]

Process technologies

When talking about technology innovation, the main idea is to create a new product or service or just to improve the products or services that the company already has in the market. For example, in the smartphone market, one way to innovate is to improve the hardware doing the microprocessor faster and lighter or to make sure that it consumes less power. Also, creating new apps, making the customer's life easier is an interesting way to innovate in this field. [1, 36]

The idea of creating or improving products and services is really important but it is important not to forget other aspects such as manufacturing and the service delivery process. These procedures are as decisive as the ideas of creating or improving new products or services and they will determine the success of the firm. The manufacturing and delivery processes are invisible to the customer but help the company in the competition. Through robust processes in manufacturing and delivery, the firm could reduce the cost of manufacturing (choosing the best material to develop the products) as well as improving the quality of the products and services. Also, with a good delivery process, the company will save time distributing its products and services to its customers, which means increasing the profits. [1, 37]

Enabling technologies

The last aspect though not less important is the enabling technologies. This source of technology innovation enables a company to execute its strategy faster, which is a competitive advantage. For example, information technologies exchange information between the different members of the value chain. The changes in enabling technologies can provide help for the firm to manage decision-making and financial management. [1, 37]

2.3   Types of Innovation

Not all innovations are created through the same process, depending on the kind of innovation being developed, the best innovation strategy will be chosen and it will provide different risks and rewards. The generic kinds of innovations are the following [1, 38]:

- ˝   Incremental
- ˝   Semi-radical
- ˝   Radical

Incremental innovation is used when the goal of a project is clear but it is necessary to solve how to obtain it. Normally, this kind of innovation is used when the company wants to improve the products or business processes that it already has. On the other hand, radical innovation is creating completely new products or business processes. In order to choose the best strategy of innovation, it is really important to know and to understand the characteristics of each type to predict what the right moment is to choose each. A common way for the firms usually to innovate is to stay for a long time in an evolution period (incremental innovation) punctuated by a short stage of revolution (radical innovation). With that model some companies have been really successful. [1, 39]

Figure 5 Innovation Matrix

Data gathered from Making Innovation Work [1, 39]

The innovation matrix (see figure 5) illustrates the relation between the different kinds of innovations and market dimensions, the needed development time to launch a new product or service into the market will depend on the kind of innovation associated with the product or service. [1, 40]

2.3.1   Incremental Innovation

Incremental innovation is the most common type of innovation in most companies in general companies spend around 80 percent of their total innovation investment. Incremental innovation usually causes changes in one or two levers of the business model or technology change. It is the way to obtain much value from the products or services that the firm already has without making huge changes or important and strong investments. It is easy to understand why the companies invest the major innovation investment in this kind of innovation or why the companies like to work in the incremental space better than others like semi-radical or radical space. Incremental ideas appear easily and they are safer. Also they are more predictable. [1, 42]

One clear example is the new generations of the smartphones line. Apple and Samsung have famous smartphone lines, IPhone and Galaxy respectively. It is really common that between different generations of products, they do not create new technolo-

gies and they present new changes just in hardware or software, which are just improvements in the features of the last generation but nothing totally new. [1, 42]

Incremental innovation in the business model is very important. The firms try to improve different processes and techniques like the quality control techniques in order to improve the quality of the products and services, financial analysis in order to find troubles or mistakes and move forward from them, marker research give to the companies the possibility to determine the customers' needs and supply chain management in order to be more effective manufacturing and delivering the products and services. On the other hand, when the company needs to restructure one process completely in the business model, this kind of innovation is not enough because the main idea is to improve some levers in the business model, not to create or develop new ones. [1, 43]

Having a few incremental innovations is very dangerous for the companies because it allows the competitors take the innovations that are being developing, copying its technologies and business model. It provides a lot of risks because the competitors can improve the company's products or services and make them more interesting, providing added value for the company's customers. Thus, incremental innovation is necessary to grow but is not enough to survive for a long time. The company needs to combine different kinds of innovations to guarantee its survival. Curiously, many companies know that developing a product using just incremental innovation is a trap but having a good leadership or good management is not enough to solve that problem. If the company does not use the innovation rules, it will not develop products using the other kinds of innovations and the company eventually will die. [1, 45]

2.3.2   Semi-Radical Innovation

Semi-radical innovation gives the company a good opportunity to improve its competitive position in the market environment which the incremental innovation cannot. Semi-radical innovation causes a change in the business model or in the technology change, but not in both. Most of the times, change in one dimension (business model or technology change) produces reforms in the other dimension but that change is not dramatic or destructive, often it may be incremental innovation. The changes in both dimensions do not have the same grade of relevance; always the change in one of them (business model or technology change) will be bigger and more important for the success of the innovation than the other dimension. For example, when Dell wanted to

change its business model, the most important change was in its supply chain management. That process influenced adopting new enabling technologies (The internet). [1, 47]

Business model and technology change (in semi-radical innovation) are related and, often, the innovation created in one dimension creates new occasions in the other. These changes in both dimensions are very interesting and important for the companies because they know that it provides the organization with a huge potential value if they can manage it successfully. [1, 48]

To be successful in semi-radical innovation, both groups (business and technology) should have the business and technology maps to always check the space in which they compete. A common mistake in the organizations is that each group only has its own map and they do not have information about the other map space. With this situation, the organizations obtain errors and miss opportunities so they are not able to produce products using semi-radical innovations in the right way. Using both maps simultaneously provides the company the opportunity to always check the threats, opportunities, strengths and weaknesses in order to improve the innovation process. [1, 49]

Producing products or services with semi-radical innovation is a hard process. The first step should be to do a good diagnosis of the organization's problems and then check the organizations innovation capability. Sometimes the companies want to give a huge innovation impulse but they are not conscious of these points. They invest a lot of resources and they overestimate their ability to use this kind of innovation and this rush causes companies to fail and sometimes go bankrupt. Managing both the business model and the technology model at the same time is one of the most important goals for the organizations. Usually the companies are experts in the technology change or in the business model but seldom both. The companies that manage successfully these changes, in both dimensions, have a competitive advantage over their competitors. [1, 51]

2.3.3   Radical Innovation

Radical innovations affect both the business model and the technological dimension and provide a huge change in an industry. A successful radical innovation redefines the rules of an industry providing new changes in the competitive environment. Radical

innovations use new technologies to develop entirely new products and services and often they create new markets. They are revolutionary innovations. These innovations have a big uncertainty; the companies seldom achieve their revolutionary targets so that is why they are questioned and also because they invest many resources and money. [1, 51]

Sometimes, these new technologies developed by radical innovations are created in R&D groups like universities or a research laboratory and they do not have a clear target in the markets. These innovations are created without a vision of the applications that they might serve. For example, in 1980, Tim Berners-Lee created a network to share information between different computers in an easy and cheap way. Ten years after, Marc Andreessen developed the first Web browser. Nowadays, it is surprising to discover that the use of the internet is totally different than it was in the beginning, when the internet was created by the U.S. military computer department to survive a possible nuclear attack. [1, 52]

In other cases, the radical innovations create new products as a response to existing or emerging needs. Independently, if the radical innovation is developed in order to meet a need or not, they create a new market by themselves. [1, 52]

2.3.4   Ersatz Radical Innovation

This kind of innovation appears when there is a combination of two semi-radical innovations that change the industry. The effects are quite similar to radical innovation but the risks, costs and profits are supported by different groups. Ersatz radical innovation looks for the collaboration and cooperation with different organizations. That fact gives them an upper success probability, with a strong impact and the possibility to catch an upper value. [1, 55]
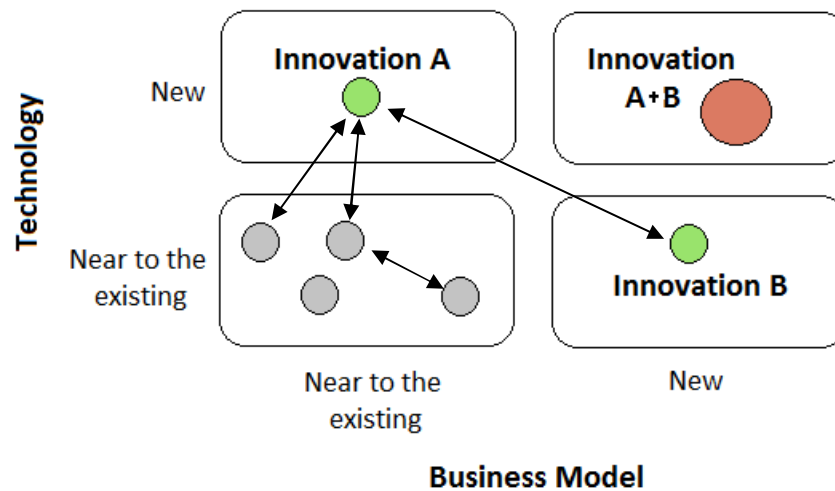
Figure 6 Ersatz Radical Innovation

Data gathered from Innovacion Para el Cambio Social [28]

Figure 6 shows an Ersatz Radical Innovation. There is an organization with a semi-radical innovation (B) which controls the business model. If it works with another organization that has another semi-radical innovation (A) which controls the technology stage, together, they are able to develop a radical innovation, and if they collaborate, they can obtain important profits for both. [1, 55]

2.4   The Importance of Learning in Innovation Ecosystems

Nowadays, the markets change very fast. The capacity to learn quickly, efficiently and more cheaply than the competitors could determine the difference between having the leadership in the market or barely outlasting. To get the expected results in the early moments of the start-ups, the learning curve provides a route to be faster and cheaper in the sales growth. To achieve the expected sales, it is important that the organization knows what products and services it needs to sell. Also, an essential help is to have feedback from the customers. [1, 209]

The key of learning in innovation is not to avoid making mistakes, but to learn from them. The target of organizational learning is creating systems where the people are able to learn faster, more efficiently and with less possible outlay. [1, 210]

Innovation means change, changes in the technology or the business model with the different kinds of innovation that are had described before (increment, semi-radical and radical). Organizational learning consists of learning about this change process; in others words, the innovation is 100% related with the learning process. With an efficient learning process, the organizations can improve their creativity process and achieve satisfactory results in the markets. [1,210]

The features of learning in an innovative organization are the following [1,212]:

- ˝ The learning process invests continuous efforts to improve. The learning has to start before the project, during the development and after the conclusion of the project to determine alternative ways to find how the process could be improved.
- ˝ The possibility to take reactions after taking action should be given with the aim of influencing the final effects (actions - reactions - effects).
- ˝ Shared vision to seek the best for the entire organization is an important aspect to minimize the possibility of organizational antibodies which might appear in the future.
- ˝ Flexibility and agility to improve the changes and create an ongoing innovation environment.
- ˝ Capability to anticipate the challenges and threats.
- ˝ Maximization of the creative tension in order to create collaborative and challenging environments.
- ˝ Reduction of the destructive tension.

2.5   A Model of Learning

The most common kinds of learning models are the Learning to Act model and Learning to Learn models. [1, 213]

2.5.1   Learning to Act

Learning to Act consists of continuous assessments of how the structure, processes and resources are working in the organization in order to find the strengths and weaknesses to improve them. In this type of learning, the strategic objectives are not ques-

tioned and it just focuses on improving the efficiency in the existing plan. One clear example is team members brainstorming techniques to find new possibilities about a problem. [1, 213]

2.5.2 Learning to Learn

Learning to Learn consists of structured processes to evaluate how the company is learning and changing. With this type of learning, the organization guarantees itself that the investments in innovation are giving back the maximum return and that the company is building a sustainable innovation. The idea is to question the way that the company is innovating in order to improve the process, find other ways to optimize the process and achieve better results. [1, 214]

The incremental innovations rely on the Learning to Act model and radical innovations rely on the Learning to Learn model more often, and they do not use the same kind of knowledge. In the incremental innovation the knowledge is shared in the entire organization, and everyone knows what the problem is that the organization is trying to solve. Furthermore, everyone knows the possible solutions, the innovation steps and how they work, and it is easy to communicate different ideas between different departments. That knowledge is denominated explicit knowledge. [1, 214]

The radical innovation does not use explicit knowledge. The knowledge is not already created and there is not a fluent interaction between the different teams. The radical innovation is not just difficult because the idea is novel, but because communicating the idea and its understanding by the people is a hard task. Learning to Learn relies on a specific kind of knowledge called tacit knowledge. [1,215]

2.6 Learning Systems for Innovation

The learning process interacts with the systems of an organization at four different levels. The first two are more related to incremental innovation and the others two are more related with radical innovation [1,215]:

- **Systems for delivering value:** These systems contain all explicit knowledge that the organization controls and with it, the company can be acted upon if an unexpected deviation happens. The learning cycle is integrated in the design of the process and the system to respond to these possible deviations. [1, 215]

- **Systems for refining the current model:** The target of these systems is to move the current business into the future. They have a continuous improvement and integrate the Learning to Act cycle. [1, 216]

- **Systems for building competencies:** These systems drive the organization to create the necessary knowledge to develop the new radical innovations. Top management uses these systems to experiment and develop the needed capabilities of the future strategies. [1, 216]

- **Systems for crafting strategy:** With these systems, the company obtains and encourages knowledge that is inside of the organization but is out of the core business. [1, 216]

3 Management Innovation Systems

This chapter describes key aspect of innovation systems. It shows the innovation systems that the organizations use to develop innovation products and services and the most common steps of the innovation development process. Also, this chapter show the way to find the keys of intellectual properties and the target of well-designed innovation systems.

In the end, this chapter addresses the technology adoption lifecycle that describes the acceptance of a new innovation product or service according different groups of individuals (adopters) and their own features.

3.1 The Objectives of Well-Designed Innovation Systems

Structure and process innovation can help to improve the creativity of the people only if it is used in the right way. The innovation system has to obey five essential targets, as shown in Figure 7.
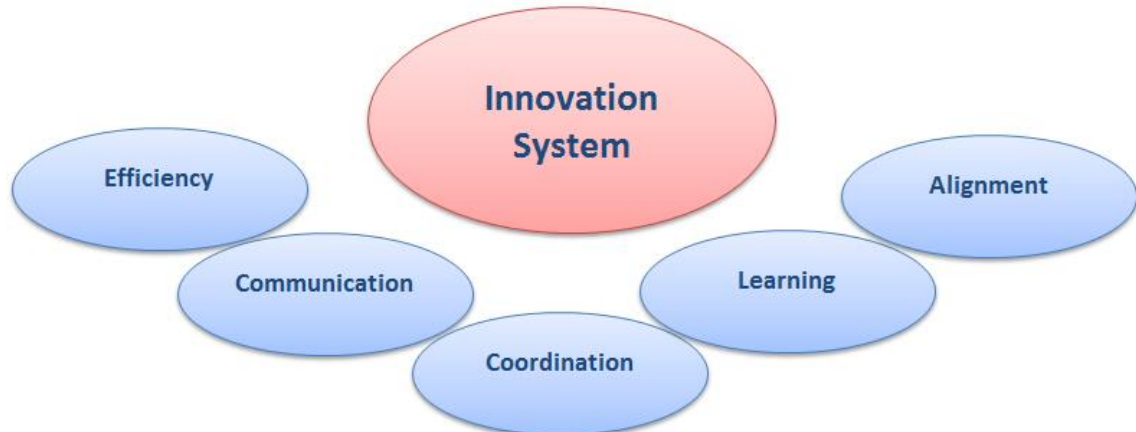

Figure 7 The Five Roles of an Innovation System
Data gathered from Making Innovation Work [1,121]

The first role of the innovation system is to enlarge the **efficiency** of the innovation process. The system has to move the idea from the concept to the commercialization process quickly and using the less possible resources. This role is very important in the incremental innovation, after which the stages are defined and the decisions are taken, time-to-market is decreased and the return on resources invested gets bigger. [1, 121]

The second role of the innovation system is creating robust lines of **communication** inside the company and also outside of the organization. The goal is to provide the innovation team with the knowledge that it needs to design and develop the new products or services. It does not matter if the knowledge comes from inside or outside of the company. In an innovation system, the information and knowledge needed to create the products have to flow between the internal departments and also with the external partners, in order to create something for the innovator and profitable providing value to the customers. In cross-functional teams, where the members have different expertise like R&D, manufacturing, sales, distribution, finance or management, it is common to use different knowledge bases to describe the functionalities and the process that the organization is following in the development of products. Also, to be in contact with internal departments and partners, the organizations use periodic planning and review meetings, and explicit milestones. [1, 122]

The third role of the innovation system is the **coordination** between different projects with the less effort. A good coordination plan provides the organization with the possibility to work in parallel with minimal communication. For example, if an organization has offices in different time zones (like California, London and India) and if they have good coordination processes, they can achieve three times the work in a day in comparison with other organizations. These kinds of projects are possible through the communication technologies. Another task in the coordination role is guaranteeing that the resources are available on time around the different offices and departments. [1, 123]

The fourth role of the innovation is the **learning**. Learning innovation provides the organization with the opportunity to become better at innovating processes. In an innovative organization, it is mandatory that it creates a system to keep the knowledge. That knowledge is learning day by day in the development of different projects and it can be used to identify issues or potential improvements in the future projects. The idea is to learn about all the aspects of innovation; the business model, the opportunities that the market presents and of course to learn about new technology. [1, 123]

That knowledge has to be retained in the organization to obtain an advantage over the competition. With the knowledge management systems, the companies have all their knowledge which helps them to be more efficient. [1, 123]

The fifth role of the innovation is **aligning** the personal objective with the company objective. Everyone in the organization has to know clearly the company strategy and the consequences of their actions. With well-designed incentives and reward systems, the organization motivates and reinforces the motivation of their employees and that means better performance. The goal of the company is to align the innovation performance with the innovation objectives and achieve the objectives. [1,124]

3.2   Innovation Systems

The innovation process can be comprehended like a flow that starts with many ideas of which only a few are commercialized. That process is often envisioned as a funnel, where the left part is the bigger part and is the part where all the new ideas are at the beginning; it is where the creative phase happens. Then these ideas pass through a tunnel where they are subdued to high analyses to determine if they will be profitable for the organization. In this part most of the projects are rejected and die. In the middle of the tunnel there are projects that are supposed to be profitable and that the organization decides to develop. This place is called execution stage. Finally, those projects that become intellectual property move to the next stage, the value creation stage. Figure 7 shows this process. [1, 125]
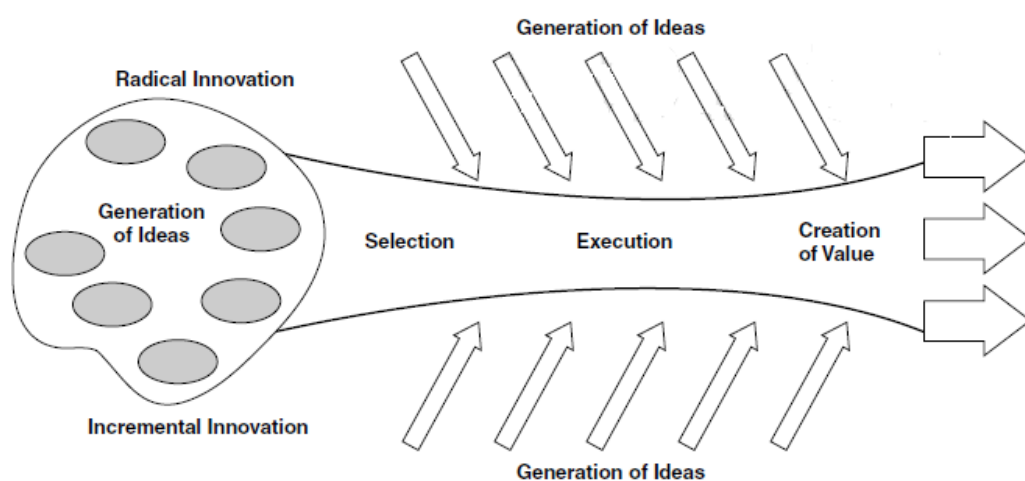

Figure 7 The innovation process

Data gathered from Making Innovation Work [1,125]

In the first steps of the management systems the ideas begin to grow and are created. Then, those ideas are moved to the next stage where the organization takes the financial decisions. In this stage the ideas are rejected or receive initial funding to start developing. The last stage is where the innovation project is executed, in other words, commercialized. The commercialization and creation of value follows a usual route from early adoption to maturity which is shown in figure 8. [1, 126]
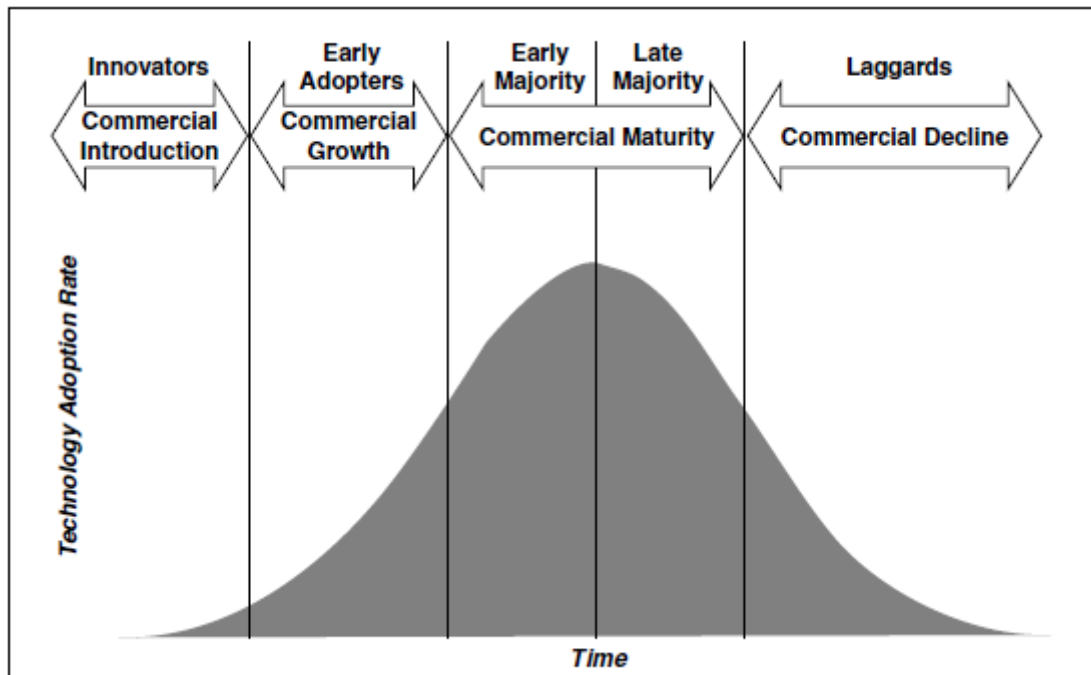

Figure 8 Innovation Commercialization Process

Whichever innovation system the organization chooses, it should have these three stages. Also, the stage could not be iterative and it is not mandatory that the process has to be lineal. In all the three stages, the new product can be improved and it does not matter if it is in the creative, execution or value creation stage. [1,127]

3.2.1 Systems for Ideation: Seeing the Gaps

The essence of all the innovations is the ideas. The ideas appear when someone discovers a gap in one field, something that provides value for the customers and it still does not exist. That gap could be a new product feature, an improved process technology, a new business model, a new technology or completely new business model. For example, Apple found gaps in the way how people consumed music (it created music devices like IPod or ITouch and it developed ITunes, a platform to download and play music). [1,127

The organizational challenge is to create an environment that promotes the creation of new ideas, focuses on the gaps and then moves these ideas to the next stages of innovation process. One essential feature that all new ideas have to contain is that they have to be economically interesting for the organization; they have to generate economic value. [1,127]

3.2.2 Structured Idea Management

Structured Idea Management (SIM) is a process that many companies use in order to create and develop new ideas. It is called managed chaos and it consists of a smart group of people analysing data, throwing out ideas to find problem solutions and writing them on post-its on the walls. Really, it is not a chaos; it is an interesting structured process. It is designed to achieve three targets successfully [1,128]:

1. Managing the innovation environment in order to maximize the creativity as much as possible.
2. Using the best and more robust monitoring mechanisms to guarantee the highest quality output.
3. Explicit protocols and identification processes to create truly revolutionary concepts.

Figure 9 shows the individual steps or tasks used in the Structured Idea Management (SIM):
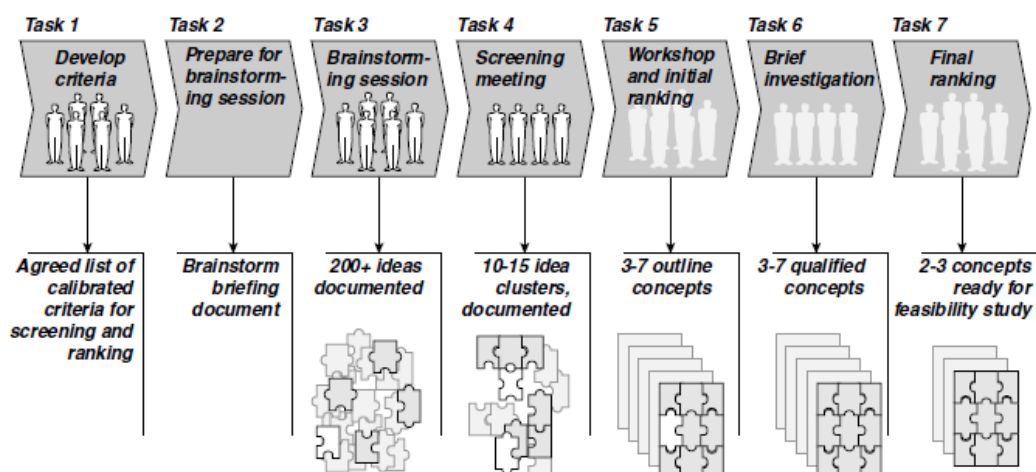

Figure 9 The Structure Idea Management Process

Data gathered from Making Innovation Work [1, 129]

The SIM is also designed to prevent the two common mistakes that the organizations make in the innovation process [1,129]:

- ˝ Understanding the difference between evaluating incremental versus radical innovation. The two different kinds of innovations have to be examined in the same forum with the same criteria. However, they need a distinct standpoint to development and selection.
- ˝ Separating the ideas by fragments and recognizing its value. The most common mistake that the companies usually make is to use brainstorming to produce finished concepts. If the company recognizes the value of each fragment from the idea and if it puts them together, a major achievement could be yielded.

3.2.3   Experimentation

Experiments are the base of radical innovations. These experiments consist of testing, refuting, modifying and validating the breakthrough concepts. The target of experimentation is providing a research continuously to find a better, faster or cheaper way to achieve the performance objectives. [1,130]

The experimentation should be part of not only technological research, but also the business model and market spaces. Well-designed experiments provide the company with unknown and hidden value and a learning process that guides the radical innovation process to get the best answers for the correct questions. The use of experimental processes accelerates the product development. [1,130]

3.2.4   Prototyping

The first prototypes of a project are tools like spreadsheets, process maps or anything simple that helps the team to understand the concepts of a project. The innovation team must be able to use it to find the opportunity to improve it, change and develop the prototype to higher stages in order to get robust projects. [1,131]

To develop successful prototypes, it is important to pay attention to three rules. These rules are described in figure 10.

Rule 1 **Think modularly**	Do not try to solve all of the pieces. Build prototypes that provide insight into one or two key uncertainties. As goodexperimenters know, this provides valuable information into the nature of the problem as well as the potential solution.
Rule 2 **Fail fast and cheaply**	Define small practical tests that can be done cheaply. Build a prototype and test it quickly. It is often best to work with a partner, such as a lead customer or a supplier, to share the costs, risks, and learning. Get the results and determine what was learned and what new questions were identified. Modify the prototype.
Rule 3 **Fail often in order to succeed faster**	Use the "Ready, fire, aim. . . and then start over again" approach. It is crucial to overcome the old "Ready, aim, aim, aim. . ." syndrome. Remember that the plural of anecdote is data.

Figure 10 The Three Rules of Prototyping

Data gathered from Making Innovation Work [1, 131]

The best prototypes are developed when all stakeholders are involved in the project as providers, clients or the internal teams can understand the proposed concepts. The early prototypes have to be easy and understandable for all of them. One target of the prototypes is to understand the problems and provide clear solutions. [1,132]

Prototyping is needed extensively in the radical innovation. It is the first way of thinking about how the team could operate, and how the ideas could be transformed to real projects. In prototyping there are some activities that are completely necessary like building, testing, refining, refuting or corroborating because: [1,132]

- ˝ They promote a new way of thinking inside the team in order to create fresh mental models.
- ˝ They provide new patterns based on the results and the teams can learn from them.
- ˝ They create powerful unions inside the team with shared points of view.
- ˝ They generate new ideas that can, in the future, turn into radical innovations.
- ˝ They raise interest and excitement in the projects that other techniques cannot reach equally.

3.2.5   Making Deals

In order to get funding from the venture capital firms, the start-ups have to design a plan to convince them, sometimes showing that their products provide a clear value for the customers. Sometimes, small companies fail because they think that this value is self-apparent, they inflate the return on the investment or they give inflated projections of the timing. In these situations, the investors mistrust the product because they do not clearly see a potential value for the customers and the start-ups do not receive financial support. [1,133]

In all organizations, it does not matter if they are big or small; it is indispensable that there will be two important different roles, the seller and the buyer. These people have to make deals with other organizations because the flow of these deals provides the organization with higher probability to develop a successful innovation. Deals need other deals to combine and fuse, in other words, business collaboration. These operations also give the organization the possibility to increase its knowledge because they work with experts in those materials and they also receive different points of view from the outside. [1,133]

3.2.6   Innovation That Fits

Some successful organizations focus their innovation improving their core competencies. Knowing the core competencies and innovating around them is an interesting way to achieve innovation improvements. For example, EasyGroup has a clear plan: they find services that can be bought or ordered on the internet. They might, for example, buy flight tickets, book hotel rooms or rent cars, and they play with the price elasticity providing low cost services. Their plan is not designed for all the people, instead, it is designed for middle and lower middle class people. [1,134]

The experience shows that when an organization goes into business where it has not relevant competencies or relevant experiences, most of the times it wastes money, time and value. However, if a company does not invest in a business that it is not its core business, it might lose a good opportunity of increasing its portfolio value. The important question is how close a new core business is to its core businesses. Going very far usually is not a good idea and the companies often fail. On the other hand, staying very close decreases the opportunities to find new profits. For example, if Apple

had decided that music did not fit its core business, they would not have developed ITunes and IPod. [1,135]

The key aspect is defined very carefully, including the core competencies for the organization and new areas of enough interest to warrant investment. [1,135]

3.2.7 Management Systems Comparison

There are many different kinds of innovation management systems, so Table 2 shows the different approaches that the innovation management systems provide to incremental innovation and radical innovation.

System	Incremental Innovation	Radical Innovation
Reward/recognition	Heavy use of rewards. Rewards are linked to achieving milestones and output target. Usually cash reward but also public recognition. Also rewards clearly defined before the start of a project.	Rewards are decided once the project is complete. Continuous support is more important than working for a reward. However, when the project is successful, recognition through reward will be perceived as fair.
Project planning	Lot of upfront planning, definition of milestones, clear objectives. Plan suffers from small modifications.	Define broad goals, little detailed planning, but heavy reliance on experimentation. Plan constantly revised.
Resource allocation	Based on financial metrics. Clear definition of resources committed and how they will be released.	Based on promise of technology and market. May be informal. Not clear how much will be needed.
Metrics	Clear metrics; includes input, process, outputs.	Metrics are limited to input metrics at most and experimentation related metrics.
Monitoring	Based on whether milestones are met, by exception.	Based on subjective evaluation of whether the experiments provide learning.
Process formalization	High; based on stage gates.	Low; based on small team dynamics.

Market research	Traditional tools; focused groups, conjoint analysis, surveys, prototyping.	Anthropological; observation, experiential, experimentation.
Strategic boundaries	Not needed; managed through objectives or milestones.	A strategic framework may be relevant to bound the search process.
Strategic planning	Extrapolating current business model. Identify gaps.	Exploring new technical approaches and business models.
Portfolio planning / management	Straightforward, simple tradeoffs.	More complicated; risks and rewards are larger.
Culture	Focus on detail, cross functional collaboration, experience-based.	Focus on ambition exploration.
Learning tools	Continuous improvement tools -- quality tools, cycle time, reengineering, customer feedback, optimization tools.	Experimentation tools, prototypes, learning tools.
Knowledge management	Developing systems to make knowledge accessible across the organization.	Knowledge is created and managed within the team.
Partnerships	Collaboration over various projects -- long-term	Partners provide access to capabilities that the organization lacks.
External monitoring	Monitoring current competitors and current eco-system.	Monitoring idea generation places . universities, labs, startups.

Tabla 2 Comparing Innovation Systems for Incremental Versus Radical Innovation
Data gathered from Making Innovation Work [1,137]

There is not a common set of innovation management systems for all organizations. They have to choose which ones are more effective according their technology and business strategies that the organization has decided to develop. [1,138]

All the innovation management systems have to be overseen by the senior management in order to ensure that they are matching with the organizations targets. The

company can change or move in different systems to achieve the expected value of the innovation. [1,138]

3.3 The Innovation-Development Process

The innovation-development process is a set of decisions and activities that an innovation project has to follow to be successful. That process starts recognizing a problem or need, continues with basic and applied research, development, commercialization, diffusion and adoption of the innovation and concluding with the impacts or consequences of them. The goal of this section is to describe all the activities to give an idea about what a common innovation-development process is.
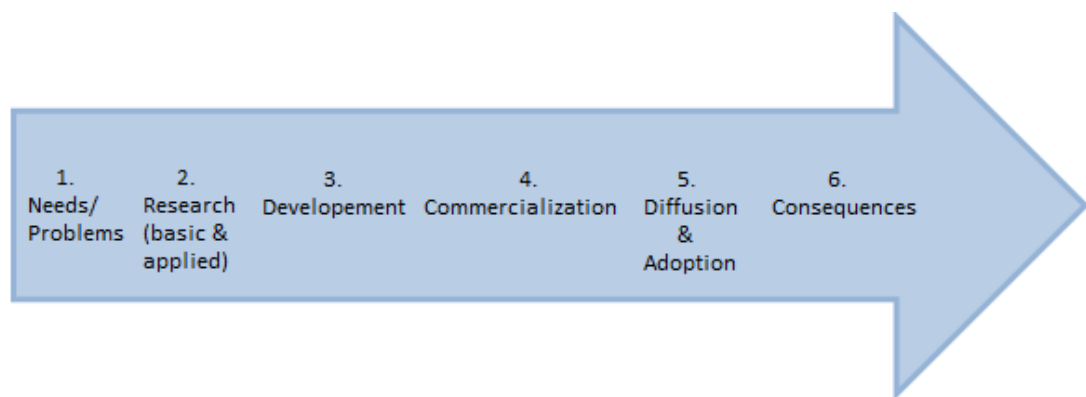

Figure 11 Six Main Phases in the Innovation-Development Process
Data gathered from Diffusion of Innovation [2,133]

These six phases are somehow arbitrary in that they do not always occur exactly in the order shown here, and certain of the phases may be skipped in the case of certain innovations. [2,132]

3.3.1 Recognizing a Problem or Need

One of the first stages to start an innovation process is to recognize a problem or find a need to stimulate research and development activities in order to design an innovation as a response to them.

Sometimes, different needs rise to the top position in a social community as happened in 1960 when the auto safety became one the most important social problems in The United States with an annual death rate of 50,000 people. In these cases, the problem is both a matter of scientific and political forces and these needs are considered as high priority. [2, 132; 5, 30]

3.3.2   Basic and Applied Research

Most of the innovation projects are related to technology which is why it is often used as a synonym for innovation. As chapter 1 has described, the technology is how the society uses tools and knowledge in order to find solutions to problems or needs. Often, the technology is based on hardware and software but most of the time the software is not as visible as the hardware innovation. [2,138]

The innovation technologies are created and developed by scientific research. The **basic research** provides the base knowledge of a technology, designed as original research for the advancement of scientific knowledge. They have not the object of applying that knowledge into practical problems. On the other hand, **applied research** is designed to apply scientific basic knowledge (basic research) to practical problems in order to find solutions to perceived needs or problems. Often, applied scientists develop research based on basic research. Thus, innovation research may be a result from a process of basic research followed by applied research. [2,138]

One measure to determine the success of research is if the research leads to a patent. A patent is the way the government guards the rights of the inventor during the new invention is being commercialized. To get a patent, it is mandatory that the new invention does not use knowledge from other patents; in other words, the research or the project has to be completely new. [2,138]

3.3.3   Development

As everybody knows, the acronym R&D is related to research and development and the letters are always presented together, but for the purpose of this section, it explains them as different phases of an innovation process.

In the development stage, the organization tries to give shape to an idea in order to accomplish the expectations of the possible adopters and customers and this step is always performed after than research stage. [2, 139]

The role of uncertainty in R&D. The level of uncertainty in a new innovation invention does not depend on the inventor perspective. The developers have to be conscious of a lot of factors, starting with their own design and manufacturing problems and continuing with the behaviour of others in their own R&D organization, their competitors, government policy makers and other factors that affect the success of a new invention. The information exchange inside the organization is an essential component and how the workers obtain and use it. It is a very useful technique to monitor the uncertainty. This kind of information includes for example innovation performance, market data, information and components that the organization is using in the innovation, information of the competitor innovations, the nature of patents related to their proposed innovation, government policies related with their innovation and the final customersq problems. The innovation-development process is driving by the sensitive information exchange with a high level of uncertainty. [2, 140]

The social construction of technology. Often, the technology is determined by social, economic or military factors. The technology is a societyq product and it is influenced by the rules and values of a societal system. [2, 138]

Skunkworks. It is a small and enriched unit inside the organization that does not use the usual organizational procedures in order to encourage innovation. The people that work in these environments are very highly selective, they have special resources and they create a needed innovation through working on a crash basis. A good example of this technique was established in Apple Computer in the early 1980s when Steve Jobs designed the Macintosh computer. [2, 138]

Sometimes skunkworks are completely necessary because often the R&D departments are bureaucracies, which are structured with the aim of achieving stability and continuity, aspects that differ a lot of from radical innovations. Skunkworks provides a solution for obtaining the best of the organizational structure and technological innovation. [2, 138]

Technology transfer. Technology transfer is a process that aims to put in use the obtained results from basic and applied research. It also includes technical information exchange between the R&D scientists who create a technological innovation and the people that use the invention, the new idea. There are three different levels of technology transfer [2, 139]:

- ˝ Knowledge: here the receptor has knowledge about the innovation technology, maybe because there was a previous communication about this technology.

- ˝ Use: here the receptor has put the technology in use inside the organization. It is more difficult to carry out than a knowledge level.

- ˝ Commercialization: in this level, the receptor puts the new technology as a product that will be sold on the market. To achieve that level of technology transfer, it is really necessary to invest a lot of time and resources in the technology receptor.

In conclusion, the technology transfer is a difficult process; regardless the level an extra effort is needed to make it happen. [2,137]

3.3.4   Commercialization

Commercialization is the result of exhaustive scientific results packaged as a product or service ready to be used by potential customers. In other words, the commercialization is the production, manufacturing, packaging, marketing and distribution of an innovative product or service. Most of the time, these products or services are developed in the R&D departments with scientific research but it is also possible that the innovations will arise from the practical experiments in order to find solutions to problems and needs. [2,143]

3.3.5   Diffusion and Adoption

Perhaps they are the most crucial decisions in the innovation-development process. In this step, the diffusion theory drives the diffusion of the product or service in order to be

adopted by the potential customers. As it will address later, in the next section of this chapter, in that process, the different kinds of adopters with peculiar features will be shown [2,144].

3.3.6 Consequences

It is the last step of the innovation-development cycle. When a new innovation has been developed, it is time to determine and check if the initial targets have been achieved. Sometimes in the end of the development of an innovation, new problems or needs appear, so in this stage, the innovation-development process will start again to solve them. [2, 149]

This section has discussed what the six phases of innovation-development cycle are. However, sometimes some of them cannot occur or the time-order of the phases can be different. [2,150]

3.4 Diffusion of Innovations

Diffusion of Innovations is a theory that tries to explain what rate, how and why the new ideas and innovative technologies are spread through society systems. Everett M. Rogers spread this theory in his 1962 book, Diffusion of Innovations. He defined the diffusion of innovation as a process by which innovation is transmitted by communication channels over time among the members of a social system. Rogers (1962) maintained that there are four important components that influence the propagations of a new idea [2, 10]:

- ˝ Innovation: Rogers defines innovation as ‰an idea, practice, or object that is perceived as new by an individual or other unit of adoption+.
- ˝ Communication channels: A communication channel is the way by the messages to get from a person to another.
- ˝ Time: Time is the speed that a new idea or technology needs to be adopted by members of a social system.

˝ Social system: According to Rogers, ‰a social system is defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal". [2, 24]

When the potential adopter receives the innovation, he has to decide to adopt it or not. The process of taking a decision is not an instant act, but it needs time and during it there are five activities. These are the common steps that all the researchers mention in their research [2,162]:

˝ *Knowledge* is the first step and it will start when the adopter knows the existence of the new idea or technology and how it works.
˝ *Persuasion* is the step where the individual has to take a favourable or unfavourable stand about the technology.
˝ *Decision* is a moment when the individual starts the process in order to adopt the new technology. If the individual decides to reject the technology, the knowledge and persuasion stages will not exist.
˝ *Implementation*: after accepting new technology, the individual incorporates it in her or his habitual activities.
˝ *Confirmation*: the individual looks for support of the taken decision.

3.4.1 Technology Life Cycle: S-Curve

Technology life cycle uses the S-Curve model to show the efforts that the technology companies invest in developing a new technology (the performance level) related to the time. Also, that curve shows how a new technology is being adopted by the societal system from the beginning to the end of the life cycle. Figure 12 shows the shape of that curve with the different stages.
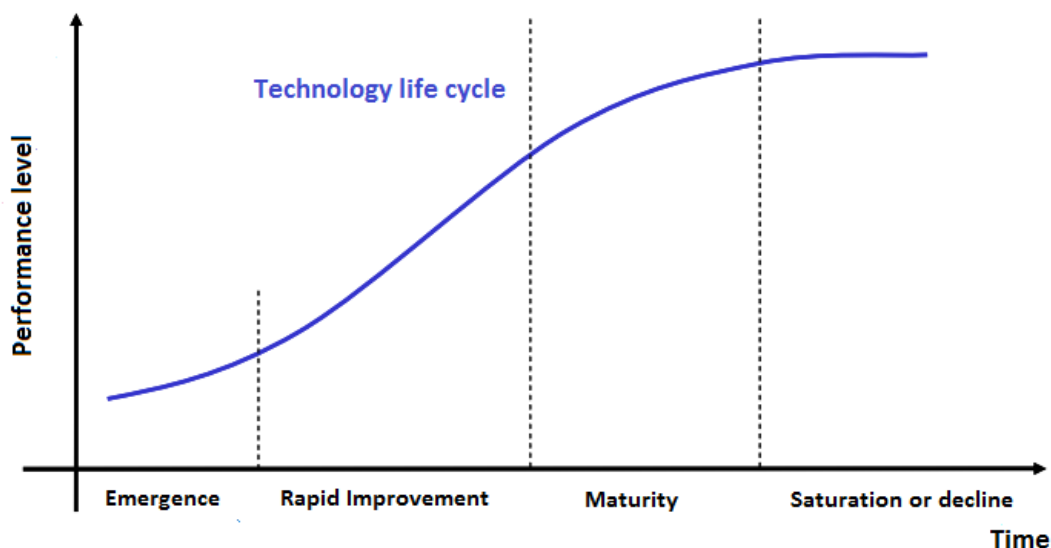
Figure 12 Technology Life-Cycle. S-Curve [17]

S-Curve contains four different phases. The first stage is the emergence step, where the new technology appears. In this step the performance of the new technology is lower than the technologies that are in the market. The companies invest resources in the R&D in order get information about it. In the second phase (rapid improvement) the companies have acquired enough knowledge and it is considered a trustworthy technology. The new technology starts to be used by the other organizations and also other companies start to invest resources in order to improve it. It produces a rapid and sustained growth and the other technologies start to be obsolescent. In the maturity stage, the new technology is very stable and the experience acquired provides successful processes to solve all problems that can occur. Improvements in that stage are more difficult to achieve because the technological performance is very high. In the final stage, saturation or decline, the technology is giving its best performance. New technologies start to appear providing interesting alternatives to do the same but with a better performance. [17]

3.4.2   Adopter Categories as Ideal Types

Everett M. Rogers shows in his 1962 book, Diffusion of Innovations, that there are five adopter groups related to all kind of innovation: the innovators, early adopters, early majority, late majority and laggards. In this section they are going to be described and the most important characteristics are analysed. Figure 13 shows the individual percentage of each adopter group. [2, 246]
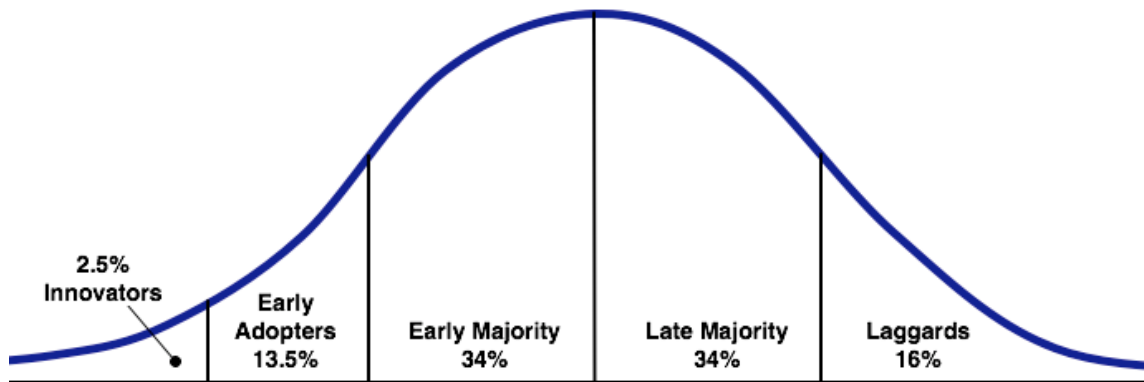
Figure 13 Adopter Categorization on the Basis of Innovativeness

Data gathered from Diffusion of Innovations [2, 262]

Innovators: Venturesome

This group makes up 2.5% of the members of a social system, and these people are the first to adopt a new tool, idea or technique. Rogers describes them as enterprising with resources because they understand and use the technology easily. They are always in touch with similar individuals inside the system. They accept the uncertainty and they do not get discouraged with problems related to innovation. These kinds of individuals do not need an external motivation. The innovators may not be respected by other members of the social system. [2, 263]

Early Adopters: Respectful

The next group making up 13.5% of the social system to adopt an innovation is called early adopters. In contrast to the innovators, they are usually respected by their colleagues and the other social system members. They are known for using the technology tools, methods and ideas in a measured and successful way and thus they are the model for other people. [2, 264]

Early Majority: Deliberate

The next group makes up 34% of the social system members. They are known for having a high interaction with their colleagues. They do not have leadership positions in a social system; their principal function is to provide connections between the different interpersonal networks in the system. They take more time to use a new tool, idea or technique than the innovators and early adopters. It is in this stage where the new

technology extends completely and a critical point is achieved by users because these adopters have huge predisposition to interact with everyone. [2, 264]

Late Majority: Sceptical

Late majority makes up 34% of the population. They are quite sceptical of new ideas, methods and tools. They are more cautious choosing and trying new innovations. They have fewer resources, so for them, it is also more difficult to acquire new technologies. A rule in this group is that most of the uncertainty regarding the new idea must have been removed before they adopt it. [2, 265]

Laggards: Traditional

Laggards represent 16% of the social system members. Rogers says that is not advisable see this group in a negative way. They are the most traditional members of the social system. Laggards are excessively cautious to explore new ideas, techniques and often they do not have resources to support them. Their reference point is the past so they are important for a social system because they remember the history and they give continuity. They are solitary people who adopt the innovation a long time after they have known of its existence and also when the change is completely necessary. [2, 265]

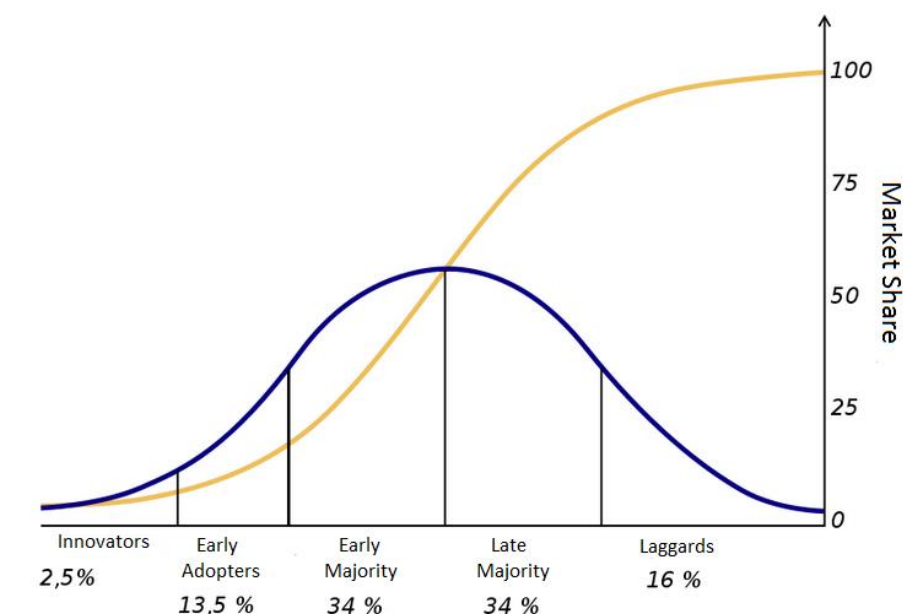Figure 14 shows the relation between the S-Curve and the Rogers adopter curve:

Figure 14 S-Curves and the Rogers Adopter Curve

Data gathered from Wikipedia [17]

This figure shows how in the first stage of the S-Curve, the performance is really slow because the innovators are researching the new technology. In the early adopters and majority stage, the performance grows fast because all the problems about the new technology are solved, and people start to understand and use it. This is a critical point, as it determines if the technology will be adopted by all the people or if it simply will be an invention that will not shake up the market. In the late majority the technology adoption continues growing and in the laggards stage the technology is stabilized, but there is not growth. [17]

4   Business Strategies

Before starting to develop new products or services, choosing and creating the strategy are one of the most important keys in order to obtain success. This chapter describes the different strategies that a company can choose. It also describes the factors that a company has to analyze in order to obtain for example the best strategy according to its needs, resources, type of innovation.

This chapter focuses on the innovation marketing field. It illustrates the key concepts of high-tech marketing showing the top ten mistakes in this marketing area, the objective of marketing strategy and different kind of strategies.

4.1   Innovation Strategy and Creating the Strategy

One of the clear tasks in innovation must be determined by how organizations use the innovation to develop new products and services. In other words, this explains what innovation route the organization will follow in order to achieve its targets. This task has to be taken by the senior management team. It will create its own innovation strategy by adapting it to changing conditions and choosing the best moment to make key moves. [1, 59]

The innovation strategy has to be related to the business strategy. The key innovation aspects will be dependent on the strategy and the competitive environment. It is vital that all people involved in the innovation process will have a clear idea about the innovation strategy and they must understand it. The key innovation players must be aligned with the organization in order to be successful with the innovation. [1, 60]

4.1.1   Play-to-Win or Play-Not-to-Lose Strategies

In relation of creating an innovation strategy, some companies prefer being dominant in one lever within the innovation matrix. Other companies prefer spreading out their resources through all levers of the innovation matrix, creating a diversified portfolio of innovations. Depending on these diversified investments within the matrix, are identified two different kinds of strategies, play-to-win and play-not-to-lose.

The most important target of **Play-to-Win Strategy (PTW)** is to generate important competitive advantages and sometimes, the company's competitors will not be able to develop them in a short time. To start to launch this kind of strategy, the innovation investment has to provide the company with one of the key resources of the organization competitive advantages. PTW tries to transform the organization investing a lot of resources in new technologies and business models in order to create new ideas or products. It also exceeds its competitors in the incremental, semi-radical and radical innovation. These investments are completely needed to obtain competitive success in the organization. [1, 60]

Clear examples of this strategy are the high-technology startups. Often, they must be very focused on a new idea, technology or business model but the failure rate of these kinds of companies is very high. One of the reasons for this high failure rate is that they do not have a strong investment portfolio, which makes the PTW pretty risky. When these startups achieve the success with their radical innovations, sometimes they have problems because they have to enlarge the investment portfolio. Then they have to change their strategy, combining radical, semi-racial and incremental innovation to obtain the most value for their products to provide them for their customers. These changes are very sensitive and delicate; therefore, if they are wrongly executed, the board or the investors will require solutions. [1, 61]

A successful example of this kind of strategy is Amazon. In the 1990s, it created a new business model in the book market. Previously it was not possible to buy a single book on the internet; the books were sold by pallets. Using a new software technology and creating a new delivering service, Amazon has been known as for increasing the product portfolio using a PTW in the right way. [1, 63]

However, it is always not a good idea to adapt a PTW strategy. The external and internal conditions will determine the best moment to try to obtain an advantage with this strategy. Until this moment, some companies prefer using the play-not-to-lose strategy. [1, 63]

Sometimes, there are external and internal conditions that make it difficult to adopt a PTW strategy. These cases appear when the competitive environment is really strong, indeterminate or when the company has internal constraints. When it happens, the cost

and risk of adopting a PTW strategy may exceed the benefits; therefore, it is a good idea to adopt a play-not-to-lose strategy. [1, 63]

Play-not-to-lose (PNTL) is a strategy that uses more incremental innovation than the PTW strategy. The most important target in this strategy is to guarantee that the company can stay in the market, taking estimated risks and moving close to their competitors. It is important that companies that follow this strategy stay alert to the new improvements their competitors develop. By doing so, these companies will be able to implement internal changes in their processes to wear down the competitors and to look for the best moment to change to a PTW strategy. [1, 64]

Often, the companies that use this kind of strategy are in fragmented industries, where changes in the technology and business models are not very frequent. In this environment, companies that develop better incremental improvements in these models are the leaders and it causes the PNTL to be the norm for the industry. [1, 64]

This strategy is a good option until an organization launches a new product with a high semi-radical or radical innovation. When it occurs, the company that uses PNTL does not have enough resources to compete with these innovations. They are not able to compete with success in this environment. [1, 65]

PNTL is always called the "fast-follower" strategy. If a company is always focused on following the innovation of its competitors, it will see decrease in their innovation capability. It will miss the chance to create products related to its business. However, some companies are expert in following the first innovators. They use the PNTL strategy to develop the innovation products and services that the first innovators developed. Then, they improve the products or services with their business processes such as marketing, distribution, product manufacturing or with their successful technology processes. In some cases the companies that use this technique beat the first innovator. [1, 65]

4.1.2   CEO's Responsibilities in Innovation Strategy

The Chief Executive Officer (CEO), one of the most important roles in the organization, has the following responsibilities related to the innovation strategy:

˝ He or she is responsible for choosing the innovation strategy that supports the technology and business models.

˝ He or she will decide which innovation strategy (play-to-win or play-not-to-lose) the organization will follow in each moment depending on the internal and external conditions.

˝ He or she has to construct an investment portfolio with the right amount of incremental, semi-radical and radical innovation in order to support the strategy.

˝ He or she is responsible for identifying the roles in the business model change and technology change.

˝ One of the most important tasks is to spread out the strategy through different communication channels and to ensure that the metrics of success and the reward are based on the optimal execution of the strategy.

˝ He or she has to guarantee that organizational antibodies do not slow down and depreciate the innovation investments.

4.1.3 Choosing an Innovation Strategy, Internal and External Factors

Over time, the organizations innovation strategy needs changes. There are several internal and external factors that determine which strategy is better at a precise moment. Table 3 shows these different factors:

Internal Factors	External Factors
• Technical capabilities • Organizational capabilities • Success of the current business model • Funding • Top management vision	• Capabilities in the external network • Industry structure • Competition • Rate of technological change

Table 3 Factors to Consider in Choosing an Innovation Strategy

Data gathered from Making Innovation Work [1, 75]

Internal Factors

The features of each internal factor are the following:

˝ **Technical capabilities:** The amount of new technological innovation is developed by the organization depending on internal capabilities in the organization and the resources obtained from its innovation network. If the organization has invested a lot of resources just in marketing or in incremental innovation, they will have problems in the future to develop semi-radical or radical innovations. [1, 76]

˝ **Organizational capabilities:** For technical capabilities, organizational capabilities are very important to develop semi-radical and radical innovation. The organization cannot launch successful products or services in the market if organizational and management capabilities are not well integrated into the strategy and in the company. [1, 76]

˝ **Success of the current business model:** The difficulty that successful companies have, doing changes in the business model, has been described in the previous chapters. If a company becomes successful, the future and required changes will be more difficult to implement in the business model. The greater the success is, the greater the resistance to change. [1, 76]

˝ **Funding:** The need of having the economic resources to achieve the innovation targets is obvious, but having too much funding may be dangerous as not having enough funding. For example, the startups of the late 1990s and early 2000s had more funding than they needed. The result was that economic resources were not managed in the right way and sometimes they were wasted. The funding has to be correct, and sometimes, less generous funding leads into the economic resources being distributed carefully. [1, 76]

˝ **Top management vision:** The last internal factor makes reference to management's vision. Management has to position the company in a good spot on the market. Also, it has to manage the company's talent because it has an important role in the company's innovation strategy. [1, 77]

External Factors

Internal factors are not only the agents that determine the election of an innovation strategy. The external factors have influenced the innovation strategy choice. Some external factors are the following:

˝ **Capabilities in the external network:** Sometimes, developing new technologies or business models requires new alliances with external organizations. These collaborations provide the companies with additional knowledge and complementary resources that helps the initial strategy to be successful. The chance of obtaining good partners will take an important weight in the future strategies. [1, 77]

˝ **Industry structure:** The industry structure itself is an important agent. An exhaustive analysis of the industry structure will provide the organization with the most relevant barriers and opportunities in that sector. The organization will be able to take these important inputs in order to design a successful innovation strategy if the company understands very clearly the future industry's vision, if it knows who dominates this industry and why and how it provides value for the customers. [1, 77]

˝ **Competition:** Depending on the position of the competitors and their innovations, the shape market can change drastically in the near future. While the organization is in a good position in the market, new competitors may appear or the competitors may redirect the market route with PTW strategies. It is interesting that the companies examine their competitors to elaborate the best strategy. Analyzing its competitors, the organization can decide if it should adopt a PTW approach or if the PTW strategies of other companies give it new opportunities to extend the products portfolio. [1, 77]

˝ **Rate of technological change:** In this era, the technological change advances dramatically and the life of the products and services becomes shorter and shorter. It is necessary to identify these new advances on time and to change the strategy. For example, if the technological advances exceed the products of a company, the strategy does not provide any advantage for competitors and the company's positioning on the market could go down. [1, 78]

Updating and constantly improving the strategy give the company the opportunity of maintaining and increasing its position in the market. If the company controls the internal and external factors, it will have a high probability of obtaining good innovative results. With a lot of probability, it will also achieve its targets. However, it is not a secret formula so it will not ensure the success in the competitive market. All companies are different and they have to use their best advantages in order to get the best positioning in the aggressive environment. [1, 78]

4.2 Marketing Strategy in Innovation

This section shows the key aspects in the marketing related to innovations answering the first questions such as when an organization is designing a marketing strategy, who the target customers are, or what value the company offers to its customers. Answers to these questions illustrate the different kinds of marketing strategies.

4.2.1 Common Mistakes in High-Technology Marketing

The company does not focus on the market and it is not oriented to the customers.

These aspects obstruct the success of the company. Sometimes, the company does not identify and prioritize the market's segments. There is no idea of consumer culture in the whole company, just in the marketing and sales department. As a result, the company does not serve adequately its products to potential customers. To solve these problems, the company has to adopt market segmentation techniques and prioritizing the most important. Putting the customers in the high level of the pyramid of the company values and undertaking activities to increase consumer awareness. [12; 13]

The company does not know the potential customers.

It is a serious problem and it starts because the company has not delimited its potential customers and has not made a market study. As the result, obtained sales will lead to low expectations and there will be a high level of customer complaints. The solution for this problem is making more thorough market research, using analytic techniques to evaluate the customers' behaviours and compiling useful data. [12; 13]

The company has to define and control better its competitors.

The company knows and defines with exactitude its direct competitors. However sometimes it overlooks the indirect competitors and also the technology advances that could influence in its business. To avoid in this problem, the organization should create a team responsible for the competitive intelligence, hire competitorsqemployees, be updated of the technological advances related to its business and launch similar offers than the competitors. [12; 13]

Poor management of the stakeholders.

Poor management of stakeholders occurs when the stakeholders (such as employees, investors, and partners) are unsatisfied with the company management. The company has to adopt techniques to change this situation like rewarding the employees to keep them motivated or collaborating with the best providers and keeping good relationships with them. [12; 13]

The company does not manage well the new opportunities.

When most of the initiatives and new products fail, it is possible to consider that the company is not managing the new opportunities in the right way in the market. The company has to track the market in order to find new opportunities. Then it has to design a system in order to stimulate the ideas generation, collaborating all together to achieve the companyqs targets. [12; 13]

The marketing planning is insufficient.

All companies should possess a clear marketing in which the targets and the strategies to achieve the targets should be described. When the plan does not have certain basic components, the plan does not provide financial stimulation or the plan does not permit changes, the results of which are insufficient to the marketing planning. [12; 13]

The capacity of creating a brand is weak.

The organization has to work to obtain a good position in the market. When the market does not know the brand or the brand is very similar to others, the company has this problem. Using marketing techniques which have greater effectiveness regarding investments and measuring the impact of brand value helps to solve this problem. [12; 13]

The company is not well organized to carry on efficient marketing.

The company has to possess a good structure with technical and human resources. It is possible to have a robust connection between all the departments and have a good leader and to develop efficient skills in the marketing department. [12; 13]

4.2.2   Key Strategy Decisions

All marketing strategies should answer at least three key questions as shown in Figure 15 and listed here:

˝   Who are the target customers?

˝   What value is offered to them?

˝   How can that value be created and delivered efficiently and effectively?

The companies try to determine the core issues of the strategy sweet spot. The core issue deals with these three questions which mean the organizations can get sustainable and competitive advantages. [4, 54]
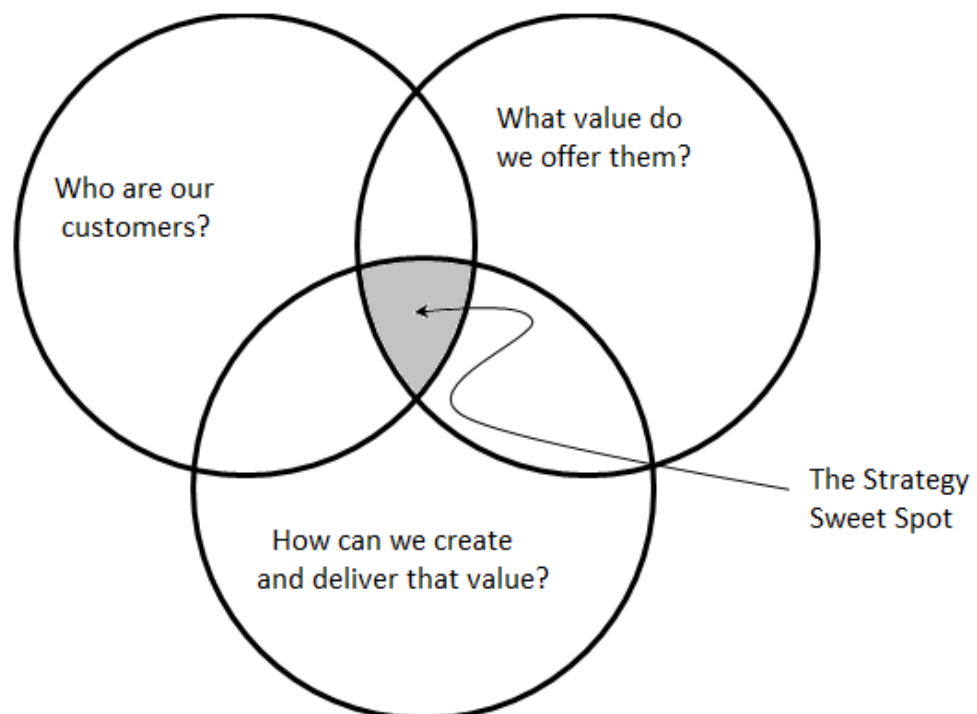

Figure 15 Key Strategy Decisions

Data gathered from Marketing in High-Technology Products and Innovations [4, 55]

WHO ARE OUR CUSTOMERS?

Who the customers are is a very difficult issue for the high-tech start-ups. Often, the new innovation can be used in different industries and markets; thus selecting a customer segment on which the organization will focus contains a lot of risks. Obtaining and determining a clear customer segment is the main point regarding this question. Some companies do not follow this clear point of view and spend most of their energy spreading their products across too many customer segments. Therefore, this shows why they are less successful than if they focus on obtaining and determining a clear customer segment. [4, 55]

Usually, established companies do not have this problem but they know the customer segments that are interesting for them. The problem of the established companies is that they may not be open-minded to find other customer segments. If it happens, they will lose opportunities to increase the customer volume because in the high-tech area, customer preferences change very quickly. The managers must present the following questions: %Who are our current customers?+ and %Who should be our customers in five year?+ [4, 56]

When firms try to increase the number of their customer segments, they search for a new market space, also called %blue ocean+ strategies. Market space is related to the market or product area where the firms compete. The successful companies do not put limits in the industries where they are established; they believe that the industries are fluid and dynamic environments. [4, 56]

WHAT VALUE DO WE OFFER?

 The next key strategy question is determining what and how much value is offered to the customers. Products, services and technology have to be seen as resources to create value. When a new innovation appears, it has to answer the question %how will this create value for the organizationς customers?+ After this approach, the engineers would start considering the customers in the first stages of the innovation instead of technology. [4, 56]

In order to get a good answer to the previous question, the firm has to explore the industry and to examine the value propositions of its competitorsqproducts. It is because the competence is usually obtained by studying the products of other companies that provide responses to the same needs.

The objective of the value is to persuade the potential customer to buy the product. The customer will obtain numerous benefits when they purchase the products which have offers. The three main kinds of value proposition are the following [4, 56]:

1. **The ĺAll Benefitsĺ value proposition**. This value proposition just joins the benefits that a customer obtains when he or she accepts the offer. It is very easy to construct because having a lot of knowledge of the customersqneeds and competitorsqcapacities is not required.

2. **The "Favorable Points of Difference" value proposition**. Regarding this value proposition, the potential customers have the ability to distinguish the products and services. The companies need to offer different products compared to their competitors by providing more value.

3. **The "Resonating Focus" value proposition.** This value proposition answers the buyerç key needs, focusing on demonstrating with studies and statistics that the final results of the purchase are beneficial to the customer.

HOW TO CREATE AND DELIVER VALUE?

The last value proposition is determining how the firm creates and delivers this value. Sometimes, marketing strategies fail because they are not well executed. The execution requires having the necessary competences, structures and suitable systems. The conditions and the strategy evolve very quickly, which means the execution of the requirements also needs to be changed. The efficiency management of alliance and associations with other firms is a key aspect to develop successful marketing strategies, and the flexibility has to be a mandatory feature in all kind of strategies. [4, 58]

4.2.3   Strategy Archetypes

There are four archetypes that provide a good answer to the major strategy questions that were mentioned previously. They are the following:

- ˝ Product leader (prospector)
- ˝ Fast follower (analyzer)
- ˝ Customer intimate (differentiated defender)
- ˝ Operationally excellent (low-cost-defender)

Table 4 shows how each archetype answers the most important marketing questions.

	Who are the customers?	What value?	How is value created/delivered?	Advantages / Disadvantages
Product Leader (Prospector; Pioneer, First Mover)	Innovators Early adopters	Innovative new products -Incremental innovations have greater odds of success for pioneers than break-through innovations	Focus on speed, commercializing ideas quickly	Pros: - Establish barrier to entry - May gain higher profits - Define ideal product attributes Cons: - Inherently risky: market may not develop as quickly as expected - High failure rate - High development cost
Fast Follower (Analyzer)	Early adopters Early majority	Superior products Lower prices New business models	Focus on cost, distribution	Pros: Innovative late entrants grow faster
Customer Intimate (Differentiated Defender)	Early and late majority - Narrow niches - Specific (Individual customers)	Customized solutions Superior service	Relationship marketing Intimate customer Knowledge	Pros: - High margins - Repeat business leads to high customer lifetime value
Operationally Excellent	Early and late majority	Superior combination of quality, price and	Value chain efficiency	Pros: High asset

(Low-Cost Defender)	• Mass market • Price-sensitive customers	ease of purchase Cost leadership		turnover rates and asset return rates.

Table 4 Four Strategy Archetypes

Data gathered from Marketing of High-Technology Products and Innovations [4, 62]

Product Leader (Prospector). The market pioneers use this strategy. They create new innovations and spread them on the different markets. They are the innovators and early adopters because they have the resources to solve the high risks that appear in the first stages of a new innovation product or service. A successful product leader commercializes the new product very quickly. If there is no competition, the leader will obtain important advantages against its competitors, getting high profits. [4, 61]

When a new company wants to enter into a new market after other companies, there are some aspects which the company has to undergo; having no experience as a new, unknown company and counting with a competitor who currently has the technological leadership. [4, 61]

Pioneers also obtain the most predisposed customers (early adopters), whereas the late movers are left with customers that have fewer predispositions to acquire new products. [4, 63]

If the customers do not have a lot of knowledge of the new product, the pioneers can influence the customers. The firm spreads the idea that its innovation contains the essential features of this new product. The pioneers have a huge degree of consumer consciousness so this reduces the perception of risk by the customers. [4, 63]

Despite these initial advantages, this strategy has big amounts of failure rate. An analysis during the period of 1856 -1979 determined that the successful rate of market pioneers was 53% while their average market share was 10%. [4, 64]

Fast Follower (Analyzer). This strategy consists of imitating the successful product leader's products trying to improve the market dominator's offer in some key way. For example, Bill Gates observed that the videogames had a high market quote when, Sony sold almost one million copies of PlayStation in March 2000 in only three days. One year later, Bill Gates announced that Microsoft was working on a new video game

device that would shake up the video game industry; he declared that "its a new platform for the industry". Gates promised that the new video game machine (Xbox) would be more realistic, with better graphics and more memory than PlayStation 2. Finally in November 2001, the first edition of Xbox was launched in the market and it brought successful results. Microsoft was not the pioneer in the video game machines. However, it captured the importance of this technology segment and it imitated the PlayStation 2 creating a similar video game machine but with their own improvised features. [4, 64]

The most successful fast-followers are the early adopters and early majority customers. The firms that adopt this strategy, usually use the following guidelines [4, 64]:

- ˝ They innovate in high quality products.
- ˝ They undercut the prices and improve the attributes of the product.
- ˝ They outadvertise / outdistribute the leader.
- ˝ They innovate in strategies that could change the game rules.

This kind of innovators grows faster than product leaders and they have a higher market potentiality. A study shows that the fast followers could create their product 35% cheaper than the pioneers. It is because the innovation patents needs more time to be developed than the products developed from others products as reference. [4, 65]

The Customer Intimate (Differentiated Defender). This strategy is focused on what customers need, want or desire instead of the overall common market wants. The company does not look for a unique transaction or unique purchase; it tries to grow a special relationship with their customers. The firms want to transmit the idea that they have the best solution for the customer and they provide all the support that the customers need. Then the firms could obtain optimal results and provide the value that the customers are looking for. [4, 65]

Delivering excellent customer services produces the appearance of customer loyalty and it increases the possibility that the customer purchases new products in the future. This strategy activates trust in the company. [4, 65]

For some companies, to build a robust and profitable customer relationship is the most important aspect in their business strategy. It is because their customers are the most important assets. [4, 65]

Operationally Excellent (Low-Cost Defender). This strategy is aimed at early majority and late majority customers providing a good offer in terms of quality, price and facilities to purchase the product. When the strategy is established, the firms try to obtain the cost leadership in the market through a success value chain and effective manufacture and distribution processes. [4, 65]

5   Open Innovation: The New Innovation Model

High-technology changes with time; therefore, it is necessary to adapt the innovation process to these new times. Understanding these new changes in the society, technology and with the new capacity to increase the knowledge level in the companies, it is safe to say that the traditional way of innovation is getting out-of-date. The new perspectives include adopting new ways of innovation, where cooperation between different firms and partners, and sharing information and knowledge is becoming important.

The traditional innovation model **(Closed Innovation)** is represented by a funnel. To begin with, all the ideas and technologies enter the funnel through its big mouth. The final products or services come out at the end of the funnel and they are offered to the customers. It is a linear system where all the ideas go through the funnel. In the first stages of the model, only the best ideas are selected. The company develops prototypes, validates the products which causes all the tasks to obtain the desirable result. Figure 16 is a graphic illustration of the closed innovation model. [3, 21]
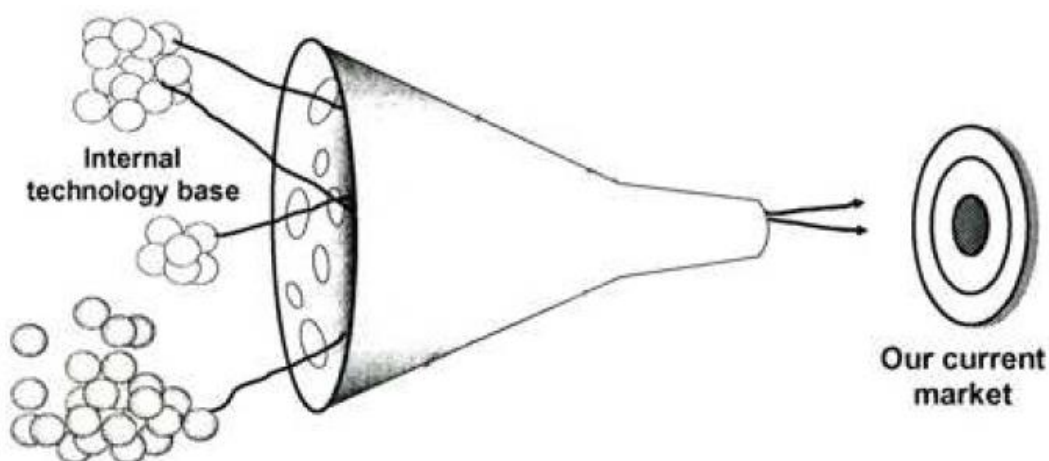
Figure 16 Closed Innovation Model
Data gathered from ¿Qué es la Innovacion Abierat? [7,1]

In a close innovation model, the firms want to keep everything under control in order to protect intellectual properties. Also, they try to employ the best experts to create the innovation products and services. The main object of this model is developing successful products or services through success ideas. These ideas are created by the internal resources of the company using their experts. Sometimes, the experts obtain these

ideas, for example, through congresses, exhibitions, and projects so the capacity to generate successful ideas is limited to the capacity of these experts. [3, 21]

Regarding the new concept of the innovation model **(Open Innovation),** the main goal is to obtain the most successful ideas, no matter where they were created. Be it in a small group of entrepreneurs in Silicon Valley, at a university in Bangladesh or in an expert team in a renowned company, all the options are interesting. [3, 43]

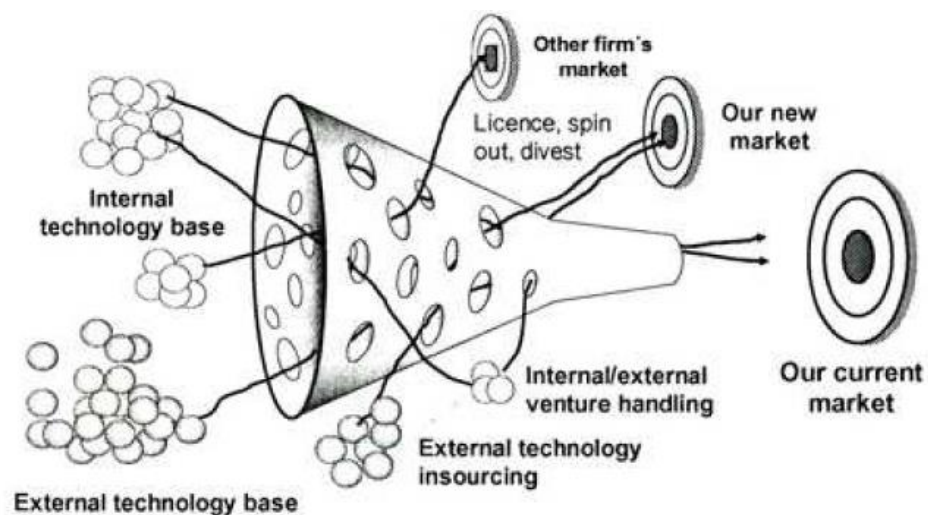Figure 16 shows a way to understand the open innovation model.

Figure 16 Open Innovation Model
Data gathered from ¿What is open innovation? [7, 3]

One of the challenges of this model is to identify access and obtain the needed knowledge to develop successful products and service. Identifying this information is not trivial; it requires having the knowledge of what is happening in the industry through basic resources (such as experts, research, providers and customers) and secondary resources (such as statistics and prospectives). Obtaining or mixing the external knowledge and the knowledge that the company achieves from internal resources pro-vides the company with more experience and a improves the learning process. [7, 3]

One of the first researchers that coined the phrase %open innovation+ was Henry Chesbrough, chief Executive in Open Innovation Center at Berkeley University in 2003. He says that open innovation means that a firm can use the external resources and the

best practices to complement the value of its innovation assets, obtaining greater re-
turn of investment. According the Chesbrough's approach of open innovation, today's
society is a global market where the innovation is a "commodity" that can be bought,
sold, licensed, paid and reinvested. [3, 43]

As can be observed in figure 16, the new ideas and technologies do not just come from
inside the company, they also come from outside. The difference with the traditional
model (closed innovation) is that the projects can go out of the company before they
arrive at the traditional market as spin-offs or patent licenses. [7, 3]

The companies that actually have the best practices in innovation creation obtain more
than half of their generation of new ideas from external sources as figure 17 shows.
The firms that adopt open innovation model may obtain new ideas from different
sources. [7, 3]

They trust in their partners, clients and all the stakeholders involved in their innovation
process. A company that uses open innovation understands that the cooperation with
different stakeholders provides them with a different and valuable perspective. [7, 4]
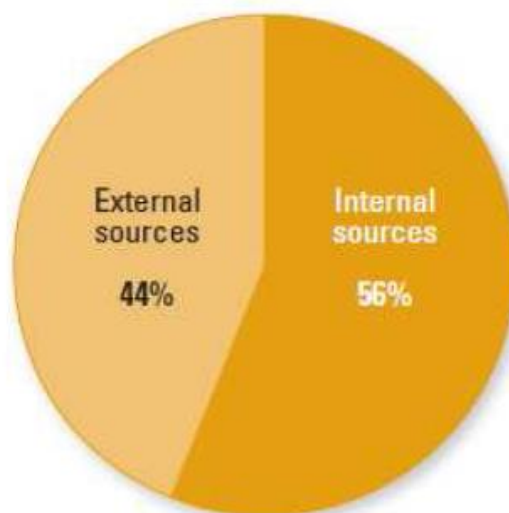

Figure 17 Sources for the Generation of Ideas
Data gathered from ¿What is open innovation? [7,4]

This vision of open innovation based on the collaboration is one of the possible stages.
The collaborative innovation starts to be open when a firm collaborating with other or-

ganizations or institutions achieves certain goals. Therefore the knowledge, the decision-making and other aspects start to filter through the organization. [7, 4]

Changing the innovation model from closed innovation to open innovation has to be structured. It requires changes from the organizational culture to the business model, going through the technologies and intellectual property management. [7, 4]

This paradigm change provides the company with the capacity to be quicker, more competitive and produce more added values.

Professor Chesbrough has said that the 20th century organizations invested a lot of resources to developing the best R&D departments by hiring the best students from the most recognized universities with the main target of developing the most innovative ideas and then protecting them through different strategies of intellectual property. Chesbrough suggests that the future has go through of separately regards the traditional innovation model, because it is very unlikely that all the best experts work in the same company. He suggests that the companies need to have an internal R&D innovation department and other external departments. This will keep the competitive level and it will require the redefinition of the current business models, resulting in a more open vision according to which the company will have different ways of generating value. [3, 43]

5.1 Key Elements of Open Innovation

5.1.1 Business Model

According to François Barrault, president of BT International, %The innovation is not only in the R&D labs, it also is in the relationship with our customers+. The innovation has to spread around the entire business model. In turn, Chesbrough claims that an open business model has at least two advantages. The first one is to create a stronger value source for the organization. The second is to provide the organization with the capability to be more efficient creating and catching that value. [7, 6]

The most interesting business model in this paradigm is the open source model. This model makes all the aspects of a company easier because without having to hide its intellectual properties, the organization can add the great ideas of the all interested

stakeholders, they can help the company in the development, in the quality control and in the propagation of their product. [7, 6]

5.1.2 Technologies

The open innovation model tries to open the organization to distinguisn agents in order to promote the interaction between them in a successful ecosystem. The social networks based on the internet or GRID technologies may be considered as interesting tools to approach this interaction. [7, 6]

Due to increased internet use, many new opportunities appear for the new technologies to support the innovation. Social tools such as blogs, wikis or podcasts create a fresh ecosystem where the people develop their ideas in a more horizontal and cooperative way than before. The web and technologies 2.0 are being developed in order to catch, combine and analyze the required resources and knowledge to innovate. [7, 7]

5.1.3 Knowledge Management

When the knowledge begin to be managed, the company does not rely on its financial and production capabilities only to create value. The knowledge is an important resource to create value and an essential source to obtain income and wealth. Therefore this is why the organization needs a suitable policy and strategies to achieve a good knowledge and information management. [7, 7]

This process has to consider all kinds of knowledge: the explicit (the easiest to process, transmit, store and share) and the tacit that is more abstract and less formalized than the explicit making it more difficult to manage and integrate inside the organization. [7, 7]

5.1.4 Intellectual Properties

The instruments of the intellectual properties could give the company a quick implementation of innovation. The acquisition of intellectual properties reduces the time-to-market or affords the company the access to another segment of the industry. [7, 8]

The intellectual properties may suppose an income source for the organization because it can commercialize or sell them. Acquiring intellectual properties is an interesting option because the firms decrease the risk rates. [7, 8]

The idea of copyleft is used in the open innovation. The main idea of this license is to provide the possibility to create a copy keeping the same copyright regime than the original. This kind of license tries to guarantee bigger freedom for all the users of the copy. A derived version of a work, the work itself or derived versions of it, can be used, modified or distributed. [7, 8]

5.2   Why Use Open Innovation in Organizations?

According Chesbrough and Schwartz, the collaboration between different organizations is one of the most important aspects in the open innovation model. Using external partners could decrease the R&D budgets, increasing the innovation results and discovering new segments in the market. [7, 9]

A recognized management consulting firm, ATKeamey, published the most relevant advantages that open innovation provides the company [7, 9]:

- ˝ Decreasing the cost of the at innovation process.
- ˝ Accelerating the innovation.
- ˝ Providing the possibility to develop new products or services increasing the profits and the market share.
- ˝ Increasing the organizations creative capacities.
- ˝ Reducing the direct R&D investment because part of this investment should be intended for collaboration with external agents.

As have been mentioned above, the collaboration with other external agents is the key point of the open innovation. Sometimes, it is hard to manage because there is the impression of loss of control by the organizations. There will not be just one company that will take the decisions; these must be agreed on by all parties involved in creating the product or service. [7, 9]

5.3   How to Implement the Open Innovation in the Organizations?

Open innovation, as well as all paradigms, needs focus on special tools and good practices in order to achieve desired results. The best practice is to have an open and receptive vision to collaboration with all stakeholders involved in the innovative environment. However, there are also other useful open innovation practices that allow the organization to walk towards a more open innovation system.

Take Advantage of the Market. The market is a common innovation source. The dynamism between the providers, clients and competitors creates, for example, a huge flow of different opinions, ideas, and product specifications that cause innovations. For example, in the software development case of open source, the users develop their own software solutions. [7, 10]

The organizations can innovate through the observation of their providers. Also, another interesting option is buying the competitors. Sometimes, the biggest multinationals like IBM, Google or Cisco keep their innovation power by buying young startups. A singular case of an innovation source is Eclipse foundation, where the users, providers and competitors collaborate together to develop a common software development platform. [7, 10]

Move Closer to Innovation World. The universities, technology centers and innovation institutes are great environments where the innovation flows. Often, the biggest companies collaborate with these institutions. However, more and more, small companies that do not have a strong and robust R&D department are interested in collaborating with these institutions. [7, 10]

Adopt Standards and Regulations. The security, quality, technique, health or environment standards mean an important innovation source for many companies. They have to adopt these standards for new regulatory conditions and / or competition. [7, 10]

Exploiting Intellectual Property. The intellectual property provides the organization with a direct way to absorb innovation. When a company obtains the intellectual properties the time-to-market is reduced or this gives an opportunity to access the markets

of other segments is obtained. On the other hand, selling or transferring licenses may be a significant income source for the company that develops patents. [7, 10]

Cultivating People. It is impossible to create an innovative organization if it has not innovative people inside it. Some techniques are used to obtain the best innovative people like "learning-by-hiring" (getting the best employees from the competitors) or training people around innovation through high-tech consulting firms. [7, 10]

The "innovation scouts" are professionals whose mission is to observe the environments and identify innovations or business opportunities. Better companies have scouts around the world, in universities and technological areas. [7, 10]

Move, talk and listen. Exhibitions, conferences and high-tech festivals are interesting events to observe the technology environment. The creation of a high-tech environment where the universities, startups, capital risk companies, and high-tech companies can share information and different points of view enriches the innovation environment. The active listening of the different stakeholders makes the difference. [7, 10]

6   Conclusion

An innovation will be adopted quickly by the users if it has the following features: relative advantage (how beneficial it is for the individuals), compatibility (how the innovation is compatible with the moral values), complexity (how the innovations are understood by most of the members of the society), trial-ability (degree to which an innovation may take trial experiments) and observability (degree to which the adopters observe the final results before adopt it).

The role of the chief execute officer (CEO) is the most important in most companies. Having a CEO with strong leadership will make the difference with the competitors. Among others, he is responsible for balancing the innovation in the technology and business areas.

An important decision is determining which kind of innovation (incremental, semi-radical or radical) is the best option for developing their products as a function of several external factors, for example, the competitors products or the current technology and the internal factors like the learning capacity or the leadership of its CEO.

In innovation, there are some good practices that guarantee good results like managing the tension between creativity and value capture, neutralizing organizational antibodies, obtaining knowledge from external and internal environments, creating metrics to measure the results or integrating business mentality inside the company.

In order to get success in innovation, a company has to invest in two dimensions, the technology innovation field and the business model innovation field (innovation matrix). In this matrix, there are six levers that help the company to produce good products or services, three related to business model innovation (value proposition, supply chain and target customer) and the other three related to technology innovation (products and services, process technologies and enabling technologies).

The most common innovation types are the following: *incremental innovation* (makes changes in one or two levers of business model or technology change), *semi-radical innovation* (when changes in business or technology dimension produce changes in the other dimension) and *radical innovation* (affects both the business model and the technology dimension and provides a huge change in the industry).

Having the capacity to learn more quickly, more efficiently and being cheaper than the competitors could provide the company with the leadership in the market. The main point of learning in the innovation system is not to avoid the mistakes but to learn from them. The innovation is 100% related to the learning process and it has to be present during the whole innovation process.

There are two different kinds of learning systems. Learning to Act evaluates the process and the resources in order to find the strengths and weaknesses in order to improve them. The Learning to Learn model explores the way that the company is innovating in order to improve the process, to find other ways to optimize the process and to achieve better results.

In marketing, one of the priorities is determining who will be the customers of the company, in other words choosing a clear customer segment. However, if the company is established, it is not a good idea to spend all the resources in only one segment. A good practice is being open to discover new market space in order to increase the customer volume.

Most of the innovations will be successful in a segment market if they create a value for the users. The technology, new products or services have to be tools to create this proposition value.

To create a success value proposition network, the company needs to have necessary competence, structures and suitable systems. The conditions on the market are very changeable so the marketing strategy has to be flexible trying to establish alliance with others firms.

When a pioneer company creates successful products, it obtains some advantages against its competitors like economic profits, reputation and they acquire the most predisposed customers. However, being a pioneer includes have several risks and the statistics show a high failure rate.

Copying a successful product from other companies is an accepted idea only if the company provides extra value for the customers. Decreasing the price, improving the

products features or adding new functionalities are the techniques to provide additional value for the customers.

Focusing on customersq needs instead of overall market needs and providing a high-level customer service gives the company the opportunity to obtain customer loyalty. This may provide the possibility that in the future, the customers will choose its products or services when they will require needs.

The open innovation model is a new innovative paradigm where the main idea is to make the innovation process flexible compared with the traditional innovation model (close innovation). The collaboration with other organizations and institutions is the key point and it will provide the organization with the capacity to be quicker, more competitive and produce more added value. The decisions must be agreed on by all parties involved in creating the product or service.

Changing the innovation model from closed innovation to open innovation has to be structured. It requires changes from the organizational culture to the business model, going through the technologies and intellectual property management.

When the company becomes big enough, it can keep its innovation power buying young startups. Nowadays, this phenomenon is regularly happening. Companies like Google, Facebook or Yahoo are buying different kinds of startups in order to increase their product portfolio.

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