Creative Process and Product Life Cycle of High-Tech Firms

Authors: Verna LU  
Cédric MARJOT  

Principal Tutor: Dr. Philippe Daudi  
Co-tutor: Dr. Mikael Lundgren  

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ABSTRACT

Given the context of globalization and growing competition, we assist at a reduction of the product life cycle and at a rapid diffusion of creations and innovations. To respond to the fast changing customers’ demand and to reinforce their market position, firms shall design an effective creative process offering superior customer value and insuring their future in the long term.

First of all, after an explanation of the differences between creativity and innovation, the creative process of high-tech firms in terms of actors involved, resources allocation, leadership and management of creative people will be depicted. Secondly, the creative destruction process and some of the inherent obstacles and risks of the creative process will be addressed. Thirdly, the concepts of Technology Life Cycle (TLC) and Product Life Cycle (PLC) will be developed.

Within this thesis, our ideas are presented and justified through three methodologies: Literature Review, case study and interview. We mainly used the cases of Hewlett-Packard (HP) and France Telecom Orange (FTO) to backup our argumentation.

We conceptualized the creative process and we highlighted the connections between the creative process and the Product Life Cycle. With the help of two other small cases study (Nintendo and Apple), we emphasized the downward trend of high-tech products’ lifecycle in the long run. Ultimately, four practical recommendations are given to leaders from high-tech industries and directions to deeper research this topic are advised.

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Jou-Yen (Verna) Lu
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I dedicate this thesis to Emilie.

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INTRODUCTION
1. Research Context

According to a lot of business specialists, creativity constitutes one of the most powerful competitive weapons in today’s business world (Moger, 2007). Indeed, some of the most important gains over the last few years such as Google or Apple (BusinessWeek, The World's 50 Most Innovative Companies, 2008) can be explained by a dedicated culture to creativity and innovation.

Due to the globalization, growing competition between companies, countries, openings of new huge markets (China, India), we are assisting at a reduction of the products’ life cycle and at a rapid diffusion of creations and innovations. To respond to the fast changing customers’ tastes and to reinforce their market position, firms shall find a solution, build a system to face the constant need for novelties and improvements and insure their future. In this context, companies must be particularly organized to gain or maintain their position. The risks of failures have never been so important and will continue to rise in the coming years. Organizations have to face the reality: the society change, people change, companies change and as a consequence, their portfolio of products and services too. Whatever the usefulness or quality of a product or service, one thing is certain: it will sooner or later be copied; replaced by a more innovative one; or by a new creation. In accordance with business experts in Product Life Cycle, every company which does not innovate during three years is condemned to disappear from the market (Fisher, 2008) because it becomes rapidly impossible to reduce the gap with the competition.

Today, our means and networks of communication make it particularly easy for global competitors to copy all kinds of products as transfers of information can be done quickly. Once released on the market, creations and state-of-the-art technologies are duplicated notably by firms from newly industrialized countries in only few months. The information flows also help clients to compare without difficulties national and international offers regarding similar products and services. Customers seldom hesitate to directly order their new products from foreign companies via Internet. Even if they tend to be loyal towards a brand or a firm, if they can get the device or service they are looking for at a cheaper price (shipping costs included), whatever the nationality of the manufacturer, they will buy it because price remains their first purchasing criterion. As companies are used to publicly announce the launching time of their new products, clients can also chose to postpone their purchasing date which will end the current Product Life Cycle.

Due to the omnipresence of globalization and competition, companies cannot depend anymore on customer loyalty, transaction costs or Government protection. Accordingly, we can ask ourselves the question if they can survive, gain a competitive advantage and become successful under such tough conditions? It seems that the survival, independence and success of companies in the long run
depend mainly on their ability to build effective creative and innovative processes. Their capacity to continuously innovate, to run faster than their rivals and to give value to their innovations on the market appears also critical. Given the fact that new high-tech products and services are constantly released on the market; the previous ones become rapidly mature and obsolete and finish by disappear. This creative destruction phenomenon is on the rise by reason of global competition which tends to reduce the lifecycle of high-tech products.

Besides, most of the products which will be available in 2020 do not exist today. Therefore, companies will need skilled and talented people to:

1. foresee and detect the new trends of the market;
2. analyze customers’ needs and create new ones;
3. select the best market opportunities in coherence with the organizational strategy;
4. decide when to replace end lifecycle products by new ones;
5. create and design the new products that will insure the company success in the long term,
6. lead and motivate organization members to be more creative and innovative;
7. handle the creative destruction pace;
8. minimize the risks inherent to the creative process.

Given this research context, we have decided to concentrate our thesis on creative and innovative organizations located within the high-tech industries. We will see that due to the nature of their offer, the lifecycle of some of their products and services on the market is particularly limited. For instance, we will examine the creative process organization of two companies from the telecommunications (France Telecom / Orange) and consumer electronics industries (Hewlett-Packard, later HP). We will also study the lifecycle evolution of two specific products created by firms located within the video games and computer hardware and software industries. Except Sega (Japan) and France Telecom / Orange (France), all the companies that we investigated through cases study are ranked among the fifty most innovative companies in the world in 2008. Data such as stock returns, revenue growth or the number of patents registered on the 2001-2007 period were taken into consideration to build this ranking:
Perhaps, these firms managed to succeed by building a more or less similar creative process. This is what we want to find out through cases study and the two interviews of a Manufacturing Manager (Terry Tseng) from HP and an Engineer R&D (Micheline Perrufel) from FTO.

Why do we have decided to focus our analysis on the computer (HP) and Telecommunications (FT / Orange) industries?

First of all, the PC (Personal Computer) industry contains desktop, laptop (Notebook), handheld computers (PDA, Personal Digital Assistant) and servers. In addition, it is characterized by an average one year short Product Life Cycle but a long R&D process.

According to Gartner Inc. (2008), there are a total of 271.2 million units sold worldwide in 2007 and a 13.4 percent growth rate since 2006. Meanwhile, the EMEA (Europe, Middle East and Africa) Region is still the largest PC market with a 14.7 percent increase by 92 million units’ shipment volume in 2007, and Asia Pacific took over the second largest PC market (70.7 million units) during fourth quarter 2007. Furthermore, the U.S. PC market grew 5.3 percent in 2007 by 64.2 million units; the Latin America market had shipment volume 24 million units; and PC shipments in Japan were 13.9 million units. Accordingly, 2007 depicted a clear landscape of the worldwide PC market that is a stronger increase in Asia Pacific region and slower growth in the US market.
The PC industry is a mature industry in which it is difficult to succeed given the fact that the top five players occupy more than 55 percent PC market share worldwide. For that reason, creativity and innovation represent a key driver that helps PC Companies to survive and sustain their competitive advantage. If a company cannot keep its eyes on innovation, this firm may be phased out naturally.

Then, the Telecommunications industry is characterized by major changes due to deregulations, privatizations, numerous creations and innovations (mainly on Internet and wireless technologies), mergers and acquisitions, fierce international competition, and customers’ shifting demand. Consequently, markets change rapidly and business models and strategies evolve.

The Telecommunications industry globally represents $3.5 trillion in annual revenues; $1 trillion for the only U.S. market (plunkettresearch.com, 2008). It includes not only local and long-distance telephone services but also mobile, wireless communications, the Internet, fiber-optics and satellites. The worldwide Telecommunications market is expected to grow at a 9.2 percent compound annual growth rate from 2007 to 2011 (tiaonline.org, 2007). The worldwide mobile phone market counts 2.3 billion users (mid-2007) and is estimated to reach 4 billion by the end of 2011. The cost of a cell phone call continues to drop even if it remains more expensive than landlines or VoIP calls.

New technologies such as Unified Communications or Voice over Internet Protocol (VoIP) menace established businesses on landlines and mobile communications. For instance, projections from the Telecommunications Industry Association (TIA.org, 2008) indicate that 200 million people will subscribe globally to VoIP in 2011 against only 4 in 2004. Moreover, wireless access to the Internet, notably the WiMAX technology which allies a wireless connection with a high-speed debit, threatens traditional broadband suppliers. As a result, the Telecommunications industry is full of business opportunities. A slowdown of the Product Life Cycle downward trend or of the creative destruction phenomenon does not seem planned in a near future.

Today, a product like the iPod from Apple represents what comes first to people’s mind when they are questioned about creativity and innovation. The Cupertino-based company has become a reference in this domain and their products result of the extremely successful creative process they managed to build. Their leader’s vision (Steve Jobs), who tries to give people what they really want, the talent of their employees, their design quality as well as their focus on the user’s experience are other elements susceptible to explain their achievement. Moreover, if you take a look at the evolution of mobile phones from Martin Cooper’s creation in 1983 with the Motorola DynaTAC to the Apple iPhone in 2007, you will definitely see the fantastic impact of creativity and innovation in
everything we do.

2. Research Questions

After an explanation of the differences between creativity and innovation, we will clarify our understanding of the creative and innovative processes. This will allow us to respond to our first Research Question in which we want to depict the creative process of companies from high-tech industries. We will address, for example, the actors who participate and influence the creative process. How organizations handle creative people will be emphasized as well as techniques used to foster creativity and innovation, and resources allocation too. Finally, some of the risks and dangers inherent to creativity and innovation will be highlighted, and some of the barriers within companies will be discussed.

In our second Research Question, we will examine in what ways do companies from the high-tech industries cope with the issue of Product Life Cycle shortening while it requires several years of Research and Development (R&D)? As we believe that the lifecycle of technologic products (whatever their nature) is evolving downward, we will study the lifecycle trend of high-tech products. We will also address the creative destruction phenomenon and the obstacles and dangers that usually surround the creative process.

After a presentation of the methodologies used, theories of well-known authors will be systemically articulated with empirical examples throughout this thesis to answer each research question.

3. Objectives and Scope

The literature available on creativity and innovation focuses mainly on actors of the creative process, resources allocation and the ways managers lead creative people; but very little work has been completed on the interplays between Product Life Cycle and the creative process. Therefore, we attempt to fill this gap of the literature.

In addition, we believe that the lifecycle of technologic and high-tech products is following a downward trend. We think that this issue has not been covered enough and hence it can be further developed.
3.1 Research Objectives

Throughout this thesis, the research objectives are to:

1. Identify, in the companies under study, how do they plan, organize and lead their creative and innovative activities; in other words, their organizational structure;
2. Depict the creative process of organizations that is how they can effectively nurtured, mobilized and harnessed creativity and innovation;
3. Show the influence of the environment, of external actors on the companies’ creative process notably from competitors, customers, Government and other stakeholders;
4. Examine if the lifecycles of consoles from Nintendo and iPods from Apple are really evolving downward;
5. Emphasize the advantages of creativity and innovation and some of its inherent dangers and barriers within organizations;
6. Conceptualize the connections between the creative process and Product Life Cycle.

We hope our research will help members from scientific and academic communities notably practitioners, teachers, students but also companies to get insights on the relations between creativity, innovation and Product Life Cycle. We want them to take into consideration the Product Life Cycle while they build their creative process in order to obtain a sustainable competitive advantage in the long run. We would like to aid companies to take the good decision when they invest on short Product Life Cycle whereas the R&D phase is long.

In addition, the purpose of this three months thesis is also to become experts in the different fields of our research area. We aim to increase our skills, our knowledge on the subject. We want to find meaningful conclusions that could interest professionals from the IT or lateral industries. At last, we also look forward to give them recommendations to follow when they are facing issues related to creativity and innovation.

3.2 Research Scope

The territory and main domains of research of this thesis are Creativity, Innovation, Management, Leadership, Strategy and Competitive Advantage. Consequently, the following borderline fields, even though interesting, are located outside of this thesis’ theoretical scope: Industrial and Intellectual Property, Human Resources, Talent, Gender, Change Management, Technology Transfer, Development of Nations.
Regarding the empirical scope, companies from Computer (HP), Telecommunications (France Telecom / Orange), Consumer Electronics (Apple), and Video Games (Nintendo, Sega) industries will be analyzed. To obtain insights and information that we could not find with the help of the literature and cases study, a Manufacturing Manager from HP and an Engineer R&D from France Telecom / Orange were interviewed. During this thesis, only creative and innovative technologic products whose lifecycle is limited (5 to 10 years or less) will be studied.

4. The Vision

Our vision is to find out the concrete relationship between creative process and Product Life Cycle. We want to help companies to succeed in the market and create more innovative products or services for their customers.

We also hope this thesis can aid companies to decide whether they want to invest their money on creativity and innovation or on something else. Furthermore, we want to find meaningful conclusions that could interest professionals from the Computer, Telecommunication, Information Technology, Consumer Electronics, Video Games or lateral industries but also teachers, students to learn more about how to be more creative and innovative.

First, we expect to find out that the lifecycle of technologic and high-tech products diminishes or tend to decrease in time. Second, we want to clarify the relation between creative process and Product Life Cycle. As authors, we also look forward to improving our analytical, writing and presentation skills.
I.

Research Design
Inside this part, we are going to present and justify three methods that we used within our thesis: Literature Review, case study and interview. Our final objective consists of building a theoretical framework close to the reality to elevate the analysis level of our thesis through the knowledge generated and acquired with the help of these three different methodologies.

We exploited mainly secondary materials. The Literature Review informs readers on main theories related to creativity, innovation, the management of creativity and creative people, and on Product Life Cycle. Concerning the cases study, first, two big cases (HP and France Telecom / Orange) will be examined in details in order to answer our first research question in which we want to depict the overall organization of the creative process of high-tech firms. Second, Apple and Nintendo cases will be addressed as we will focus our analysis on some of their specific products (iPods, Consoles) for replying to our second research question. Our will is to check their high-tech products’ lifecycle trend and to see if it is possible to generalize the results to any high-tech products. Eventually, the interview method will allow us to complement our theoretical framework with information that could not be found in the literature or in the cases study.

To realize this master thesis, we followed an abductive approach. Indeed, we started from the empirical level by focusing notably our attention on the evolution of high-tech products’ lifecycle. Then, we carried out a review of the literature existing on the different subjects of this research. This helped us to complete two interviews and different cases study. Ultimately, we conceptualized the main ideas extracted from the literature, interviews and from the cases study.

1. Literature Review

Throughout this thesis, we exploited the best literature available on the themes of Creativity, Innovation, Management of Creativity and Innovation, Leadership and Product Life Cycle.
Firstly, a Literature Review is an account of what has been written on a subject by recognized scholars and researchers. Its purpose is to summarize the main authors’ arguments on selected topics. One considers that a good Literature Review is characterized by: a logical flow of ideas; current and relevant references with coherent quotations; a good, unbiased understanding of the previous research on the topic and an appropriate use of terminology. In accordance with Cooper (1988), a Literature Review uses as its database reports of primary or original scholarship [...]. The primary reports used in the literature [...] are written documents. The types of scholarship may be empirical, theoretical, critical/analytic, or methodological in nature. Second, a Literature Review seeks to describe, summarize, evaluate, clarify and/or integrate the content of primary reports.

As our thesis is related to creativity, innovation, leadership, creative workers and Product Life Cycle, we want to communicate to the reader the quintessence in terms of knowledge and ideas in these different research areas. We built our Literature Review thesis with the help of a multitude of books, articles and websites that we critically analyzed. Our purpose in this second part is to focus on mapping the literature through the overview of different articles. We will present, for each of these articles, their main argument and discuss its acceptability and plausibility by looking for counter arguments or counter conclusion. This step within our research helped us notably to define and establish clearly the distinction between creativity and innovation. We also addressed some of the repercussions stemming from creativity and innovation whether positive or negative. Our Literature Review includes well-known authors’ theories as well as ideas from Academic journals and from our “Master’s programme in Leadership and Management in International Context” (Kalmar, Sweden).

Secondly, why do we really need a Literature Review? The answer is very simple as we want to become experts in these fields in order to elevate the analysis level of our thesis. Besides widening our knowledge about these topics, writing a Literature Review helps us to gain and demonstrate skills in searching, identifying and analyzing unbiased and pertinent valid information. We also aim to emphasize the last trends within these research areas and to bring our audience up to date with the present literature. This methodology also helped us to raise a lot questions. While doing it, we managed to identify few gaps within the literature that worth to be studied. We notably think that the relationship between creativity, Product Life Cycle and innovation can be further studied. We believe that the lifecycle of creative and innovative products from high-tech industries, that is to say goods whose lifecycle is generally lower than five years, diminish or tend to decrease.
To insure a qualitative Literature Review, we tried to find a balance between widening it enough to include all the relevant aspects of our research and narrowing it to focus on the main issues. We have decided to present our Literature Review by themes even though it's possible, for instance, to organize it by authors or chronologically.

2. Case Study

The second method that we decided to use within our thesis is case study. The main reason stems from the fact that we studied a lot of companies with this method during the year. As a result, we acquired certain abilities to work effectively with it. Contrarily to the selection of random companies which would have hardly aided us to generate the necessary knowledge to build a good theoretical framework, the case study method helps us to get insights from firms that we have deliberately chosen as we think that they can bring added value into the research. According to Lamnek (2005), the case study is a research approach, situated between concrete data taking techniques and methodologic paradigms.

This method refers to the gathering and presentation of in-depth data about a particular actor or small group of players. Before going further in developing this technique, we want to make our intentions clear. As thesis students, we aim to reach valid conclusions in a particular context, on specific products and only concerning the group of companies under study. We want to analyze, explore and depict the creative process of organizations providing creative and high-tech goods whose lifecycle is lower than five years. We also intend to observe the “phenomena” linked with the creative and innovative processes. Thus, we will examine 5 companies by following a flexible analytical grid which contains a variable number of meaningful elements to investigate in our research. We will start our analysis with two major cases studies (HP and France Telecom / Orange) and then focus our work on three small cases (Apple, Nintendo and Sega). To backup our argumentation with the help of the case study method, we will provide a mix of quantitative (notably statistics) and qualitative evidences coming from reliable sources. Accordingly, the case study constitutes an interesting complementary method to Literature Review and interview in order to answer our two main research questions.

To generalize the ideas discovered through case study, two simple techniques are particularly easy to apply. The first one consists of finding a problem on a critical case, for example, in an organization which is ranked as the best in its category. As a result, it is likely that all the companies positioned behind this best of breed player will encounter the same issue. Thanks to this kind of generalization technique which follows the pattern If it is valid for this case, it is valid for all (or many) cases (negative form: If it is not valid for this case, then it is not valid for any (or only few)
cases), it is possible to save both time and money when working on a given problem. The second direct test to apply to generalize from case study is called falsification (Popper, 1959). Despite his simplicity, this technique is particularly accurate as whenever an observation differs with the initial proposition, the found conclusion cannot be considered as valid anymore and must be either rejected or revised.

The selected below companies can be justified by the fact that they are all linked with the main notions present in our thesis which are creativity, innovation, creativity and innovation management, leadership and Product Life Cycle. Therefore, we will analyze the creative process of companies from different industries: Computer (HP), Telecommunications (France Telecom / Orange), Consumer electronics (Apple), and Video games (Nintendo, Sega). Our choice is naturally guided by our interest in their products offer. We will use a flexible analytical grid that we built to investigate and to take into consideration specific elements in the following cases. The case studies presented below exemplify the value of creativity, innovation, creative process, managing creative people as well as the trend followed by the lifecycle of technologic and high-tech products.

2.1 Case Study of Hewlett-Packard and France Telecom / Orange

As regards HP and France Telecom / Orange, we will depict their strategies which consist of exploration and experimentation in order to be more creative and innovative. We will also emphasize how they diffuse, maintain and promote their creative culture within their organization. This implies to explore, analyze and depict their:

(1) Organizational structure (Number of R&D centers, Localization (headquarters, Science Park…), workers involved in the creative process, etc);

(2) Creative process (from the creative idea to the decision to add the new product or service in the portfolio);

(3) Resources allocation (Budget in R&D, number of employees dedicated to R&D, project time, etc);

(4) Ability to take risks or not (risk aversion);

(5) Recruitment process (notably regarding creative people: researchers, R&D, etc);

(6) Management style (autocratic, democratic, “laissez-faire”, mix) with creative people;

(7) Leader’s vision;

(8) Levers to rise creativity and innovation, Promotion of the creative culture;

(9) Techniques to Recognize and Reward creative workers;
Number of patents registered yearly.

2.1.1 Why Hewlett-Packard?

The Computer industry is one of the high-tech industries and has a short product life cycle which is in average of one year and then more high-end products will be launched soon after. HP is one of the leading companies in this industry and ranks 15th in 2008 among the world’s 50 most innovative companies (Business.com, 2008). HP is especially innovative on its processes, business models and customer experience. Moreover, Verna has the pre-understanding in light of her previous working experience and possesses good relations with HP.

Hewlett-Packard Corporation (HP) is an American information technology company founded by William (Bill) Hewlett and David (Dave) Packard in 1934, and headquartered at Palo Alto, California. At the beginning, its initial business was unfocused on working a broad range of electronic products. Soon or later, they decided to concentrate on high-quality electronic experiment and measurement equipments. In 1966, they entered the computer market by a simple and accumulator designed products (the HP 2100 and HP 1000 series of minicomputers).

Soon after, HP launched inkjet and laser printers for desktop computers in 1984 and its scanner product line has been successfully developed into multifunctional products later on. HP extended its computer product lines in the 1996s, which originally they targeted customers from research, commercial and educational fields. A decade later, hpshopping.com was opened as the independent subsidiary to sell their products online directly to consumers; it was renamed “HP Home & Home Office Store” in 2005.

Carly Fiorina was appointed as CEO in July 1999 who was the first woman ever to serve as CEO of a company. Concerning her management and performance at HP will be further introduced at 2.1 that section later on. During her leading period, a revolutionary strategy, the merger with Compaq, was against strongly from the board of directors but she insisted to do it in 2002. Consequently, analysts observed that her audacious strategy made HP being a key player in desktop, laptop and server computers for numerous markets. As regards HP current CEO (Mark V. Hurd), company culture and HP’s management styles, those will be introduced from the following sections later.

2.1.2 Why France Telecom / Orange?

Orange represents the main brand of the France Telecom Group which was privatized in 1998 and constitutes one of the leading operators in Telecommunications. Since its creation, the organization is recognized for its innovative spirit which led to the invention of the Minitel (1981),

FTO generated €6.8 billion of net revenues in 2007 that is an increase of 42% if compared with the 2006 results. This extremely positive evolution of the French group’s turnover can be principally explained by the activities with Emerging Countries (Central and Eastern Europe, Asia, Africa, Middle East) in which the growth is important. The FT group offers its products and services to around 170 million customers. Two third of these clients belong to the Orange’s portfolio. The NExT (New Experience in Telecommunications) Plan which was designed in 2005 to turn the group into the leading convergent operator in Europe has completely transformed the firm’s businesses since its implementation. In 2007, Orange ranks third as European mobile operator and No.1 as Internet provider (francetelecom.com, 2007).

Since 2005, FTO creative process structure notably evolved because of: the competition, new technologies (VoIP, WiFi, etc.), customers who require new telecommunications devices and services, the equipment rate of developed countries, the economic emergence of new countries and the market which requires cheaper prices. This case study will be reinforced by the analysis of the answers of an Engineer R&D (Micheline Perrufel) from FTO that we interviewed on the 11th of April 2008. Her main missions are to conduct prospection studies and to design innovative services.

Micheline Perrufel argues that FTO is mainly influenced in the development of its new products and services by the competition, our CEO, all the economists, financiers and marketers of the company but also by their customers, strategic partners, the French Government, institutional organizations, universities and non governmental entities.

These two important cases study will allow us to respond to our first research question.

2.2 Case Study of iPods (Apple) and Consoles (Nintendo)

Concerning Nintendo, we have planned to investigate the lifecycle evolution of their consoles from 1983 to nowadays with the hope to find out a downward trend. Our objective with Apple is the same regarding the lifecycle evolution of their iPods Classic between the first and last (sixth) generation.

We will examine the:

1. Lifecycle of Apple’s iPods Classic: (1st to 6th generation);
2. Lifecycle of Nintendo’s consoles: (NES, SNES, N64, GameCube, Wii).

Due to their particular creativity and innovation, Apple and Nintendo constitute critical cases in our thesis and are strategically related to our second research question.
2.3 Case Study of Sega

In the case study of Sega, we will highlight that sometimes being too creative can lead an organization to smoothly disappear. Indeed, some of their last consoles (Saturn, Dreamcast) although competitive were too advanced for the market which rejected it. As a consequence, the firm which almost went bankrupt due to the tough competition had to leave the console market and survive nowadays by creating and providing games to their former competitors (Sony, Microsoft, and Nintendo). They also manage to arrange other different partnerships notably with Apple and mobile manufacturers. On the contrary to the majority of companies, Sega constitutes an extreme or atypical case and contains a lot of relevant information. Therefore, it seems interesting to clarify the causes that lead Sega to the situation that we know nowadays and its consequences:

(1) Excess of creativity and innovation?
(2) Other Reasons (Debts, Rising competition, Customers not ready, Pricing strategy, Distribution channels, Promotional strategy, Lack of games, etc).

In addition, some key issues extracted from Literature Review and from interviews were particularly helpful to carry out these five case study.

3. Interview

Our research methodology also includes interviews which constitute one of the qualitative research methods. Some issues that we could not answer with the help of the Literature Review and cases study will be partially resolved. The interview method of research, typically, involves a face-to-face meeting in which a researcher (interviewer) asks an individual a series of questions (sasked.gov.sk.ca, 2002). One differentiates biographies, experiences, opinions, values, aspirations, attitude and feelings interviewees’. In general, interviews can be categorized in 4 types: structured interview, semi-structured interview, unstructured interview, research interview. Normally, an ideal interview is realized face to face with the interviewee; however it can be also executed by telephone.

(1) Structured Interview: This kind of interview is associated with surveys by questionnaire for data collection. Each person will be asked upon the questionnaire in the same way where validity is checked by asking the same issues, but conducting different forms of question wording then comparing the answers. The neutrality of the interviewer’s role is stressed and there are some rules for researchers to adopt this method which are standardization of interpretations, allowing a little deviation of schedule, drawing forth the responses of the respondent; no personal point of view; not merely explaining meanings and then repeating
the questions; and preparing in advance instead of improvising. This kind of method is more and more popular from marketing purposes through telephone interview to collect data from public.

(2) **Semi-Structured Interview**: It is more flexible comparing with structured interview which interviewer is freer to ask questions and follow up questions when unexpected but interesting information is revealed during interviewing. The interviewer aims to classify and elaborate valuable information from the given answers which enable the interviewer to probe deeply from another dialogue for expansion of issues discovered. This kind of interview allows the respondent to answer question at will comparing with the structured interview, but still organize structurally.

(3) **Unstructured Interview**: This kind of interview permits the interviewees to feel free to talk whatever the topics. The researchers aim to find out some key information via the respondents frame of reference. Moreover, the parameters of the discussion can be re-organized by the interviewees depending on the kind of procedure they value most. It is also known as Life History Interview. The researcher attempts to understand the interviewees’ perspective toward specific area and events which can help to approach in historical research like stories. There is an advantage of unstructured interview which it can challenge the official ways of revealing unknown, private and historical incidents.

(4) **Research Interview**: Research interview is to explore social norms and dynamics of issues or phenomenon where researchers want to find out. It is a well settled research method which can be adopted through variety forms. Nowadays this type of interview is frequently conducted online. To interview within a group is the normal way which we can see from this type of interview, as researchers want to investigate such as social relation or norms in general.

Based on the above introduction, we carried out two interviews in this thesis in order to collect data that we could not find either from Literature Review or Cases Study. We interviewed in a semi-structured way an Engineer R&D from France Telecom / Orange to obtain information on the beginning of the creative process and a Manufacturing Manager from HP to get insights on the end of the creative process.
After interesting us to the position and mission of the interrogated person, we asked questions divided in the nine following categories:

(1) Creative Process Organization;
(2) Creative Process Details;
(3) Leader’s Vision / Management Style;
(4) Projects / Team Work;
(5) Motivation / Rewards / Sanctions;
(6) Actors;
(7) Product Life Cycle;
(8) Patents and Competitive Advantage;
(9) Risks / Obstacles.

4. Grounded Theory

This method will help us to extract the main concepts of our two main cases study and interviews.

First of all, the grounded theory represents one of the multiple qualitative analyses. This approach was developed by the sociologists Glaser and Strauss. It implies the scientific study of a phenomenon in order to generate theory. The phenomenon can occur within a group, organization or can be related to an individual. The two authors define the grounded theory as a *qualitative research method that uses a systematic set of procedures to develop an inductively derived grounded theory about a phenomenon* (Strauss & al., 1990, p.24). When working on the field, at an empirical level, analysts try to reproduce the reality of situations from our complex environment while knowing that they will never completely fulfill this mission. Indeed, researchers must do their best to remain accurate and objective to limit the propagation of natural biases in their work even if a perfect objectivity is almost impossible to reach as *building theory, by its very nature, implies interpreting data* (Strauss & al., 1990, p.22). The difference between theory and description lies in the fact that the action of describing data or situations contains very few interpretations and do not result in the creation of concepts.

Then, the data analyzed and later emphasized mainly come from observations or interviews realized within the framework of a qualitative research. To improve the investigation quality, *the very first interviews or field notes should be entirely transcribed and analyzed before going on to the next interviews or field observations* (Strauss & al., 1990, p.30). Usually, investigators cannot realistically present all the data as too many are collected and it would take too much time to cover
all the aspects of a problem. However, taking shortcuts in the work will result in a poorly
constructed and narrowly conceived theory that may not be an accurate representation of reality
(p.26). Therefore, a balance must be found between excess and lack of information to portray
faithfully and to uncover the phenomenon under study. With the aid of analytic or interpretive
procedures, researchers can conceptualize data and build their theory in a sensible way. In fact, the
data must be conceptualized and the concepts related to form a theoretical rendition of reality
(p.22). To formulate a grounded theory, the researcher must possess theoretical sensitivity which
Strauss and Corbin define (p.42) as the attribute of having insight, the ability to give meaning to
data, the capacity to understand, and capability to separate the pertinent from that which isn’t. This
helps to elevate concepts from the field (ground) and make the theory emerging.

On the one hand, in order to solve the highlighted problem, technical or nontechnical literature
(scientific articles, reports, biographies, etc) as well as personal and professional experience
constitute good sources of inspiration. The Literature Review aids the reader to learn, acknowledge
and recognize the previous and recent work done by different authors in a particular field. It also
assists analysts in their process of identifying subjects and “niches” to further investigate. The
technical literature helps the researcher to delineate important variables for study and suggests
relationships among them (Strauss & al., 1990, p.49). As a consequence, the theoretical sensitivity
of the reader is stimulated. Furthermore, the phenomenon under study can be seen from a different
angle which will bring new perspectives and ideas into the analysis; thus elevating the level of the
theory. Indeed, it can direct you to situations that you may not otherwise have thought of, but that
are similar or different from those being studied; thereby enabling you to add variation to the study
(Strauss & al., 1990, p.52). On the other hand, the investigators' frames of reference can also blind
their vision and their representation of the reality and impede them to think “out of the box” that is
to say differently. Hence, we have to challenge our assumptions, delve beneath our experience, and
look beyond the literature if we are to uncover phenomena and arrive at new theoretical
formulations (p.76).

Moreover, “insight and understanding about a phenomenon increase as you interact with your
data” (Strauss & al., 1990, p.43). This happens with the coding procedures when you start asking
questions, suggesting hypotheses, making comparisons, creating categories (or variables) and
building connections and links between concepts related to the phenomenon under study. According
to Strauss and Corbin, coding represents the operations by which data are broken down, conceptualized, and put back together in new ways. It is the central process by which theories are
built from data (p.57). This process which leads to new discoveries can be realized in three different
manners: through open coding, axial coding or selective coding. The first technique consists of
creating concepts and labeling categories within which data are regrouped. The properties and dimensions of those categories are also defined throughout the analysis. The second technique aims to connect categories with their subcategories by using the paradigm model. The latter links up a situation with: different conditions, a specific context, strategies and outcomes (consequences). As regards selective coding, this complex process consist of selecting the core category, systematically relating it to other categories, validating those relationships, and filling in categories that need further refinement and development (Strauss & al., 1990, p.116). As we are dealing with process, movement and interactions tend to be difficult to analyze and to conceptualize in details. Nevertheless, we ought to keep in mind that all these attempts of theoretical explanations must be carefully considered as provisional and never taken for granted and accepted as fact until proved. The theory will be considered as grounded only when validated with data.

Finally, creativity constitutes an important element of the grounded theory notably when it comes to the labeling of different variables (or categories). In fact, through their choice of names, analysts will strongly influence the future readers' understanding of their theory. As a matter of fact, many scientists are outstanding experts in their specialties, and even competent researchers, but are not particularly creative (p.29) when it comes to put names on a phenomenon. If developed successfully, the grounded theory meets the criteria for doing “good” science: significance, theory-observation compatibility, generalizability, reproducibility, precision, rigor, and verification (Strauss & al., 1990, p.31).

The Grounded theory will be used within this thesis to conceptualize data obtained via interviews (notably with France Telecom / Orange and HP) and through cases study. We will emphasize the creative process organization and build a theoretical framework as close as possible from the reality.

5. Qualitative Research

This thesis conducts mainly qualitative research methods such as, Literature Review, case study and interview. The data will be collected from analyses, observations and interviews. Qualitative researches can investigate human behavior, people’s lives and stories, organization activities and social relationships through observations and interviews. It is also possible to analyze different types of documents: books, journals, newspapers, videotapes or websites.

Why did we choose to develop a qualitative research? The main reason is that we want to collect data from documents, cases study and interviews. But also because quantitative research such as questionnaires necessitate time to gather data and to respect a representative sample.
II.
Depicting the Creative Process
Within this part, we will depict the creative process of high-tech firms by explaining the differences between creativity and innovation. Then, we will address the many actors who participate and influence the creative process as well as the allocation of resources among high-tech firms. Finally, their leadership and management style with creative people will be described. Later, we will conceptualize the main ideas of this second part concerning the creative process of high-tech firms.

**1. Creativity and Innovation**

To better understand the fundamental differences between creativity and innovation and between the creative and innovative processes, a definition of both concepts will be given in the following paragraph.

**1.1 Definition of Creativity**

Creativity stands for the quality or ability to create or invent something new, unique, original or even risky from scratch. It is frequently referred as the original starting point of a product, service or process that didn’t exist before it was created. As any investment, it requires an acceptance of possible failure and a long term commitment that necessitates time and other resources (money, people and materials). These requirements deeply influence the management culture of the organization. Creativity appears as a formal, continuous and complex process which can be taught and learned. As a matter of fact, completely new models are exceptional and very costly in terms of resources. Following this clarification, it's easy to realize that most of the products we buy are in fact only enhanced innovations that will be rapidly replaced by new ones due to the shortening of the Product Life Cycle and to the customers’ changing taste. However, considering that many educations and courses are available around the subject of creativity, each organization can teach their members and teams a multitude of ways to be more creative.

Amabile (1998) indicates that, in each of us, creativity is composed of three elements: expertise; creative, imaginative thinking skills and motivation that managers can influence. Expertise can be considered as the technical, intellectual and bureaucratic knowledge acquired by an individual whether at school through a formal education, at work through a practical experience and by means of multiple interactions with different kinds of professionals. The larger the expertise, the better.
The second element indicates how people approach and deal with issues. This takes into consideration the employees’ thinking style, personality and working style. In order to find a solution, are they flexible, rigid, determined or lacking of perseverance? At last, motivation influence creativity in an intrinsic or extrinsic way.

### 1.1.1 Enhancing creativity

Luecke suggests six methods that organizations can apply to enhance creativity and innovation (2003, p.114):

1. **Acceptance of risk taking;**
2. **Welcoming new ideas and ways of doing thing;**
3. **Ensuring a free flow of information;**
4. **Giving employees access to knowledge sources;**
5. **Support of good ideas by executives;**
6. **Rewarding innovators.**

In addition to the six precedent approaches, the physical workplace can also influence creativity and innovation. Thus, below practices (p.114) are advised:

1. **Design space and the work processes together;**
2. **Co-locate teams and knowledge sources for easier communication with each other and with the physical equipment that occupies their thoughts and experiments;**
3. **Design the physical space so that contact between teammates is frequent and convenient.**

Moreover, Luecke recommends six steps that anyone can use to enhance his own creativity? There are six steps suggested (2003, p.95-96):

1. **Strive for alignment;**
2. **Pursue some self-initiated activity;**
3. **Take advantage of unofficial activity;**
4. **Be open to serendipity;**
Diversify your stimuli;
Create opportunities for informal communication.

1.1.2 Idea Generation

It is important for organizations to generate as many ideas as possible in order to gain a real advantage. The relationship between ideas and innovation is like a body which cannot live without its nutrients. Ideas generation can come from different ways such as:

1. New knowledge: Although the innovative process needs time to generate new knowledge, it is one of the only ways to create the ideas that will constitute the basis of radical innovations.
2. Customers’ ideas: Innovators can find something new from customers’ feedback especially what customers complained of.
3. Lead users: Companies need to pay attention to specific users who require products or features on their products that do not exist now because they may able to anticipate market trends. Therefore, it can be interesting for firms to monitor closely these consumers.
4. Empathetic design: Observe how people use existing products and services and try to see how potential customers do things and attempt to solve problems.
5. Open market innovation: It is a good way to collect ideas from licensing, joint ventures and strategic alliances.

1.2 Definition of Innovation

Innovation can be interpreted following different perspectives. Generally speaking, innovation means the introduction of something new and it is normally related to performance and growth through improvements in efficiency, productivity, quality, competitive advantage, market positioning, market share, etc. Innovations can happen in every industry in the form of business model innovation, marketing innovation, organizational innovation, process innovation, product innovation, service innovation, supply chain innovation, substantial innovation, financial innovation, incremental innovation, radical innovation, systemic innovation and social innovation.

Innovation can be viewed as the act of adding something new to an existing product, service or process in order to give it better characteristics or functions. For instance, the first range of mp3 players (MPMan F10) created by Eiger Labs in 1997 can be seen as a creative output. Moreover, the different iPods (started in 2001) and other MP3 players implemented and proposed by their competitors in terms of sizes, shapes, and colors can be considered as innovations based on the Eiger Labs’s original idea. In comparison with creativity which implies risks and difficulties,
innovation appears as a safer process which is informal, piecemeal and incremental and consists of changing, modifying or improving something already existing. Therefore, it can be implemented in any level or service of the organization and can occur randomly. As a consequence, it seems that on the one hand, organizations that rely mainly on innovations will flourish until their output become obsolete and useless whereas; on the other hand, creative companies will possess the products and services supposed to insure their future but will lack of the necessary financing to exploit them. As a result, a company that relies both on innovation and creativity is more likely to be present and successful in the long term.

Innovation can also generate negative effects such as organizational rigidities or resistances to change and lack of cooperation from employees. However, companies are forced to innovate if they want to keep their competitive advantage. As a consequence, a lot of firms do not hesitate to take risks to innovate.

The innovative process plays an important role when it comes to lower down the production costs. It is one thing to create an innovative new product, but it is another thing to create a process capable of manufacturing it at a price the target market will accept. Thus, innovation in both realms is connected; some innovative products must await process innovation before they can achieve market traction (Luecke, 2003, p.9).

Service plays a key role in innovation area because it can help to enhance customers’ satisfaction and sometimes create winning business models. Dell built an innovative process offering to consumers the possibility to customize computers they order online. Moreover, there successful supply-chain permits to reduce logistics costs and to maintain their market share.

 Nevertheless, it is not always easy for service-oriented companies to succeed on service innovation. We can still see some failure cases happening from American companies which want to provide home-delivery household service but they fail due to an expensive delivery service. As a matter of fact, you cannot assume that your job is done when you have developed an innovative service, you must pay attention to the whole process which supports it. Furthermore, it is better to check each production and delivery steps of your service and to try to improve the process incrementally or even to replace some steps radically by something new, faster and cost-effective.
Generally speaking, incremental innovation exploits existing forms or technologies, whereas a radical innovation is something new to the world (Luecke, 2003). If we compare these two kinds of innovation, we can find that incremental innovations normally take less time and generate less risk, so many companies prefer it. However, incremental innovation cannot guarantee a company’s sustainable competitive advantage in the future. For that reason, companies like to operate incremental innovations and radical innovations hand in hand, which is why radical innovations are generally followed by a period of incremental innovations.

An innovation process aims to achieve substantial reductions in unit costs of production or service delivery. In many cases this is accomplished by integrating or eliminating separate process steps (Luecke, 2003, p. 11). To build a competitive advantage, companies need to build an innovative process which will reduce the manufacturing, delivery and service costs.

1.2.1 Detecting Innovative Opportunities

Innovation implies to improve something already existing. Entrepreneurs play an important role in adopting innovation and seeking advantage from it. Peter Drucker has listed seven sources innovative opportunities (1985):

1. The unexpected: An expected event or result can form the basis of an innovation.
2. The incongruity: A discrepancy between what people perceive and the reality can allow organizations to innovate.
3. Innovation based on process need: If a link within a process is weak, an innovative opportunity exists for companies willing to develop the missing link.
4. Changes in industry or market structure: There is an opportunity for an innovative product, service or business when the industry or market shifts.
5. Demographics: a change of the population’s size, age, structure, composition, employment, education level or income can incite firms to innovate.
6. Changes in perception, mood and meaning: Changes in society’s universal assumptions, attitudes and beliefs can develop innovative opportunities.
7. New knowledge: New product and markets can be created from advances in new knowledge.

Drucker (1985) indicates that to design successful innovations, firms can follow five principles:

1. Begin with an analysis of the opportunity.
2. Analyze the opportunity to see if people will be interested in using the innovation.
3. To be effective, the innovation must be simple and clearly focused on a specific need.
(4) Effective innovations start small. By appealing to a small, limited market, a product or service requires little money and few people to produce and sell it. As the market grows, the company has time to fine-tune its processes and stay ahead of the emerging competition.

(5) Aim at market leadership. If an innovation does not aim at leadership in the beginning, it is unlikely to be innovative enough to successfully establish itself. Leadership here can mean dominating a small market niche.

1.2.2 Moving Innovation to Market

Moving ideas to the market is the final phase of the innovation process. At this phase, companies must create a rational method for rejecting some old ideas which are developed earlier and move others forward to the final commercialization.

Besides, innovators can adopt the stage-gate system to control activities from the creation of ideas all the way to commercialization. It is an alternating series of ideas generation stages or checkpoints for early rejection of weak ideas and urge time-to-market for potential products.

Yet, innovators cannot ignore the financial issues when innovative ideas are closer to commercialization. Two assessment tools are suggested:

(1) Break-even analysis: It helps to evaluate the fixed and variable costs and to measure how many units need to be sold to reach the break-even point.

(2) Discounted cash flow (DCF) analysis: This method is used to assess the future cash flows of a project or an organization.

1.2.3 Innovation and Competitive Advantage

If a company does not invest on innovation, their competitors will do it which will result in the loss of their competitive advantage. We learn that creativity and innovation can aid organizations to survive in their environment and to face fierce competition.

Competitive advantage, advanced technology and innovation are linked by complicated and multidimensional relationships. Nowadays, it becomes critical for organizations to invest on innovation to defend their competitive advantage. Due to the rhythm and unpredictability of technology change, many companies face fierce competition. Due to the sensitive demand of technologic goods, globalization pushes companies to build a process permitting to convert rapidly innovative ideas into marketable products.
Lengnick-Hall (1992) emphasizes four elements of the connection between innovation and competitive advantage:

1. Innovative products or processes can be hardly imitated and as a consequence can lead to sustainable competitive advantage.
2. Innovations can create a unique market niche that will give to first mover a competitive advantage.
3. Innovations enable a company to take advantage of timing characteristics of the relevant industry and this can lead to a sustainable competitive advantage.
4. Every company can create an innovation that will result in the formation of a sustainable competitive advantage.

According to Porter’s competitive advantage (1985), if a strategy is difficult to copy, then the competitive advantage can last longer. Certain authors argue that by means of strategic innovation, process innovation, service innovation or information-based innovation companies can build a competitive advantage in the long term which will make the imitation of their process or offer almost impossible. Yet, others suggest that companies should develop new and specialized technologies that have crucial importance for their future business in order to protect their market position and sustain their competitive advantage.

### 1.3 Differences between Creativity and Innovation

We believe that the creative process starts with the leader’s vision that the firm needs a new product, and ends with the decision to add the creation or new innovation to the products portfolio. For example, let’s presume that a leader wants a new product in five years as he expects one of his current products to become obsolete in six years. To respect this deadline, the leader with the help of his organization shall convey his vision, creates project teams, assign tasks, empower managers to lead creative people or motivate creative worker, etc. We think that other stages such as prototyping or experimentation are also part of the creative process. However, we consider that steps like industrialization, procurement or logistics belong to the innovative process.

### 2. Actors of the Creative Process

Now that we better understand the fundamental differences between creativity and innovation, we are going to study the actors who participate and influence the creative process of new technologies or products whether they are located in or outside the organization.
2.1 Leaders and Employees

Leaders represent the keystone of organizations as failing organizations are usually over-managed and under-led (Bennis & al., 2003). Like employees, they strongly participate and influence the creative process.

2.1.1 Leaders

Even though leadership is not articulately defined, it consists of influencing individuals in a certain way, following a determined vision, in order to accomplish a desired objective. To convey his message and to push people to adopt his views, the leader disposes of different instruments as leadership is a “multiple-communicative” task.

Leaders possess specific skills that allow them to guide, set objectives, chose the strategic direction their organization will follow, foster creativity and innovation, create the bases of a creative culture, build creative teams and motivate people. They can also empower people to recruit talented people, check the implementation and control the respect of deadlines. To succeed, they may need to be self-confident, audacious, and take risks. To reinforce their will to promote a culture dedicated to creativity and innovation, they can convey their vision (See 4.1 Leader’s Vision p.67) and stimulate as well their employees through different methods (See 4.4 Rewards and Sanctions p.74).

First of all, being an effective leader requires high communication skills and some creative thinking as the organizational wisdom and the cognitive maps of the employees or followers have to be challenged or modified. As all organizations depend on the existence of shared meanings and interpretations of reality (Bennis & al., 2003), the leader’s objective consists of aligning and updating the mental picture of company’s workers towards the same direction. Communication means also that the message can be conveyed through different means like gestures, attitudes or written documents. Moreover, to succeed in business, leaders must start to know and believe in themselves. Therefore, self-confidence is paramount to manage in good conditions but also to give indications to the individuals, notably to creative people, that they can blossom and help the organization to develop and prosper. The greatness of a leader comes from his capacity to recognize its qualities and to remain focus on optimistic goals to drive the firm a step further. We also know that the art of leading others comes from the art of leading oneself (Daudi, 2003). If it is true that a good leader can influence positively the work quality of its employees, a bad leader can also affect and limit their creativity. Consequently, leaders have also to take a new look at themselves to reduce their weaknesses by continuously nurturing their skills. This point refers to the myth that “Leaders
are born, not made”.

The use of language whatever his form (labels, rhetoric, stories, and figures of speech) allows leaders to interact with their environment. Likewise, symbols (logos, emblems), rituals or even silence can express a lot. To Disraeli, the action of naming is particularly powerful as with words we govern men (Gardner, 1996, p.3).

Then, Bennis and Nanus indicate that effective leaders should guide their organization towards a realistic, credible and attractive future. To design the best direction that their firm should follow, leaders may need to constantly analyze the situation of their environment. On the contrary of the manager [who] has his eye on the bottom line; the leader has his eye on the horizon which means that his decisions are carried out more on a strategic than operational level. Likewise, due to the fast changing environment, leaders shall guide their workers to evolve towards the same direction through planning or innovative learning processes such as continuing education. Thus, they will be able to cope with new issues and unforeseen situations which will insure the future of the company in the long run. The result will be a proactive open organization through market anticipation and workers’ participation.

In addition, like any family or group, an organization requires trust among its members, built through time to operate correctly. With the aid of their hierarchical position, leaders have the ability to guide their employees from the thinking stage to the implementing stage. To reach this stage, they sometimes have to remember to their subordinates their position in order to create the basis of a positive business atmosphere which will lead to creativity and innovation, as leaders who are trusted make themselves known, make their position clear (Bennis & al., 2003). Besides, leaders ought to learn to trust their subordinates without being constantly suspicious or on guard and should keep formal relations to avoid toppling in an excess of familiarity.

To conclude on this point, leaders cannot do and control everything. Therefore, if they want to translate intentions into reality and sustain it, they have to delegate that is to say transfer a part of their powers among the members of the organization so that implementation can occur. With empowerment, good leaders make people feel that they’re at the very heart of things, not at the periphery (Bennis & al., 2003). Regarding power, it should only be seen as an action lever which can drive the firm efficiently if used with parsimoniousness and wisdom. For example, by empowering one of his followers to act freely, the leader shows him gratefulness and support for the quality of his work. In exchange, leaders receive the benefits of the actions undertaken by their staff that care and feel concerned by the future of their company.

To encourage their staff to be creative, leaders can (Luecke, 2003, p.49):
(1) Recruit talented people;
(2) Encourage the diffusion of ideas;
(3) Support workers by providing necessary resources;
(4) Cultivate an innovative climate;
(5) Reward and promote employees.

To stimulate creativity and innovation, leaders can also (Luecke, 2003, p. 129):
(1) Develop a culture that nurtures creativity and innovation;
(2) Establish the strategic direction within which innovation should take place;
(3) Be active participants in the process that runs from idea generation to commercialization;
(4) Improve the idea-to-commercialization process;
(5) Think of ideas and project in terms of a portfolio with distinct risk and return dimensions;
(6) Put the right people in charge.

In the end, leaders need to develop an effective organization on the long run able to anticipate opportunities and solve problems in the short term.

2.1.1.1 HP’s Leaders

There are actually many prominent leaders in HP, but we only talk about Carly Fiorina and Mark V. Hurd.

Carly Fiorina was the former CEO (1999 to 2005) and Chairman of the Board (2000 to 2005) of HP, and was famous for her decision of the merger between HP and Compaq in 2002. She was acknowledged as one of the 30 most powerful women in America by Ladies Home Journal in 2001. People are used to refer to her efforts of attempting to reinvent HP. For example, during the general business downturn in 2001, she laid off 7,000 employees (hmi.ie, 2008). Ultimately, she was ousted by HP’s board of directors in 2005 due to reports of disappointing earnings. According to BusinessWeek (1999), as a leader, she has a personal touch that inspires intense loyalty. She's known for giving balloons and flowers to employees who land big contracts. Fiorina not only brings leadership to HP but also savvy marketing and sales techniques.

Mark V. Hurd replaced Carly Fiorina as HP’s chairman, CEO (chief executive officer) and president in 2005. He spent 25 years at NCR Corporation as CEO and president prior to joining HP. His leadership was outstanding by remarkable efforts to improve operating efficiency, strengthen the position of NCR’s product line and establish a vigorous management team. He is also a member of the Technology CEO Council, a coalition of chairmen and chief executive officers of IT companies, which develops and advocates public policy positions on technology and trade issues.
To achieve the goal of establishing HP as the world’s leading technological company, he has sharpened HP’s strategic focus and concentrated the R&D investments on three long-term growth chances. He had said: “Investing in the right people and infrastructure” (HP’s website, 2007). In the meanwhile, he has improved HP’s operating efficiency, execution, financial performance and customer focus. The result can be seen from increasing HP’s growth and profitability, greater value for shareholders and customers, and a stronger competitive position in global IT markets.

2.1.1.2 FTO’s Leader

Didier Lombard was appointed as the CEO and Chairman of the France Telecom Group in 2005. He also holds the position of Director at Thomson and Thales and is a member of the Radiall’s and ST Microelectronics’ Boards.

He began his career at France Telecom in the R&D Division in 1967. During eight years, from 1991 to 1998, he occupied the General Director position of industrial strategies at the French Ministry of Economy, Finances and Industry. Then, he carried out a mission with the French Ministry of Research for five years and was named as well Chairman of the IFA (Invest in France Agency). In 2003, Lombard came back to FTO as Vice President of Technologies, Strategic Partnerships and New Usages.

In 2006, he decided to gather all the products and services (notably Orange Mobile and Wanadoo) of the France Telecom group under the brand Orange in order to guarantee the customer of a unique experience founded upon proximity and simplicity. Later, he introduced a new innovative structure with the “Orange Labs”, “ExploCentre” and “TechnoCentre” to face the tough competition and clients’ fast changing demand.

2.1.2 Employees and Creative Employees

Within this point, we are talking about general and creative employees who can participate and influence the creative process. Then, employees and creative employees at HP and FTO are presented such as where they come from and what kind of roles they play in the process.

2.1.2.1 Employees

Whether employees are working at the creation stage, implementation stage or marketing stage, they play a paramount role in the results of an organization.

Firstly, employees can work individually or in teams but need to systemically report their work to a hierarchical superior. Nowadays, it seems that people tend more and more to work in teams. Functions of their position or on what is stipulated in their employment contract, they can
accomplish their work in the company’s premises, outside of the organization or at home. Depending upon the line of business, the firm’s size, the company’s history or the management style employed; relations between employees can be formal or informal. However, what matters most is that personnel feel at ease when working for their organization and rapidly share information they possess as retention of information can deeply affect decisions.

Secondly, as people tend to become “knowledge workers” namely more and more educated, they need to be guided towards the track that will lead the company to achieve its goals (Bennis & al., 2003). When leaders and managers empower workers to realize a new mission, it is likely that the latter will reward their firm for the grant of these new responsibilities by doing their best. Moreover, by adapting and promoting an “Open door policy” that enable any employee to meet his direction on demand, companies can increase the number of suggested ideas from workers who have the feeling that they can contribute to the organization’s future success.

Today, an increasing part of the work is executed from a distance with the help of new means of communication, notably Internet and mobile phones. As a consequence and although they remain compulsory, less work is carried out through traditional face-to-face meetings.

2.1.2.2 Creative Employees

Creative workers are widely widespread among organizations. Their job can take the form of a multitude of position from artist, biologist, developer, designer to engineer.

Contrarily to receive wisdom, creative people are more driven by the interest of their profession than by earnings. Creative employees express most of their qualities through their work which is something that many leaders and managers at times have difficulties to understand. Thus, gentle feedback is important, because creative employees are more emotionally involved with their work (Penttila, 2003). Because most creative workers are highly skilled and competent, they do not really appreciate being told what to do and sometimes have issues to respect and meet their hierarchy’s instructions.

Furthermore, they generally require more space than ordinary employees to think and create. To face this situation, leaders can chose to gather their creative employees in R&D centers in order to foster creativity and innovation. Time management and respect of budgets are other areas where creative people may need support from their hierarchy. Although they are not the best time managers, creative employees [are] working; it's just a different way of working (Penttila, 2003). Therefore, a good solution to increase chances to deliver a project on time and with respect to its allotted budget can be to offer creative workers the possibility to work on flexible hours. Leaders
can also decide to include them in the project from the beginning that is to say during the brainstorming and throughout the rest of the creative process.

In addition, to leverage creativity, leaders can include creative people in teams composed of workers from different departments (human engineering, logistics, marketing, etc) of the organization. A creative team leader will always ask a lot of questions, never judge, encourage, goes for quantity (of ideas) [...] during the group creativity meetings (Sanjay Dalal, 2007). Even simple questions such as “any creative ideas today?” will drive the organizational culture towards more creativity and innovation.

Likewise, to incite creative people to cooperate effectively and efficiently with their company, innovative employers are structuring work iteratively, rehearsing and trying again until valuable results emerge - the opposite of how things get done in most companies (Austin & al., 2003). Eventually, they clearly articulate their vision to make sure that every member of the firm will be aware of the organization’s goals.

2.1.2.3 HP’s Employees and Creative Employees

In the first place, HP has approximately 156,000 employees in 170 countries from different cultures. Due to the founders created a culture of performance-oriented and committing to works, as a consequence employees in HP are talented people with a strong ambition to succeed and desire to satisfy customers.

The Manufacturing Manager (Mr. Terry Tseng) told us during the interview (28th April, 2008), he could not name an outstanding creative employee that is not because of no one in HP; whereas they always work in a team to achieve the goal. The whole creative process is carried out by people from various functional departments. Without the cooperation in a team, no individual can accomplish a task successfully.

In short, teamwork is being emphasized in HP and they always put customer satisfaction at the first place.

2.1.2.4 FTO’s Employees and Creative employees

At 31st of December 2007, the FTO Group counted 187,331 employees. Among the latter, more than 5,000 work in one the 18 Orange laboratories, in the ExploCentre or TechnoCentre.

The attraction of the Information Technology and Telecommunications helps the French organization to recruit talented and creative employees. The recruitment is generally outsourced with the help of specialized firms.
2.2 Competitors

After the employees, competitors constitute the second category of actors who take part in the creative process.

Competition stands for the natural state of affairs as producers will get the competitive rent and buyers the competitive price. Competition is also known to be a lever for enhancement and innovation. Furthermore, interactions between competitors are mainly part of a zero-sum game where firms can seldom win together. Most of the time, the gain of one company is conditioned by the loss of a competitor from the same industry, that is to say that competitors cannot win in same proportions at the same time. As the market situation is atomistic, organizations shall focus on the enhancement of their competitive advantage and defend their position. They also have to try to remain as independent as possible (especially in terms of essential resources) because this tends to reinforce their position in competitive environment and give them the possibility to maneuver following their own interests.

2.2.1 Competitor Analysis

Competitors are those who compete with your business from selling products or providing service in the same industry. Competitor analysis is to assess the strengths and weaknesses of your current and potential competitors, and it is very important for marketing and strategic management. Furthermore, it can provide firms offensive and defensive strategies through identifying your opportunities and threats. Despite the competitor analysis constitutes one essential component of corporate strategy, Porter argues (1998) that most firms do not conduct enough systematical analysis.

2.2.2 Competitor Profiling

Profiling competitors can unify all relevant competitor analyses into one framework of efficient and effective strategic formulation, implementation, monitoring and adjustment.

Competitor profiling can facilitate strategic objectives in three different ways. Firstly, it can reveal rivals’ weaknesses which firms can exploit. Secondly, it enables firms to anticipate competitors’ responses toward firms’ strategies, and to predict changes of the environment. Thirdly, it provides proactive knowledge which gives firms strategic agility. Companies’ offensive strategies can be implemented more quickly to exploit opportunities and reinforce their strengths. In addition, competitor profiling can provide defensive strategies from exploiting firms’ own weaknesses to counter rivals’ threats.
Obviously, those firms can gain a significant advantage from systematical competitor profiling. Therefore, a comprehensive competitor profiling rapidly becomes an important capability for firms’ successful competition. Companies need to profile each of their major competitors which should include an in-depth description of rival’s background, finances, products, markets, facilities, people and strategies.

### 2.2.3 Potential Competitors

Even though it is very important to analyze your current competitors, it is also necessary to find your potential competitors and future threats. Potential competitors may be:

1. Firms from a similar industry proposing alike offer;
2. Organizations using analogous technologies;
3. Companies targeting the same market segment but with distinct products;
4. Businesses from different geographical areas and with comparable products;
5. New start-up firms created by former employees and/or managers of existing companies.

### 2.2.4 Competition and Cooperation

Nowadays, it’s impossible for a firm to succeed without taking into consideration his environment as few companies can go [...] alone in every situation (Hamel & al., 1989). From an economic point of view, cooperation has limits as it can distort the competition’s rules leading the market to a less efficient situation, and it can also create bureaucratic problems. Indeed, collaborative arrangements can lead to opportunism, and push alliance members to cheat on each other or abuse of trust. To avoid this, agreements of cooperation shall be signed and respected, increasing the bureaucratic burden. As cooperation comports risks and is “rarely a solution” (Porter, 1990), relations between organizations shall remain arm’s length and transactional. The firm must also be able to exit a relationship in due course. Nevertheless, cooperation can be implemented while expected benefits are well calculated. Even though cooperation between firms from lateral industries can appear like a good solution to increase creativity and innovation, it can either result in failure (Smart: Mercedes / Swatch) or success (iPod accessories: Apple / Nike).

As a result, instead of cooperating firms should collaborate to acquire new technologies or skills during a short period since a strategic alliance can strengthen both companies against outsiders (Hamel & al., 1989). Collaboration is also viewed as a competition in a different form. Therefore, exchanges between entities have to be monitored in order to be sure that strategic information stay at their place.
2.2.5 HP’s Competitors

In 2006, HP was in virtual tie with Dell for the champion position in global PC shipments, but in 2007 HP shipped 18.2 percent of worldwide PC which led to its number one market share position. Nevertheless, HP’s shipment volume kept increasing strongly by 30 percent among top 5 companies (see figure 5) in 2007.

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hewlett-Packard</td>
<td>49,434</td>
<td>18.2</td>
<td>38,037</td>
<td>15.9</td>
<td>30.0</td>
</tr>
<tr>
<td>Dell Inc.</td>
<td>38,709</td>
<td>14.3</td>
<td>38,050</td>
<td>15.9</td>
<td>1.7</td>
</tr>
<tr>
<td>Acer</td>
<td>24,257</td>
<td>8.9</td>
<td>18,252</td>
<td>7.6</td>
<td>32.9</td>
</tr>
<tr>
<td>Lenovo</td>
<td>20,131</td>
<td>7.4</td>
<td>16,652</td>
<td>7.0</td>
<td>20.9</td>
</tr>
<tr>
<td>Toshiba</td>
<td>10,932</td>
<td>4.0</td>
<td>9,198</td>
<td>3.8</td>
<td>18.9</td>
</tr>
<tr>
<td>Others</td>
<td>127,717</td>
<td>47.1</td>
<td>119,022</td>
<td>49.8</td>
<td>7.3</td>
</tr>
<tr>
<td>Total</td>
<td>271,180</td>
<td>100.0</td>
<td>239,211</td>
<td>100.0</td>
<td>13.4</td>
</tr>
</tbody>
</table>

Figure 5: 2007 PC Worldwide Market Share (Source: Gartner Inc. 2008)

From the above figure, we learn that Acer and Dell are HP’s main competitors. Accordingly, Acer and Dell’s company profile will be analyzed in the following.

**Acer Inc.** (Acer) is a Taiwanese multinational corporation (MNC) founded in 1976 by Stan Shih and ranks worldwide No.3 after HP and Dell. Its original name was Multitech and renamed Acer in 1987. In 2000, Acer separated its manufacturing operation out from its business portfolios to centralize itself on branding business. In 2007, it was an amazing year on account of two news astonished people in the PC industry. One is the notable lawsuit of Acer filed by HP in the U.S.; the other one is an incredible US$710 million merger between Acer and Gateway. At the same time, Acer remains the fastest growing PC maker and its shipments grew by 32.9 percent. (CNET News.com, 2007)
Dell Inc. (Dell) is an American technological company founded by Michael Dell in 1984. Since 1985, they sold PCs directly through national computer-magazines to consumers and offered custom-built units according to the selection of options. The CTO (Configure to Order) business model has two advantages: one is to offer lower prices due to saving retail costs; the other one is the convenience of not having to configure components by themselves. Despite not the pioneer to conduct this model, Dell is the first one to succeed with it.

Referring to the interview, Acer gives the pressure of its design capacity to HP and Dell threatens HP by announcing to enter retail channel. The following comparing table (hp.com, dell.com, acer.com, 2008) shows you more details of these top three PC makers.

<table>
<thead>
<tr>
<th>Company Logo</th>
<th>HP</th>
<th>Dell</th>
<th>Acer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Founders</strong></td>
<td>William (Bill) Hewlett, David (Dave) Packard</td>
<td>Michael Dell</td>
<td>Stan Shih</td>
</tr>
<tr>
<td><strong>Headquarters</strong></td>
<td>Palo Alto, California, USA</td>
<td>Round Rock, Texas, USA</td>
<td>Taipei, Taiwan</td>
</tr>
<tr>
<td><strong>Employees</strong></td>
<td>156,000 (2007)</td>
<td>95,000 (2008)</td>
<td>6,554 (2005)</td>
</tr>
</tbody>
</table>

Figure 6: Top 3 PC Makers Company Profiles

2.2.6 FTO’s Competitors

FTO takes part in a multitude of businesses in many countries. Therefore, we will only address its competitors regarding the French market. In France, FTO operates essentially as Internet provider, mobile phone operator and as landline supplier.

Firstly, Orange (previously Wanadoo) leads the Internet service providers market ahead of Neuf Cegetel – AOL, Free and Alice–Telecom Italia.
Secondly, Orange is also leader on the mobile phones market with a market share of 45% against 32% for SFR–Cegetel, 18% for Bouygues Telecom and 5% for the MVNOs or mobile virtual network operators (Arcep.fr, 2007).

![Figure 8: French Mobile Phone Market – 2007 (arcep.fr, 2007)](image)

Thirdly, France Telecom remains the leading company on the landline market with a market share of 56% against 23% for the alternative operators and 21% for VoIP firms (Arcep.fr, 2007). The latter will rapidly overtake the alternative operators and reduce the gap with FTO given the prices of communications via Internet.

Since the privatization of the Telecommunications industry in 1998, the organization is forced to constantly develop new technologies and products to face competition. However, the group disposes of many assets such as its telecommunications network that allow FTO to dominate easily the French market. Moreover, FTO was the former French “historical operator” and consequently possesses strong ties with the French Government. Finally, FTO holds a good reputation with the French population notably with the elders who consider their products and services better than the ones of competitors. All these elements explain why FTO leads the French market.

### 2.3 Customers in High-Tech firms

Customers constitute, after employees, one of the most important assets of companies. Through their “bargaining power”, buyers compose one of the five Competitive Forces of Porter (1985).

Organizations which are generally market-driven shall listen to their customers’ desires in terms of products, service quality and proposed prices. They shall try to fulfill clients’ demand as much as possible. Whatever the strategy selected, the market can hardly be ignored as the reaction of the clientele on new products or services launched play a major role. Their ongoing feedback can help firms to evaluate and improve the quality of their realizations. Therefore, *a continual and intimate connection with the market environment is vital* to insure that the product meets the demand (Miller & al., 2002).
HP’s manager Terry mentioned that customers do influence their marketing strategies sometimes. Particularly, customers’ complaints are highly respected while they do R&D. Their customers are mainly companies, institutions, universities, schools and private people like you and I. Regarding the purchasing power of these buyers; except big corporations and governmental entities, other clients can hardly negotiate with HP.

With regard to FTO, they are used to place the customer at the heart of [their] approach to innovation (Didier Lombard, CEO and Chairman, France Telecom Group, francetelecom.com).

Orange’s clients are not only receptors of innovative products and services. With their feedback, they participate throughout the creative and implementation processes. Since the implementation of its new organizational structure in 2005, Orange rethought its customer relation. From the very beginning to the end of the fabrication process, Oranges is building with its clients which are from now on totally involved. In the TechnoCentre, new products are systematically tested with the help of internal and external clients. For instance, the optical fiber was pre-tested by clients who then gave their perception and opinion on the service to one of the TechnoCentre teams. This can allow the Paris based firm to evaluate the user experience, the differences of usage between nations and decide the optimal moment to launch a new offer. Through his opinion, the client contributes a lot to the development of new creative and relevant products and services.

To detect the future customers’ demand, FTO is present in “Second Life”, the main online virtual world which represents according to many specialists the future of our current Web 2.0. The group owns an island (orange-island.com) to monitor and study avatars’ behaviors and background. This allows the firm to receive priceless comments and realize amazing savings as the new products or services are first of all implemented virtually. All these initiatives lead the clientele to propose services enhancements and in fact to “co-create” new services that will help Orange to better handle the innovation rhythm on its markets.

Furthermore, within the Telecommunications Industry, the bargaining power of buyers (Porter, 1985) is quite important whether it is for the Internet access or mobile phones. Indeed, since many competitors are present on the market, customers can easily switch to another provider or to another operator if not satisfied.

2.4 Government

In commercial competition, although Government does not stand on the front line to face global competition of business, home-based Government can foster a more creative and innovative business environment for companies to compete with their competitors from other nations.
According to Porter (1998), on the one hand, even though having a home base in the right nation can benefit firms from certain aspects, it does not guarantee companies for success; on the other hand, firms without having a home base in the right nation may raise fundamental issues. Many successful international companies obtain a good market position from their national environment, and adopt strategies to make their home nation more favorable in the global competition. They strengthen their home-based advantages and offset disadvantage for their global strategies. Consequently, Government policies as well as the national position in the global competition represent an important part of companies’ business strategies but also help firms to compete with competitors if their Government provides them with a good investing environment.

Different Governments have various plans to help companies to develop new technologies. According to Taiwan Government’s National Science and Technology Development Plan (2004), the following global trends can be noticed:

1. Increasingly, many Governments promote technological R&D; invest on national institutions in the formulation of technology development policies; stress more on forward-looking technology development planning; and execute targeted technology development in order to integrate technological resources.
2. Conducting basic science research and using the manpower of universities and research institutions are being emphasized today to break through scientific and technological development, and to train the next generation of technical professional.
3. The importance of protection and utilization of IPR (Intellectual Property Right) is increasing in virtue of safeguarding R&D results and high-tech industrial competitiveness.
4. The increase of international cooperation and division of labor are ushering in a knowledge age marked by concurrent cooperation and competition.
5. Some newly-industrialized countries in Asia such as Korea, China, Singapore and Malaysia have actively carried out Government-supportive high-tech development plans.

We can learn from the above trends that Government’s position and policies can actually influence firms’ business strategies toward creativity and innovation. Governments can execute a multitude of incentive ways to encourage and help firms to invest on creativity and innovation. The following governmental impulses and help are what we usually can see:

1. **Set up Science Parks**: A Science Park is designed for high-tech, research or related technical business development. Typically, firms and organizations in Science Park focus on advanced product development and innovation. Moreover, Science Parks are associated with national institutions or high education such as colleges or universities, and they are mostly founded in
developed countries like the USA where there are over 140 ones. The most outstanding examples are Hsinchu Science Park in Taiwan and the Cambridge Science Park in the UK (iasp.ws, 2008).

(2) **Tax deduction**: the Government can implement certain tax-deductible (land tax, income tax, VAT…etc.) policies to encourage firms to be more creative and innovative. For instance, since January 2008 the French Government offers innovative companies up to 50 million Euros and provides research tax credit, if they invest 100 million Euros in R&D (Invest-in-france.org, 2008).

(3) **IPR Protection and utilization**: Intellectual Property Rights (IPR) protect the legal field of creations such as artistic works, musical compositions, literary works, inventions, symbols, names, images, and commercial designs including trademarks, copyrights and patents, and so on. Under the law protection, the holder of IPR has the executive rights on its creation which aims to prevent imitation. However, IPR depend on Governments and normally developed countries have recognized firms of IPR for centuries; yet some Governments such as developing countries just have done so in recent years.

(4) **Patent premium**: Patents can stimulate companies to develop and create technologies and products.

According to 2007 EIU (Economist Intelligence Unit) research data, Japan is the world’s most innovative country and the Taiwanese Government registers the highest number of patents in the world. Taking Taiwan as an example, the Taiwanese Government encourages firms to invest on creativity and innovation, and Hsinchu Science Park is almost the most prominent one in the world.
In conclusion, we can say that Government’s policies and attitude can motivate companies to develop more creative and high-tech products.

2.4.1 Relations between HP and the Taiwanese Government

In the first instance, the United States and Taiwan rank each 3rd and 6th of global innovative nations (See figure 9). As mentioned earlier, although Governments do not stand at the front-end line of business competition for favoring firms, they can assist organizations with certain public policies. Correspondingly, HP and Dell, the number one and two big PC makers, are America-based companies; whereas Acer, the 3rd large corporation, is Taiwan-based. Besides Government’s public policies, IPR and patent compose additional elements to support the creative process in the global competition.

HP has registered over 31,000 patents in the USA until 2007 for the protection of their inventions and improvements of product. In their beliefs, those patents and applications are significant for improving the differentiation of their products from competitors, moreover maximizing the return on R&D investments. Furthermore, they also grant their intellectual property to third parties once they judge appropriate.

Without the complete IPR protection and recognition by the American Government, how can HP defend their patent business portfolio? In addition, if Taiwanese Government does not offer preferential treatments for foreign companies to invest in Taiwan, would HP set up a Design Center in Taiwan? HP Terry told us during the interview that HP did discuss with related Taiwanese
Institutions before they decided to build “HP Taiwan Design Center” in 2002. Therefore, what does the Taiwan Government attract international companies to invest in Taiwan? First, providing a right environment includes favorable governmental policies, a rich talent pool, and the rapidly improving and up to date infrastructure. Second, building up a simple paperwork process, the Taiwanese Government set up the Ministry of Economic Institution to assist multinational corporations. Third, they offer tax deductions and duty-free import of research equipments.

In the end, HP VP (Vice President) Tom Mitchell (2004) said that HP TDC (Taiwan Design Center) makes teamwork much easier since the HP employees are no longer an ocean away, and it has already increased development efficiency by 40 percent and shortened the time frame for new products by 50 percent.

2.4.2 Relations between FTO and the French Government

The participation of FTO in the French « Pôles de compétitivité » (Competitiveness Clusters) illustrates its relations with the Government and its will to actively develop and diffuse innovations on a national scale. This represents a tremendous opportunity for the organization to reinforce its competences on its strategic axes of growth. The operator’s presence in these clusters permits its R&D centers to work with the local communities, to cooperate with SMBs (Small and Medium Businesses) and to strengthen already established partnerships to experiment locally and create innovative products and services expected by the population.

FTO strongly participates in the following seven information technology “Pôles de compétitivité” (competitivite.gouv.fr, 2008):

(1) Three global Competitiveness Clusters: “Secured Communicating Solutions” (SCS) in the Marseille area, “Minalogie” in the Lyon area and “System@tie” in the Paris area.

(2) Two globally-oriented Competitiveness Clusters: “Cap Digital” in the Paris area and “Images and Networks” in Brittany.

(3) Two nationally or regionally-oriented Competitiveness Clusters: “Secured Electronic Transactions” in Normandy and “Risk Management and Territories Vulnerability” in the Marseille area.

Finally, Micheline Perrufel indicates that the French Government obviously contributes in a budgetary way to the R&D efforts of the group without specifying the exact amount.
2.5 Other Stakeholders

One considers that many other stakeholders have an impact on the creative process. Indeed, in addition of the five precedent actors (Leaders, Employees, Competitors, Customers and Government), a lot of different players can influence the organization’s creative process in a negative or positive way. Actions taken by companies’ leaders affect plenty of people (Trade Unions, Suppliers, Banks, Business partners, shareholders, Media, Communities, General Public, etc) who can decide to support or block the planned actions.

The leader of a company is not only trying to convince his direct followers but also different types of participants. Thus, leaders often have to face internal or external audiences and must adapt their discourse and behaviors to them. Hence, the capacity to convince stakeholders appears to be sometimes as difficult as implementing the actions and is usually recognized as a proof of a good leadership.

2.5.1 Relations between HP and other Stakeholders

In the creative process, stakeholders like partners and societies can influence some of HP’s strategies, even though they do not participate directly such as technological diffusion component suppliers or new environmental protectionism from some parties. Hurd indicated that we do not have a super-secret strategy to move everything direct. There is no behind-the-wall meeting where we say [...] let’s go do it this way (ChannelWeb, 2008). From HP’s point of view, they want the win-win solution for all stakeholders.

For this giant, their step movement is put in a spotlight so they have to be cautious to choose partners for implementing next strategy. In other words, they want quality partners who can help them to slay some dragons (Mark Hurd, 2008). Furthermore, they do not want to partner with firms which stay old thinking 10 years ago instead they desire those which want to be on the cutting edge. They often try to develop an integrated relationship which is not confrontational but consist, predictable and simple with their partners.

In conclusion, HP is willing to invest and innovate with associates as long as they commit to step up their pace and desire to win. As a champion, HP cannot take a break because they know the competition never stop a moment in this industry. Accordingly, each strategic movement shall be discreet, effective and efficient.

2.5.2 Relations between FTO and other Stakeholders

Among the many other stakeholders that participate in the activities of the FTO group, we will concentrate our analysis on the strategic technological partners whether private or institutional, on
First of all, given the importance of competition in the Telecommunications industry, if FTO wants to generate innovations, it is necessary for the organization to operate as an open system accepting cooperation with global rivals or firms from lateral industries. As a result, FTO built a multitude of strategic partnerships notably with: Apple to provide the iPhone on the French market (orange.com, 2007); Ericsson on a *IP-based consumer multimedia service*; Motorola on *seamless mobility solutions*; Microsoft regarding “Orange Windows Live”; Nokia on *new rich-media solutions*; Siemens on a *new-generation network architecture to facilitate fixed/mobile interoperability* but also with China Telecom, Deutsche Telekom, etc (francetelecom.com, 2008). Thus, these well-known international companies help FTO to gain knowledge through transfers and enhance its know-how. The firms combine their forces on specific technologies, products and services. Likewise, the French group contracted many alliances with institutional organizations such as CNRS (National Scientific Research Centre), MIT (Massachusetts Institute of Technology) or the European Union (Framework Programmes for Research and Technological Development) with the aim of working with experts of international reputation to develop tomorrow’s products and attain a world leading position.

Then, FTO established ties with a lot of business schools and universities like for instance the ENST (Ecole Nationale Supérieure des Telecommunications) or Stanford University. More than 200 PhDs work currently in collaboration with the company whether in France or abroad. Furthermore, FTO finances and animates different “management chairs” for example in the ENS (Ecole Normale Supérieure).

Last but not least, the organization is trying to develop its activities in a sustainable way but recognizes that *while the communications technology industry is not a heavily polluting industry; our activities have some impacts on the environment* (francetelecom.com). They are working with specialized environmental entities to reduce it through energy efficiency programs, a diversification of their energy sources, eco-design of products and packaging, etc.

### 3. Resources allocation

In this third point, we are going to examine how technologic companies organize themselves to create, innovate but also to handle and manage creative people as well as their products’ life cycle.

Information obtained through the interviews of a Manufacturing Manager (Terry Tseng) from HP and an Engineer R&D (Micheline Perrufel) from FTO will complete several points of the coming sections and subsections including the ones of the part three.
3.1 Balance between Exploitation and Exploration

One distinguishes two kinds of resources. Physical resources include elements such as lands, buildings, materials or money whereas intangible resources are acquired through relations and competences (knowledge, capabilities).

On the one hand, exploitation consists of taking advantage in the short term of the resources, knowledge or know-how you possess within your organization and of the business model you build. On the other hand, exploration implies that firms constantly enlarge their knowledge base through R&D, recruitment, knowledge transfer, purchasing of licenses, external acquisitions or mergers. Thus, exploration requires more resources to generate recognized or positive results and is carried out in an uncertain framework. Nevertheless, exploration remains indispensable to insure the future of companies, as their offer will sooner or later become obsolete. In time and with chance, exploration can allow firms to develop revolutionary technologies and products. Once thing is certain, creativity requires exploration (Austin & al., 2003). If we take the example of the mobile Telecommunications industry, we can observe that although firms are developing the third and fourth (UMTS) mobile phones generations, they are still marketing the second GSM-GPRS generation (History of mobile phones, thepeoplehistory.com, 2008).

3.2 Organizational Arrangements

As products reach maturity earlier, companies must place an increasing part of their yearly budget in R&D centers to create the innovations that will insure their future. They must be also able to move faster, following their changing environment, and acquire or merge if necessary. They will probably have to build alliances in a short term period with competitors which will become business partners.

To differ from competitors, internal resources can be at the origin of the creation of a specific activity system or value chain (Porter, 1985) which allows organizations to propose a unique value to their clients in the long term. However, reaching this stage requires time, efforts and experience as well as permanent reconsideration since capabilities tend to become obsolete.

It is likely that successful high-tech companies organize their creative process in an analogous way, allocate their resources in similar proportions or manage to build a culture dedicated to creativity and innovation. This is what we will try to find out in the coming pages with information that we will extract from the analysis of cases study and interviews.
3.2.1 Arrangements of HP Creative Process

HP’s CEO Hurd had mentioned in the end of 2007 that HP wants to increase the R&D budget and concentrate its R&D investments on three long-term growth opportunities: next-generation enterprise data, personal mobile technologies and digital imaging and printing.

“HP Labs” is an advanced and experimental group in HP undertaking complicated and various challenges facing customers and society, while moving ahead the frontiers of essential science. Its research comprises an extensive range of technologies and fields all over HP’s businesses. Correspondingly, its expertise is applied to five potential growth opportunities of information technology like below figure presents:

- **Information explosion**
  - Acquiring, analyzing and delivering the right information to individuals and businesses so they can act on it.

- **Dynamic cloud services**
  - Developing web platforms and cloud services that are dynamically personalized based on your location, preferences, calendar and communities.

- **Content transformation**
  - Enabling the fluid transformation of content from analog to digital, from device to device, and from digital content to physical products.

- **Intelligent infrastructure**
  - Designing smarter, more secure devices, networks and scalable architectures that work together to connect individuals and businesses to rich, dynamic content and services.

- **Sustainability**
  - Creating technologies, IT infrastructure and new business models for the lower carbon economy that save money and leave a lighter footprint on the environment.

Figure 10: HP Labs’ Expertise in 5 Opportunities (Source: HP Labs Website)

Open innovation is being emphasized in HP Labs whereas they cooperate with universities, customers, partners and stakeholders to acquire perceptions. HP’s Open Innovation Office deepens the relationships with those people and assures that those joint research outcomes meet HP’s business objectives and its partners’ expectations.

Referring to the interview with HP, we learn that HP possesses six R&D centers (Cupertino, Huston, Colorado, Taiwan, Singapore and Shanghai.) in the PSG (Personal System Group). In HP TDC (Taiwan Design Center), there are a total of approximately 200 employees. Generally, their business is run on the basis of regions such as Asia Pacific, EMEA, USA and Japan. In each region,
they work in a systematic group that contains members of marketing, sales, R&D, supply chain and customer service departments. The creative process is normally started by the marketing division based on the research of latest market demand.

In conclusion, HP holds many global labs and R&D centers to do research on any conceivable probability of information technologies. According to the interview, even though HP is a conservative company, they are still willing to take risks. When a project fails, they insist to save it at least one year. Furthermore, they care more about the efficiency of their operations and JIT (Just in Time) management than the creativity of products which is out of the industrial standard. He said: *If you can’t have economies of scale, it is very tough for you to create your market share. Moreover, operation and supply chain management are also very important. They are key factors of time to market.* Consequently, HP is more innovative in the process, business model and customer service.

### 3.2.2 Arrangements of FTO Creative Process

Turning from the business of networks operator to the one of integrated operator requires designing an alternative business model and new modes of customer relationship management. Until 2005, R&D at FTO rested upon a vertical organization. Since three years, this division is functioning in a horizontal and collaborative mode more relevant to face current business imperatives.

![Figure 11: FTO Creative Process Structure](image)

Three main entities are part of the FTO R&D Division: Orange Laboratories (Orange Labs), the ExploCentre and the TechnoCentre. With this new structure, the French company manages to register in average 500 patents per year. The group held more than 8500 patents at the end of 2007 whether in France or abroad. This allows the firm to protect its inventions and to reinforce its competitive advantage.

### 3.2.2.1 Orange Labs

*Orange Labs form the worldwide innovation network of the France Telecom-Orange Group. Set up in 2006, they have a staff of 5,000 (researchers, marketers, engineers) in 18 different countries on 4 continents. The Orange Labs international network is a concrete expression of the Group’s aim to breathe new life into innovation and make it the driving force behind its transformation (Orange.com, Didier Lombard, 2008). Thus, Orange Laboratories’ objectives are to realize*
technological breakthroughs, maximize the number of inventions, give value to patents, accelerate
time-to-market of innovations, anticipate clients’ usages, answer customers’ changing demand,
develop synergies and lead competition.

The 18 Orange labs are located in France (Belfort, Caen, Grenoble, Issy-les-Moulineaux, Lannion, La Turbie, Rennes, Sophia Antipolis), China (Beijing), Egypt (Cairo), England (London), Japan (Tokyo), Jordan (Amman), Poland (Warsaw), USA (Boston, San Francisco), South Korea (Seoul) and Spain (Madrid). The R&D centers daily welcome internal and external clients, strategic partners, representatives, industrials, students, etc. Their reactivity and adaptability give to the group the opportunity to take rapid and concrete decisions required by a fast changing environment. More than 30 research themes are under study within these laboratories such as unified communications, home networking, wireless technologies, high speed Internet, healthcare services, Web 2.0, etc. In the end, concepts of innovative technologies and concepts of creative products with an interesting potential are directed towards the ExploCentre.

3.2.2.2 The ExploCentre

The ExploCentre situated in Paris is placed under the responsibility of the Strategic Marketing Department. Since September 2005, it constitutes on the one hand a filter of creative ideas and; on the other hand, an incubator of innovative projects with high potential. Regarding its position in the creative process structure, the Explocentre is located downstream the R&D centers and upstream the TechnoCentre. Dedicated to the creation of disruptive innovations, the ExploCentre rests upon a capital risk model and introduces a new way of working with customers based on a concept called “co-creation”.

![Figure 12: 4 Steps of the ExploCentre](image)

Each project is implemented on a small scale in an internal “start-up” or “3P team” located in a loft which gathers people from different specialties. Generally, a “3P team” consists of a marketing specialist, a researcher and a network engineer [who] work together to select, conceive, produce and bring to market innovative products and services (francetelecom.com, 2008). The ExploCentre strongly reduces the time to implement a concept into a product. Indeed, the concepts of innovative
technologies and products are explored in average within three months. Likewise, possible sources of revenues are estimated and possible targets market identified. However, only most promising projects will be further developed in the Technocentre.

3.2.2.3 The TechnoCentre

The TechnoCentre which is situated in Châtillon (France) was created in January 2006 and constitutes the last step of the creative process. More than 1,000 experts of the FTO group work there to assure the industrialization and production of innovations that are expected to reach an interesting phase of maturity in the coming months. Today, 90% of FTO commercialized innovations depart from the TechnoCentre. Its director, Yves Tyrod, argues that *its first mission [...] is to generate value by launching good products, timely, in the planned countries* (francetelecom.com, 2008).

To accelerate the time-to-market, employees are gathered in “3P teams”. The number of innovations that recently pass through the TechnoCentre shows how successful and optimized the new structure of the creative process is. In 2006, 30 products were in progress against 180 in 2007 and more than 220 this year.

The TechnoCentre conducts all the steps from “opportunities studies” to commercialization. All new FTO products and services pass through this process. Innovation flows stem from Orange Labs, the ExploCentre and market researches. Once the business plan is validated and that resources are allocated among “3P teams”, it takes in average 6.3 months to launch an innovation even if a project can be stretched to 18 months. Prior to the launching on the market, new products and services are unveiled for three months in an event called “Les Collections”. Micheline Perrufel sees in this process a similitude with trade shows of the automotive and fashion industries.

At last, to complete this creative process arrangements, FTO created an entity called “Orange Vallée” (Orange Valley) to develop and commercialize in “fast track” services with high growth notably concerning mobile phones or online social networks (web 2.0).
3.3 Creative People

High percentages of inventions in an organization are from creative people. In the following sections, we will address “Creativity and Creative Groups”, “Nine Attitudes of Creative people”, “Creative People in HP” and “Creative People at FTO”.

3.3.1 Creativity and Creative Groups

A multitude of myths exist around the notion of idea generation. In fact, people usually think that (Luecke, 2003):

1. There is a close connection between intelligence and creativity;
2. The potential of creativity is related to age;
3. Taking risks and thinking in traditional ways help to be creative;
4. Group works are barriers to creativity and innovation;
5. Creativity can be only fostered if creative people have a total autonomy from their direction.

Generally speaking, innovation can be created by cooperation between individuals working in groups. Therefore, how to identify the characteristics of creative people? How to manage those creative employees in groups? Basically, managers must take into consideration the diverse thinking styles of their employees notably regarding the creative workers. However, it might bring some paradoxical issues such as: the novice’s mind and experienced thinking, freedom and discipline, fun and profession, improvisation and planning. Organizational creativity and innovation can be enhanced when people in groups can have both divergent and convergent thinking. Divergent thinking consists of building up new ways of thinking and removing old thinking from what people are familiar with. It is likely that people with a convergent thinking will reflect, work in the same way and find similar solutions.

3.3.2 Nine Attitudes of Creative People

There are no regular characteristics of creative people since they can come from diverse backgrounds. Nine attitudes are suggested to help employees to be more creative (Rowse, 2007):

1. Curiosity: It is never wrong for creative people to be curious about everything surrounding and always ask “what if?” Occasionally, they may allow themselves to be captious of everything. Nevertheless, they need to turn their questions into quests and then come out with solutions.

2. Seeing problems as interesting and acceptable: Generally speaking, people normally regard problems or obstacles as an unacceptable part of our life. We often try to avoid sorrow or
restrain discontent when it comes. By means of doing so, one will not encounter difficulties or something different from his regular life. On the contrary, creative people usually face problems positively and can even be fascinated by the resolution of issues.

(3) **Confronting challenge:** Many original ideas in fact come from research, confrontation and treatments of challenges. Challenges enable creative people to look at things from a different angle.

(4) **Constructive discontent:** Creative people have an astute awareness of what is wrong in the world and they are more constructive to fix these problems. They will not let themselves be bogged down in discontent; however, they regard it as a motivation to do some constructive things.

(5) **Optimism:** As mentioned earlier, creative people deal with problems naturally and they like to confront challenge instead of escaping. In other words, they generally are more optimistic, because problems or obstacles are not really difficult for them to cope with. In addition, creative people will not be struck down by tough challenges.

(6) **Suspending Judgment:** In the creative process, it is essential to hold off judgments and critics regarding an idea, because special ideas often start with a touch of madness. If a critique happens too early, the idea might be killed before it becomes useful. Howbeit, Negative feedbacks are not always wrong but we need to give people time to develop their ideas.

(7) **Seeing obstructions as leading to improvements and solutions:** Creative people treat obstructions as the motivation of improvements and solutions during the creative process. Sometimes, a magic idea originates in the process of removing obstacles or solving issues.

(8) **Perseverance:** With determination, creative people can discover something new or find out some clues to straighten out problems. During the process, they can gain some new ideas to develop new technologies or products.

(9) **Flexible imagination:** Creative people need to stay open-minded to reinforce their creative thinking skills that allow them to generate ideas from imagination.

**3.3.3 Creative People in HP**

In the first instance, creative people come from various academic backgrounds or different levels of the organization. Furthermore, creativity and innovation can be generated through collaboration among individuals working in a team.
CEOs Mark Hurd’s outstanding performance is remarkable and he can be treated one of creative people in HP. When Hurd joined this company, he adopted a revolutionary strategy to reduce the layers of organizational management. He simplified not only the operation process but also the communication flows from customers to HP so as to gain speed and responsiveness. The result was rewarded by the advancement of innovative ranking from 35th to 15th in the world in 2007.

In conclusion, anyone can be recognized as creative people in HP. They can be workers who contribute to the process improvement or leaders who enhance the operation efficiency. As the interviewee Terry, teamwork values everyone essential in the creative process.

### 3.3.4 Creative People at FTO

Regarding the allocation of creative people inside projects, they work in multidisciplinary teams called “3P” in which the staff comes from different departments of the organization. Each participant tends to possess one “little” specialty in a particular domain. In addition of marketing specialists and R&D engineers, teams may include sociologists, anthropologists, artists, ergonomists, product managers, etc. This diversity widens in a positive way projects members’ vision and capabilities. Even though skills and knowledge of the participants are different, they all collaborate in the same direction.

Micheline Perrufel signals that the average number of employees working in a creative project is comprised between ten and fifteen. The simplified hierarchy of FTO’s creative people is the following:

![Figure 14: Simplified Hierarchical Structure of FTO Creative Employees](image)

As an R&D Engineer, Micheline Perrufel is working under the responsibility of a R&D Unity Director who works under the direction of a Laboratory Director whose manager is the R&D Center Director.
3.4 Budget

A R&D budget is extremely essential for the creative process because an investment can be failed due to running out of money. At this point, we introduce the importance of a R&D budget and budget control. Afterwards, HP and FTO R&D budgets are given to help with the understanding of how high-tech firms arrange their budgets in the creative process.

3.4.1 Definition and Budget Plan

First of all, a budget outlines an organization’s financial and operational targets. Moreover, it can be regarded as an organization’s action plans. For instance, a cash flow budget reflects an organization’s cash inflows and outflows within a certain period of time. So, a cash flow budget can help to predict if your business is profitable or not.

Then, a budget plan can help firms to allocate their resources, evaluate their performance and formulate their strategies. A budget plan represents that a method of financing accounts in which arrangements are made for organizations to pay a series of small amounts on an account, usually over a period of 12 to 18 months (Answer.com, 2008). For many organizations, although budget planning can happen at any time, it usually occurs once a year. In addition, the past year’s budget is reviewed when an organization plans a budget for the next fiscal year. The budget planning process consists of listing a business’s fixed and varied costs by monthly base and allocating funds for the business’s goals.

Finally, a good budget plan is very significant for organizations when they start a new objective or business goals.

3.4.2 Budget Control

It is an action to insure that the budget is spent in conformity with the conceived plan. Moreover, a budget control can be a base standard of checking managers’ performance to reward or punish them, and organizations can use it to modify their next fiscal year budget plan.

3.4.3 HP R&D Budget

In the first instance, HP remains committed to innovation and continues the R&D on developing products, services and solutions to anticipate customers’ changing needs and desires as well as enhancing its competitive advantage. HP Labs along with the diverse R&D groups around the world within their five primary business units (BU) are in charge for this commitment to creativity and innovation.
Secondly, HP’s 2007 annual report of consolidated statement of earnings indicates that HP’s expenditures of R&D were approximately US$3.6 billion in each 2007 and 2006 fiscal years. The R&D disbursement in fiscal 2007 was greater than before, principally due to the supplementary R&D expense in consequence of Mercury acquisition (HP Form 10-K, 2007). As regards the rise of fiscal 2006 R&D outlay, it was primarily because of higher bonus accruals and the expense of stock-based compensation. Analyzing its overall expenses, we can learn that they spent 66% of their costs on products, 16% on services, 13% on selling, general and administration and 4% on R&D (refer to figure x).

![Figure 15: Costs and Expenses of HP 2007 Budget](Source from HP 2007 consolidate statements of earnings)

In a word, R&D expense ranks number 4 after products, services and general administration. The result tells us that R&D expense occupies a regular percentage of HP’s budget plan even though it is not the priority.

3.4.4 FTO R&D Budget

The R&D investments reached 894 million Euros in 2007 which only represents 1.7% of FTO 2007 turnover (€1 773 billion). Nevertheless, the R&D expenses increased of 20% between 2006 and 2007. This global budget is divided among three entities: Orange Labs, ExploCentre and TechnoCentre.

Upstream research and applied science correspond to 15% of FTO R&D investments. The R&D expenses aim to: develop the portfolio of innovative technologies and its related patents; detect “disruptive technologies” (Christensen, 1995) that is to say technologies that will replace the current dominating ones; and to acquire strategic competences and knowledge to implement new creative ideas into innovations.
3.5 Time Management of Creative Projects in High-Tech Firms

First of all, Amabile has demonstrated through her numerous researches that time pressure (and other forms of pressure) in any company affects positively or negatively workers’ productivity and creativity depending on how it is handled by top executives. Managers and employees tend to possess different views on how time pressure impacts on creativity. Some are inclined to believe that it influences in a good way creative thinking whereas others consider it minimizes it. Amabile noticed that those who think that are more creative under pressure, as a matter of fact, are not. On the one hand, the author indicates that a minimum of pressure is required to foster creativity and innovation and to avoid falling into inaction. On the other hand, she points out that firms with a low level of time pressure are unlikely to be in danger.

Then, very high levels of time pressure should be avoided if you want to foster creativity on a consistent basis (Amabile, 2002). If the workload cannot be reduced to avoid, for instance delays in a project, managers shall attempt to keep their employees motivated and focused in order to maintain their creative thinking skills. These kinds of situations need to be averted as much as possible since creative people cannot function effectively in that mode for long periods of time without getting burned out (Amabile, 2002).

A moderate time pressure allows creative people to benefit from an incubation period particularly appropriate when it comes to generate ideas and to start a new project. Stronger pressure in the last steps of a mission will probably not impact so negatively on it. Likewise, waiting the last minute to solve a complex problem should be avoided since it is probably best to get started as soon as possible, laying out the problem in all its complexity and mapping out some strategies for tackling it (Amabile, 2002). Although organizations need to give time and freedom to people to think creatively, time pressure tends to keep rising nowadays in business areas notably due to competition, customers and stakeholders’ specific demands which constitutes a paradox.

At last, a good solution to stimulate the creative thinking of employees may consist of mixing periods of time pressure with phases of “laissez-faire”.

Is time an issue at HP? According to the interview with Terry, HP leaders encourage R&D engineers to arrange their time 80% dedicated on the development of the project and 20% on research. Particularly, HP managers conduct laissez-faire management and seldom give time pressure to people working in HP Labs. Correspondingly, time is absolutely not an issue in HP.

As regards the Telecommunications Company, Micheline Perrufel explicates that FTO creative project teams follow roadmaps of an average one year.
4. Leading Creative People

In the creative process, leading creative people is associated with leader’s vision, management style, motivation and rewards and sanctions. Each factor will be indicated one by one afterward. Moreover, we also address the situations in HP and FTO accordingly.

4.1 Leader’s Vision

If leaders want to build the bases of a creative and innovative culture, a clearly articulated vision, or sense of direction, to focus the attention of everyone associated (Bennis & al., 2003) seems fundamental.

Firstly, to shape their vision, leaders can exploit and listen to their current network of relations whether inside or outside the company to find new insights from scholars, analysts, clients or other leaders. All successful organizations need not just a clear mission or purpose, but also a widely shared vision or unified focus (Bennis & al., 2003). Therefore, leaders should also check with attention that their recommendations, regarding the vision of the organization, are well understood as individual behavior can be shaped, directed and coordinated. They ought to make certain that the message is diffused to all the workers and that people feel enough motivated and confident about their capability to turn into action the thought vision. As a result, leading others to a “consensus” requires a strong sense of communication.

Secondly, leaders try to influence their followers to adopt their interpretation of the reality in order to create a shared meaning that will constitute the basis to mobilize action. To reach this stage, leaders usually attempt to define and explain the current reality in a sensible way for others. This process wherein the leader is one who alters or guides the manner in which his followers mind the world by giving it a compelling face (Weick, 1995, p.10) is called “sensegiving”. Leaders need to focus and to direct the attention of their followers on specific parts of the ongoing stream of experiences. This activity known as bracketing involves nothing more than the suggestion that observers should pay more attention to this [...] portion of stream than to that one (Weick, 1991, p. 193).

Thirdly, this tentative of “management of meaning” (Smircich & al., 1983) is shaped in a dialectic interaction as leaders (or sensegivers) and followers (or sensemakers) are active and participate in the outcome of the process. On the one hand, followers try to make sense of the bracketed situation using their frames of reference. On the other hand, leaders attempt to remove the status quo and to destabilize their fixed cognitive maps in order to open their mind to new interpretations of the environment they face. Besides, when influencing members of their
organization, leaders tend to create a subculture that differs from the rest of the environment. By having the feeling to belong to a specific group or family, individuals can perform more efforts to insure a flourishing future to their organization and peers.

Fourthly, the vision suggested must make sense to the audience. As, *new justifications and new meanings are slow to emerge as they are grounded in old meanings that persist even though they are outdated* (Weick, 1991 p.27), it is possible that they will require time to be accepted. Furthermore, the context and the leader’s behavior can affect the “sensegiving” activity. To convey his message in good conditions, it appears very important that the leader embodies in front of his followers, whether in his professional or private life, what he is requesting. Otherwise, it is likely that ignorance and inaction will be the only answers he will receive from his followers. This implies that if the leader requires creativity and innovation from its employees, he must start by showing the example and by being creative and innovative.

Fifthly, through their vision and their ability to take charge, leaders can insufflate the dynamics that will lead their company towards the good direction. A priori, Leadership does not seems to be a job that can be suitable for everyone as it requires strong communication and persuasion skills, but through learning, development and improvement, leaders can appear and shape their organization in the direction that will lead it to success.

Sixthly, some persons like for instance charismatic leaders have more facilities than others when it’s time to persuade. Vision is communicated, according to Bennis & al., through a mechanism named “social architecture” that helps and forces workers, of all levels in the hierarchy, to figure out how to behave. As a result, the role of the leaders is to shape the best “social architecture” as possible. By using their rhetoric instrument which consists of a good argumentation, leaders can achieve to persuade their subordinates. Thanks to figures of speech like metaphors, the speaker can emphasize certain interpretations and hide others. Nevertheless, *a good name was not necessarily the most accurate, but one that allowed action* (Weick, 1995, p.42). Symbols also help to develop and sustain the designed reality. Everything is planned and done on purpose to create an impact and to arouse the thoughts, feelings and behaviors of the employees. Indeed, *through words and images, symbolic actions and gestures, leaders can structure attention and evoke patterns of meaning that give them considerable control over the situation being managed* (Smircich & al., 1983, p.263). Bryman suggests that the final aim of these messages is to *set limits and boundaries on how people are supposed to think and respond* (Gardner, 1996, p.287).

Likewise, with their communication skills, good leaders will succeed in arousing the emotions of their followers which will be naturally guided towards action. *The leader operates on the*
emotional and spiritual resources of the organization, on its values, commitment and aspirations (Bennis & al., 2003). To some extent, leading people is to appeal them to turn the vision into action through implementation, to make them believe that with their help, the organization will reach a better situation. The future rewards are not only physicals but also psychological: hope, happiness, social responsibility, public recognition. In addition to the content, the context surrounding the transmission of a message matters when it comes to convince the audience. It includes characteristics like the posture of the speaker, voice intonation, charisma, look, gestures notably the ones of the hands, the manner of staring the audience but also the previous reputation. Followers pay also a lot of attention to the conveyed emotions such as confidence, fear, anger, ambiguity or hesitation.

Finally, in organizations where creativity is historically celebrated, stories of creative people inspire and encourage others employees to come up with new ideas which will reinforce the company’s creative culture. Regarding stories, they should make sense to the audience and must be embodied if the leader doesn’t want to lose his legitimacy and to be considered as a hypocrite.

4.1.1 HP Leader’s Vision

Mark Hurd applies five tips (Baylor Business Review, 2006) to his leadership as the following:

Figure 16: Mark Hurd Five Tips of Leadership

Tip1. **Build a plan**: Whenever you shoulder a responsibility, you ponder what if it would be your last day on duty; what you would value it during your lifetime on this day, and **work your way backward** (Mark Hurd, 2006). Aligning the work streams to implement, then you can accomplish the vision moving forward.

Tip2. **Align yourself with the best people on the planet to help you get the job down**: Many managers are threatened by having talented subordinates around them. Actually, it is a credit for managers to gain such great employees working with them. Accordingly, managers should keep, challenge and motivate them.

Tip3. **Make things as simple as possible**: CEOs obtain many chances to speak in a complex way but they should try to avoid it. Hurd argues that the best way to lead is trying to make things as simple as you can by using simple words, simple objectives and simple structure. In HP, managers
try to make things as simple as possible.

Tip4. Lead, lead; not manage: Hard said: Managers make the most of the hand they are dealt; leaders change the hand. Correspondingly, he argues that leaders control and change the game to get right people on board.

### 4.1.2 FTO Leader’s Vision

Didier Lombard plays a paramount role to foster and stimulate creativity and innovation within the Telecommunications French Company. He communicates his vision to its employees through numerous speeches during conferences, debates, seminars, etc; but also with the help of the group’s Intranet. He is used to empower his subordinates to make sure that they are following his directions and all working towards the same objective.

Following his arrival at the head of the FTO organization and to make sure that his vision was widely shared by all his employees, Lombard introduced the Next Plan which seeks to enable the group to pursue its transformation as an integrated operator and make France Telecom the benchmark for new telecommunications services in Europe (orange.com, 2005).

### 4.2 Management Style

Generally speaking, management style is concerning the interaction between managers and their subordinates. According to Robert Tannenbaum and Warren H. Schmidt (1973), leaders should employ a wide range of leadership and exercise them appropriately. Therefore, using one kind of management style all the time may not be the best way for managers, and they can make suitable use of different kinds of management style based on different situations. Typically, there are four kinds of management style frequently discussed as below (Davidson, 2003):

1. **Autocratic Management**: An autocratic manager makes decision without discussing with his/her staff, and keeps information among top management. Once objectives and tasks are set, the workforce is then required to act exactly. The communication flow basically is only downward from managers to subordinates, and this has been criticized by Elton Mayo (1933) that it can result in a decrease of motivation for employees. The advantages of autocratic management style are that the decision remains constant; keeps similar in the direction of business and the decision-making might be more efficient than other kinds of management style. However, autocratic management style has its pros and cons. On the pro side, it may be appropriate for routine or low-risk projects where the staff just carry out the task exactly as required. On the con side, it can lead to demoralization of the employees because of no meaningful contribution in decision-making process.
(2) Paternalistic Management: A paternalistic style is still dictatorial in nature but the decision-making process tends to care more about employees than the business. The managers always explain decisions to the staff and make sure their needs are satisfied which can balance the lack of motivation on employees from autocratic management style. Generally, communication flow is mainly downward but feedback is welcome in order to make employees happy. Moreover, it can engender the loyalty of staff and reduce the turnover rate, because it cares about employees’ social demands. In addition, it has similar advantages and disadvantages as autocratic styles where employees become extremely dependent on leaders. Once wrong decisions are occurred, the employees will be unsatisfied with the leader.

(3) Democratic Management: Democratic managers seek different opinions from staff during decision-making process, and every decision is agreed by the majority. According to Davidson (2003), this kind of management can be employed effectively with knowledge workers from developed countries, but it cannot be used very efficiently in certain other cultural nationalities. Democratic style has various advantages such as: first, it meshes well with American cultural notions; second, it can lead to better decision making because it reflects a broad spectrum of viewpoints; third, it increases the commitment of staff to carry out decisions, because they themselves played a role in making the decisions. (Davidson, 2003, p.75) Furthermore, when leaders need to make a complex decision involving a wide range of specialist skills, democratic style is especially effective. Unlike autocratic and paternalistic styles, the communication is comprehensive in both downward and upward flows. However, the decision-making process is slower than autocratic or paternalistic styles and it has some drawbacks: firstly, the tyranny of the majority which results in a given majority always gets its way, much to the chagrin of what becomes a perpetual minority. Secondly, when the wrong voters are polled on their views, then decisions are consequently based on incorrect information. (Davidson, 2003, p.75)

(4) Laissez-faire Management: In a laissez-faire management style, we usually find few or no communication flow of information, or we find a lot of flows which are diffused everywhere and are not effectively spread. The laissez-faire manager’s role is outlying and employees mind their own business; the manager escapes the managerial duty and uncoordinated deputation may occur. However, this kind of style is quite suitable in managing highly professional and creative groups of employees. Employees who work under this kind of management style may be able to contribute some feedback directly, but the managers may not act properly or meaningfully in accordance with the expectation. According to Davidson (2003, p.74-75), the laissez-faire approach may be effective in state-of-the-art projects on which project managers
want to encourage creativity and are reluctant to impose their views on staff. Such freedom of action is likely to bolster morale among highly creative workers who do not like to work under close supervision. Moreover, it has some minus sides. For instance, employees may be able to work without supervision in the beginning, but the sense of freedom may metamorphose into aimlessness before long. Another concern in laissez-faire style is when the quick decision is required; it can be disastrous in situations.

4.2.1 HP Management Style

HP founders, William Hewlett and David Packard were known to friends as well as colleagues, built a distinctive management style which people called “the HP way.” Hewlett said: *The HP way is a core ideology [...] which includes a deep respect for the individual, a dedication to affordable quality and reliability, a commitment to community responsibility, and a view that the company exists to make technical contributions for the advancement and welfare of humanity* (hp.com, 2008).

![Figure 17: HP’s Five Business Units](image)

The above figure depicts their organizational management structure which is divided into five business segments: ESS (Enterprise Storage and Servers), HPS (HP Services), TSG (Technology Solutions Group), IPG (Imaging and Printing Group) and PSG (Personal Systems Group). Accordingly, they run their business in a systematic group base so as to managing simply.

Generally speaking, HP’s management style is democratic but it depends on managers. For instance, the interviewee mentioned that his supervisor is very open-minded and welcome different opinions from subordinates. In HP, they conduct “Open Door Polices” and employees can talk to leaders on demand. Although different thinking might occur between leaders and staff, HP’s leaders never make a decision unilaterally instead they communicate with their subordinates.

4.2.2 FTO Management Style

Mrs. Perrufel points out that even with the introduction of the new organizational structure in 2005; the management style of the direction remained democratic for all the employees including creative people. However, she explains that *people occupying positions in R&D are sensitized, more than previous years, to work in a democratic way but with profitability targets.* Then, she gives details on the working conditions of creative people: *individually, we are autonomous but we still have to write a weekly report on our productivity. We are not forced like telemarketing people to*
log; we can arrive at 10 am, 11 am or we can work at home if we prefer. It is a little bit freer than normal employees in term of time management but engineers are asked to report their output today which is completely logical.

In addition, it seems that FTO doesn’t practice the “Open Door Policy” which allows any worker to meet his direction on demand. Michel Perrufel clarifies the situation by saying that one employee can always meet his manager. However, it is evident that one cannot meet Mr Lombard on demand. There is a hierarchical structure to respect and follow.

4.3 Motivation

Motivation that is passion and interest plays a crucial role in creativity as it determines what people will actually do. The intrinsic motivation or natural interest of people to do something is inner which means that it is particularly difficult to stimulate. For instance, it is not enough to offer rewards such as money, promotion or to threat a position (elements of extrinsic motivation) to encourage someone to work harder. To reach this situation, people must be committed to the project by themselves and enjoy naturally what they are doing. A person will be more creative if he or she feels interested, satisfied and challenged by the mission to conduct (Amabile, 1998). It is only by arousing their workers’ intrinsic motivation that managers will spark creativity. When people are intrinsically motivated, they engage in their work for the challenge and enjoyment of it. The work itself is motivating (Amabile, 1998, p.79).

Thus, finding the good recipe to boost intrinsic motivation is the most important challenge leaders need to accomplish. Amabile suggests that when employees are mainly encouraged to work with elements of extrinsic motivation, the quality of their work is intrinsically lower. People will be most creative when they feel motivated primarily by the interest, enjoyment, satisfaction, and challenge of the work itself, and not by external pressures or inducements (Amabile, 1998). Executives should also give a sense of responsibility to their workers by recognizing that they are doing something complex but paramount for the future of the whole organization.

Then, we will address the concept of motivation from an empirical point of view.

First of all, FTO can ask its creative people to visit information technology or telecommunications trade shows organized in Europe or in the rest of the world to nurture their creativity. On top of that, the Paris based organization tries to do its best to make sure that its employees can work in positions or on questions that they appreciate and are qualified for. Furthermore, to maintain team members’ motivation and keep a peaceful atmosphere among them, projects colleagues are used to gather around internal manifestations like “Open drinks and demos”
during “the Collections”, end projects parties, or “Kids’ Day” where children of the personnel can discover their parents’ workplace. These events can reinforce workers intrinsic motivation.

Furthermore, Mrs. Perrufel observes that an implicit competitiveness exists between the different R&D teams. There is some kind of unwritten internal rivalry to develop the best creative technologies and products in the fast possible way. At last, workers’ extrinsic motivation is encouraged through different sorts of rewards.

4.4 Rewards and Sanctions

From a theoretical perspective, relations between leaders and workers are more or less “transactional” as leaders treat power, status or economic incentives (wages or advantages in nature) against actions and results (Bennis & al., 2003). In order to encourage employees to be more creative, a reward system is essential in an organization. Especially, when individuals spend a long time trying to generate new ideas, creative energy must be renewed somehow no matter those ideas are valuable or not. Rewards can be in the following shapes (Luecke, 2003):

(1) **Recognition**: A plaque or public announcement to honor individuals or groups’ achievement.
(2) **Control**: Allowing staffs to participate in a decision-making process can make them be aware of their missions, or the organization can grant them more resources to complete a project.
(3) **Celebration**: Holding a celebration to acknowledge a successful new creation.
(4) **Rejuvenation**: Giving employees a period of leave or permitting them to take a break from their works for a while.

Mainly, we can divide incentive rewards from two perspectives: intrinsic or extrinsic. An intrinsic reward can be carried out by means of an individual desire of self-actualization, curiosity, enjoyment, or interest in the work itself. As for an extrinsic reward, it can be in people’s desire of the accomplishment of the work itself such as a promotion, a bonus, or stock options. Basically, these two kinds of reward can be adopted hand in hand.

Leaders can base on different situations to conduct diversified rewards. An intrinsic inspiration is a good choice to motivate creative thinking, when the work itself is not routine. However, on the one hand, leaders must be careful not to make rewards become more important than the task itself for employees; thereby the balance between intrinsic rewards and extrinsic rewards is very significant. On the other hand, leaders cannot underrate the power of rewards no matter their nature, because it can be the mainstay of motivation for subordinates to keep the energy of creativity and innovation.
From an empirical perspective, bonus, raises of salary and stock options are mostly implemented in HP. Once employees propose good ideas or applied a patent, they will be rewarded by a bonus. On the contrary, if they contribute nothing for a period, they will get a bad performance review. Due to teamwork is being emphasized in HP; they will not hold a public acknowledgement or provide a plaque to avoid individualism.

Concerning FTO, all the group’s employees whatever their position are incited via an internal contest called “idea click” to innovate and propose creative ideas. The most creative and innovative workers are then rewarded by receiving virtual points or “Talents” that they can use to purchase gifts on the websites of the company’s partners. If the amount of creations and the results are good enough, employees can receive periodically, besides their fixed salary, a part of variable remuneration. Staff members whose ideas generate considerable improvements or results may benefit from a public recognition. This can include a meeting with the CEO, a specific ceremony to receive a prize, articles in internal magazines or websites of the group or even from external Medias if the idea is particularly revolutionary.

As regards sanctions, Micheline Perrufel indicates that the only punishment derives from the worker’s personal sadness that spent a lot of time and efforts on a project without achieving any results. If a project fails, normally no sanctions are applied to the staff as they do not have an obligation of results but an obligation of means.
III.

Creative Process and Product Life Cycle
Now that we better understand what kind of actors are involved in the creative process; how resources allocation is carried out among creative projects and how leaders handle creative people; we can address the fact that the creative process is not always associated with positive outcomes and may encounter obstacles and generate or be the reason of many risks. Later, we will explain who take the decision within organizations to add or remove a product or service from the portfolio and when does this happen? Moreover, we will answer if there are any risks for a firm to invest in short life products while it requires several years of R&D?

1. Creative Destruction Process

This expression was first mentioned by Joseph Schumpeter in his work entitled "Capitalism, Socialism and Democracy" (1942) to depict a process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one. This phenomenon, in which something old or tending to become obsolete is substituted by something new, can be observe in almost all the industries and thus with the majority of technologic products and services. This expression is strongly interlinked with the notion of radical innovation.

Laptops and computing chips constitute good examples to illustrate this permanent destruction of former state-of-the-art technologies. In fact, every three to six months in average, a multitude of new machines equipped with upgraded technologies are released on the market which reduces the attraction of former notebooks and makes them rapidly out of date. In such a case, manufacturers need to rethink their pricing strategy or upgrade their machine (in terms of memory, processor…) for the same price if they do not want their product to disappear from the market. Concretely, creative destruction provokes a double effect. On the plus side, everyone can benefit from the fact that products and services are rapidly improved. On the minus side, the velocity of technologic enhancements make the same products and services obsolete, or to a lesser extent old-fashioned after only few months.

Schumpeter describes further the creative destruction process by indicating that the market must clean itself out by taking resources away from the losers, so it creatively destroys the losing companies and reallocates resources to the winning companies. This sentence implies that mediocre products and services are not the only ones to disappear from the market if they do not meet customers’ demand. In fact, it is only by responding to clients’ specific demand that firms can insure their future in the long run. Therefore, organizations need to design a successful creative process requiring both, rapidity when it comes to the time to market, and a good value for money if they do not want to go bankrupt or to be purchased by their main rivals. By building such a creative
process, firms will be able to face and to follow the unstopping creative destruction rhythm. Companies such as Microsoft or Apple are so successful that they can decide, by launching their new products, of the creative destruction pace. When Microsoft launched Vista in January 2007, everybody knew that it was the end of XP. As a consequence, small competitors usually do not have other choice than to follow this kind of firms which possess the power to decide of the technologies that will be adopted in the coming months by their industry. Schumpeter’s idea on creative destruction that only innovative and creative companies can manage to survive in the long term seems far more accurate nowadays than Adam Smith's view that an "invisible hand" (1759) would automatically regulate the marketplace.

In general, individuals need to possess leadership and management skills as well as an entrepreneurial spirit to generate a creative destruction. Schumpeter argues that entrepreneurs play an important role in the direction taken by an economy notably to sustain the growth and the emergence of business cycles. By taking risks in order to implement new ways of doing business which will result either in failures or successes, entrepreneurs constitute one of the fundamental motors of growth that drive the economy. If they manage to create a new technology or radical innovation, they may profit during the first exploitation years of their business of a natural monopoly until competitors enter the market or until another entrepreneur discover a new revolutionary technology. However, by generating something new, it is likely that their flourishing business will destroy or modify the one of formerly established companies which will need to adapt their business to preserve their activity on the market. The latter can react, for example, by improving their design, by reducing their manufacturing costs, by inventing a new management method or by simply adopting, such as the whole industry, the more competitive technology proposed by rivals or by new entrants. When rare, creative destructions can disturb the rules of the game in an industry and can give to the initiator a competitive advantage. When repeated, they become part of the industry recipe towards success. The creative destruction process can partially explain how a competitive market can temporarily become monopolistic. Therefore, it constitutes an important economic concept. In any industry, a creative destruction can mainly come from the elaboration of a (mckinsey.com, 2001):

1. New market or product;
2. New equipment;
3. New source of labor and raw materials;
4. New method of organization or management.
It is likely that we are living in a “Schumpeterian” world governed by the ongoing creative destruction process. In the end, even if we can benefit a lot in our everyday life from continuous improvements, this phenomenon leads to an overexploitation of resources by companies, customers and the society as a whole.

2. Obstacles, Risks and the Creative Process

After an explanation of the main obstacles affecting the creative process, we will tackle the different manner to handle risks within it.

2.1 Obstacles of the Creative Process

2.1.1 Resistances to Change

Firstly, companies are sources of a multitude of resistances and rigidities. To fight inertia in bureaucratic organizations that contain *armies of unproductive workers*, Hammer (1990) argues that revolution can be the appropriate answer within a short period of time. Indeed, people are usually afraid and reluctant (psychological resistance) to change as they know that they will have to reconsider their cognitive maps which require time and work (cultural resistance). Therefore, we have a strong preference for stability, routine and known procedures. People can also be unwilling to change as the current situation gives them an advantage or privilege that could possibly disappear if things were modified (political resistance). Imagination or *a touch of fanaticism* can be the ultimate solutions to struggle the status quo (Hammer, 1990).

Secondly, while individuals may look to a leader to concretize their reality, they may also react against, reject or change the reality thus defined (Smircich & al., 1982). The existence of counter realities, as each situation contains a multiplicity of senses, complicates the leader's task. To reduce the impact of these different opinions on his strategy, the leader needs to take time to analyze their characteristics in details. Then, if the leader wants his or her proposition to be pursued, he or she must insist on their positive aspects and on the negative features of the variant solutions.

Thirdly, as decisions tend to be public and irrevocable, people can also fear to commit themselves on the long run or in an activity that they perceive as dangerous. Last but not least, negative practices such as retention of strategic information or disclosure of confidential information can happen and slow down the pace of change within organizations.

2.1.2 Managerial Practices Affecting Creativity

According to Amabile, *there can be no doubt: [in most of the companies] creativity gets killed much more often than it gets supported* (1998, p.18) by managers or top management workers.
Indeed, the ways leaders encourage, recompense and assign tasks to people tend to reduce unintentionally creativity. The problem resides in the fact that creativity is almost systematically cut down during daily activities which are designed to *maximize business imperatives such as coordination, productivity, and control* (Amabile, 1998, p.18). As a consequence, creativity is stifled and constitutes the main victim of those business obligations. Besides, a lot of executives have a tendency to believe that imagination and originality should find a place principally among marketing, research and development areas, whereas, as a matter of fact, any service or function within an organization can benefit from creativity. Although they know that the future of their organization will come from the creative process, many managers possess a narrow view of it. Creative ideas are interesting for companies but only if they can be implemented practically, rapidly and in a cost-effective way.

Moreover, during her research, Amabile achieved to identify six managerial practices that affect positively or negatively creativity depending on the manner that they are managed. Challenge, freedom, resources, work-group features, supervisory encouragement and organizational support are respectively concerned.

![Figure 18: Managerial Practices Affecting Creativity, (Amabile, 1998)](image)

Challenges constitute the first factor to have an effect on creativity. Indeed, managers need to match the expertise and skills of their team members with the right assignments to boost their intrinsic motivation. When they divide the workload among their employees, executives must try to provide interesting and achievable missions to all of them to spread out their abilities. Matching tasks with people interests and competences requires that managers dispose of an in-depth
information on their staff, for instance on their potential, but also on the work to be achieved. Good leaders will avoid situations in which workers find that they are bored or overrun by the events.

In today’s business world, freedom represents the second aspect which influences creativity. To encourage imagination and originality, a good practice seems to set the goals to achieve to the workers but not the means to reach them. Amabile points out that autonomy around process fosters creativity because giving people freedom in how they approach their work heightens their intrinsic motivation and sense of ownership (1998, p.20). However, empowering and giving people autonomy only makes sense if the set objectives remain clear and stable during a meaningful period of time. Indeed, being creative when the requests are perpetually varying appears almost impossible.

The repartition of the different resources within the organization notably time and money constitutes the third important element affecting creativity. Matching the right persons with the right tasks is not sufficient, managers need also to set deadlines and decide which budget to allot in a project. Their choice can either trigger or scale down creativity and motivation. For that reason, they need to find a balance between tight and long deadlines in order to keep their staff under a minimal pressure but without overwhelming them with unreachable goals. As creativity constitutes a slow process and usually produce results in the long term, being patient, allowing enough time or planning an incubation period can be good initiatives to promote new ideas. Managers also need to know from their direction how much they can spend in the different projects to support their staff work which will not be efficient if it does not obtain the necessary resources to implement his inspiration. To a lesser extent, the work environment can influence creative people productivity particularly the atmosphere and the offices size.

Work-group features constitute the fourth component which impacts on creativity. One considers that to achieve results, a good start consists to design and build a team with diverse backgrounds that is to say with different expertise and creative thinking styles. Indeed, homogeneous squads will be effective but not creative. Due to various intellectual foundations and working approaches, fresh ideas will come up, blossom and lead the organization a step further if executives know how to handle their staff diversity. Nevertheless, this necessitates that team members feel motivated about the final objective to reach (intrinsic motivation), agree to help their colleagues who are facing setbacks and acknowledge the skills and know-how of their coworkers. Amabile argues in the same direction saying that putting together a team with just the right chemistry – just the right level of diversity and supportiveness – can be difficult, but [her] research shows how powerful it can be (1998, p.21).
Encouragements from hierarchy are considered to be the fifth dimension likely to influence creativity. This idea is largely related to the intrinsic and extrinsic motivation. As with any new relationship or activity, working in an organization can seem very pleasant and exciting at the beginning, but in time passion tend to slowly but surely disappear. Indeed, people need to believe that their work matters to their direction or more generally to the organization. To execute their job with a permanent motivation, they need to feel that their efforts are not done pointlessly. Therefore, by naturally recognizing the creative work of their staff, even before knowing the outcome as they cannot know beforehand which project will succeed, managers make certain to build a positive atmosphere that can lead the company towards future triumph. On the contrary, offering systematically extrinsic rewards in terms of money, advantages in nature, career evolution or evaluating continuously people will decrease workers intrinsic motivation in the long run and produce a climate of fear.

Another good way to kill creativity consists to greet people’s work with skepticism or to refuse to acknowledge their efforts. Unfortunately, the vast majority of executives tend to react nowadays negatively every time one of their employees proposes a new idea. Amabile found an explanation to this phenomenon which is deeply anchored within organizations. It seems that people believe that they will appear smarter to their bosses if they are more critical and that it is professionally rewarding to react critically to new ideas (1998, p.22). If this is true, managers really need to reconsider their views and practices in order to improve the diffusion of creative ideas towards top management. Otherwise, executives can let fantastic opportunities of creations and innovations pass them by. In addition, we also need to keep in mind that companies can learn a lot from early negative tests and experimentations. By showing the example, experimenting, keeping trying to solve tough issues, communicating their positive and negative experiences, managers can nurture the 3 elements of creativity seen previously (p.31) and convey motivation and perseverance among their employees.

Organizational support represents the last managerial practice affecting creativity. The creative process is really in motion when employees receive support not only from their manager but most of all from the entire organization. The responsibility to build systems favoring a culture of experimentations, successful or not, falls to leaders. They need to convey in all levels of the company the vision that creativity constitutes a top priority and that the most effective employees in this domain will be recognized and rewarded. Regarding the recompense nature, it is better to avoid when possible money and to prefer rewards such as promotion or public recognition. To guarantee a positive atmosphere and avoid political problems, jealousy or resentment, rewards must be justified,
distributed to any workers if he or she deserves it and related to the nature or importance of the accomplishment. Moreover, to build a process spawning creativity and success, leaders must find the good recipe to convince their staff to not retain (strategic or not) information and to collaborate easily. Indeed, by exchanging information with their colleagues, people will obtain new knowledge, improve their skills (intellectual, communication, team cooperation) and will help each other which will reinforce their intrinsic motivation and their will to work.

To conclude, Amabile depicts in a practical way how managerial practices can either foster or kill the three elements of creativity. It’s only by building a creative process coherent with the employees’ skills and capacities, and by meeting business imperatives that organizations will succeed in the long run. Thus, business obligations can comfortably coexist with creativity. Finally, the “fifty phrases that kill creativity” (David Dufour, 1989) give a good practical insight (See in Appendix p.108) of how even little feedback from hierarchy at an early stage can easily affect creative ideas.

### 2.2 Risks of the Creative Process

In the following subsections, we will see that to be creative and innovative, organizations can design processes or build business models integrating risks, experimentations, failures and accidents within their strategy. We will also give details on the fact that creativity is often affected by the phenomenon of risk aversion. Later, we will discuss if it is possible for a firm to be too creative?

#### 2.2.1 Risk Management

*If you don’t risk anything, you risk even more* (Erica Jong). First, leaders like to take risks and it’s possible that to be a good leader, one must be able to take initiatives and to confront each other with danger even if this means that the leader can trigger problems and create mistakes. Peter Drucker indicates that *whenever you see a successful business someone once made a courageous decision*. This is confirmed by Albert Einstein who once said that *if at first, the idea is not absurd; there is no hope for it*. If we look, for instance, at the company Starbucks, all the indicators were against them when they decided to found their business in 1971: the coffee consumption was declining in the United States; studies were saying that people would never buy a coffee in a paper mug for 20 kr. By launching their offer on the market, they created the demand that was previously inexistent because unaware of this product. If the founders had “listened” to their frames of reference, they would have never market their business idea which means that sometimes, to succeed, we have to guess the future, rely on luck and uncertainty as in a self-fulfilling prophecy which creates its own industry recipe.
Then, in order to be innovative and bring new ideas and new perspectives of thinking into a business, it is occasionally necessary to accept chaos during a limited period of time and take into consideration alternative ideas coming from counter realities. For instance, it could be interesting to incorporate employees from different departments in the companies' board of management. Likewise, persons with unconventional backgrounds, individuals from different industries as well as young people and women need to be integrated in the decision-making process.

### 2.2.2 Failures and Experimentations driving Innovation

Some [visionary companies] best moves were not by detailed strategic planning, but rather by experimentation, trial and error, opportunism, and – quite literally – accident" (Collins & al., 2004). The authors even consider these accidents as "purposeful". In fact, organizations willing to take risks to succeed can reap the benefits of their audacity and efforts by generating creations and innovations. Following the ideas of the naturalist Charles Darwin (1859) who argues that only species or entities adaptable to change can survive in time; Collins and his colleague believe that firms’ progress is evolutionary and starts with small incremental steps or mutations, often in the form of quickly seizing unexpected opportunities that eventually grow into major and often unanticipated strategic shifts. The authors name companies which discovered through failures, trials or accidentally new business opportunities such as Johnson & Johnson (J&J) and 3M.

Firstly, the strategy followed by J&J consists of building a multiplicity of creative projects at the same time. Most of them will not generate thriving creations or innovations. However, the few which will engender a marketable product or service will allow the firm to prosper. As a matter of fact, it is by accepting failures that J&J generates innovations: *Failure is our most important product* (Johnson, Former CEO of J&J, 1954).

Secondly, the company 3M publicly recognized that accepting risks and errors is part of their business strategy: *our company has, indeed, stumbled onto some of its new products. But never forget that you can only stumble if you're moving* (Richard Carlton, Former CEO of 3M, 1950). 3M developed systems to stimulate internal entrepreneurship, to reduce the product development phase and to accelerate time-to-market. "Although the invention of the Post-it note might have been somewhat accidental, the creation of the 3M environment that allowed it was anything but an accident" (Collins & al., 2004). For example, 3M introduced methods to encourage innovation such as the “15 percent rule" with which employees could use 15 percent of their time to develop initiatives or projects of their choice; or the "25 percent rule" in which 25 percent of annual sales need to stem from products and services conceived in the last five years.

According to Collins (2004), to create successful innovations, companies need to:
(1) Take their chance and give a try to their ideas even if eccentric. The entrepreneurial spirit leads to experimentation which can result in failures or successes. The objective is to maximize successes and minimize miscarriage.

(2) Accept that mistakes will be made to learn and move on faster than competition.

(3) Experiment in a piecemeal way until finding the innovation that will insure the company’s future in the long run.

(4) Give resources to their creative employees to implement their ideas notably time and space.

(5) Build a process, a system inciting employees to mobilize their skills towards creativity.

2.2.3 The Accidental Innovator

Accidents happen and sometimes bring progress through tremendous creations that are totally fortuitous. Many important innovations are the byproduct of accidents – the key is to be prepared for the unexpected (Austin, 2006). Therefore, organizations shall be ready to seize the opportunities that are offered to them even if those come from accidents. Austin points out that a surprising number of important discoveries and inventions are associated with stories about spillage, breakage, and other manner of unintended action that led to valuable, though unexpected, outcomes. This is the case, for instance for penicillin (Fleming) or photography (Daguerre).

Creativity is composed of two phenomena: Random Variation and Selective Retention (Donald Campbell & al., 1965). The first one helps us to create things we can't think of in advance and the second one allows us, thanks to experience and studies, to chose which output to give up or further develop given its potential value. Thus, designing a creative process accepting accidents can be a possible solution to drive creativity and innovation.

2.2.4 Risk Aversion

Nowadays, managers face pressure from their hierarchy and fear to make mistakes that could jeopardize their career. As a result, they tend to avoid taking risky and bold decisions. When
managers receive creative ideas from their staff, they generally don’t possess enough time to evaluate them thoroughly. Once they learn that implementing some ideas will necessitate resources in the long run and that return on investment will not be immediate, they are inclined to “kill” the idea even if perspectives of success were high. If they want to keep their hopes of advancement and their credibility within their organization, executives know that they can’t afford to make errors that cost results and time. Consequently, creativity is generally one of the main elements affected by personal interests and business imperatives.

The issue is that by relying on the past, notably on the previous successful business models and processes, firms may miss new trends and may be sanctioned for their excessive carefulness.

2.2.5 Is it Dangerous to be too Creative?

Creativity engenders Ideas. Ideas generate innovations that will improve the products portfolio of a firm or will create, with a good communication, the demand for a new market. New Products if successful, depending on the clients’ reaction, can insure the company’s survival in the long run.
On the one hand, organizations can hardly consider that being too creative is something negative. On the contrary, they are constantly searching for innovations and new ideas to implement. Accordingly, this situation, if faced by any company, shall be seen as a competitive advantage or to a lesser extent as an important asset that worth to be cultivated because of tremendous value. Firms need to manage to build a system inciting workers to be both creative and efficient in order to enhance the time-to-market. If they do so, it is likely that they will reap the benefits of their advantage in the medium or long term.

On the other hand, creativity can give rise to new products that may fail. If this situation occurs frequently, then companies encounter a serious problem meaning that their creative process or business model is not well designed to incorporate creativity or that creative people have difficulties to cooperate with the other organization’s employees. New products can also never “see the light” if the ideas, although good, are not correctly implemented.

Eventually, like always, organizations need to find a balance between taking too many risks and being too prudent. The case study of Sega will help to answer more in detail this difficult but interesting question.

2.3 Sega Case

Sega Corporation is a Japanese (initially American) multinational company with video game software and hardware, home computer and console manufacturing businesses in 1940. The founders of Sega are Martin Bromely, Irving Bromberg and James Humpert and their original headquarter was in Honolulu, Hawaii (segacom, 2008). A decade later, they moved their office to Tokyo and registered the “SERvice GAMES of Japan” name in 1952.

Sega had succeeded in arcades and home consoles in the beginning of starting their businesses, unfortunately they left the consumer console market in 2001 as their product was too creative at that moment and the industrial environment could not support. As a consequence, Sega changed their business strategies in 2002 and concentrated on video game software development for multiple platforms and was known as a “third-party publisher”.

After the death of CSK founder Isao Okawa (he spent over US$40 million to help Sega) in 2001, CSK sold Sega at auction. In 2003, Sammy bought 22% of shares from CSK and its chairman Hajime Satomi became the Sega CEO shortly. Since Sammy took over Sega, they started to centralize their focus on the cash-cow “arcade business” instead of its dog business (home software development). At the same year, they introduced a highly successful Sonic Heroes which is the first Sonic game for both the XBOX and the PS2 (PlayStation 2) platforms, and it is one of the most
successful games in Sega’s product portfolio.

In conclusion, if a firm created a product too creative but the market could not accept it or the industrial environment could not support it, then the product would not exist on the market for long.

Correspondingly, the organization needs not only to consider whether the internal R&D can be implemented but also have to care about external factors. If the creative product with advanced technology cannot be diffused smoothly within the related industries, then the product may be hardly profitable. Therefore, a company shall assess risks before starting to invest on creativity and innovation. As Sega case imparted us, being too creative might sometimes result in failure and let a firm go bankrupt. Nevertheless, other elements such as notably the rising of a powerful competition (Sony, Microsoft, Nintendo and Internet) can explain the situation undergone by Sega at end of the nineties and in the beginning of the twenty-first century.

3. Technology Life Cycle & Product Life Cycle

By minimizing the risks of their creative process, firms can achieve to handle meticulously and without mishaps the different stages of the Technology Life Cycle and Product Life Cycle.

The Technology Life Cycle and the Product Life Cycle are both important for high-tech firms to manage. Therefore, we will briefly present the difference between these two lifecycles. Therefore, the definition of the Technology Life Cycle and the Product Life Cycle are introduced in the beginning of this section. Then, how to manage the Product Life Cycle in High-Tech firms and two cases (iPods Classic and Consoles) are presented accordingly.

3.1 S-Curve and Technology Life Cycle

3.1.1 The S-Curve
The S-curve contains two meaningful dimensions for innovators. On the one hand, this concept deals with the diffusion of innovation and, on the other hand, with time and investments. Normally, latest technologies need time to become standards on the market and can difficulty compete with existing rivals. However, they can succeed even at the beginning on specific market niches. Typically, it takes time to improve the performance, to solve technical issues and to reduce costs. In the end, the new technology performance or costs may be the same or even surpass the existing rivals. As a matter of fact, improvements of new technology on the mature market are small, irregular and costly. Once the new technology becomes a reference, then, it is particularly difficult for the former technology to maintain its position on the market.

According to Luecke’s (2003) arguments, innovators need to be aware of three lessons when it comes to the S-curve concept:

1. When a new technology appears on the market, firms with current technology (also known as defenders) have difficulties to react. Threat, generation
2. Leaders with a specific technology cannot last forever.
3. Attackers (that is to say companies which hold a new technology) possess skills and assets that allow them to attract talent, to be free from the “tyranny of service markets,” and to avoid bureaucratic problems.

To understand these three lessons of the S-curve, innovators should follow certain guidelines. Firstly, knowing and considering where their companies and their core technologies are located on the S-curve. Secondly, they should invest in rival technologies especially those which are
considered promising by the market. Thirdly, they should define the strategies which they think are most important.

### 3.1.2 Technology Life Cycle

In the context of licensing technology, the developers and the acquirers basically adopt the Technology Life Cycle (TLC) as an important tool. Typically, there are four phases of TLC: development-R&D (early), ascent, maturity and decline. The TLC is usually associated with a product or technological service but is different from the Product Life Cycle (PLC). Nowadays, more and more leaders are concerned with their product on the market regarding the best time to launch it, the identification of the target market and the business costs. When a new technology is introduced on the market, its diffusion is usually carried out in a piecemeal way.

TLC consists of two main factors: time and costs of technological development. Moreover, TLC involves risks. Generally, the TLC can be lengthened or maximize via patents and trademarks.

What do companies need to pay attention to when they develop an innovative technology? Companies should be careful when they manage their patents during the early phase (R&D) of the TLC. If companies lose their core competence through the leakage of secret elements, then this may reduce the technology lifespan. If companies can protect their technology, they can build up certain barriers to sustain their competitive advantage.

1. The research and development (R&D) phase (bleeding edge): whatever the technology potential, at this stage risks are particularly high companies can either succeed or fail.
2. The ascent phase (leading edge): at this phase the technology has been proven its value in the marketplace while is still new and difficult to find knowledgeable staffs to carry out or sustain it.
3. The maturity phase: the technology at this phase is agreed by everyone with its particular solution and information.
4. The decline (decay phase): the technology value is declined by replacing of and improved state-of-the-art one and the old technology is no longer performed.
3.2 Product Life Cycle

The Product Life Cycle (PLC) constitutes a very important concept of this thesis. Therefore, we will address the four stages of a product life introduced by Vernon and we will see for each phase the importance of the competition, the evolution of the marketing mix (product, price, promotion and place), the nature of customers and the progression of sales and profits. This model can help companies to manage their products portfolio and decide when to launch a new product or when to stop offering a good on the market. This concept exists principally because, on the one hand customers’ needs and tastes change and on the other hand technologies evolve. However, managers using this tool must be careful as phases may vary functions of the industry or product. Furthermore, the PLC evolution depends strongly on competitors’ behaviors.

3.2.1 PLC Steps

The PLC begins with the product design during the development phase (R&D, Prototype and Experimentation) and ends with the decision to remove the product from the shelves. It is characterized by four main stages: introduction, growth, maturity and decline.
The product introduction on the market corresponds to the first PLC step. As the product is slowly released on the market, the growth during this period is considered as moderate and only comes from clients called “innovators” who comprise 2.5% of the population and a part of the early adopters (13.5%). Due to the absence or quasi non-existence of competitors, innovators will often have a period of monopoly and possess a first mover advantage until competitors start to imitate and/or improve their product. Profits during this stage are inclined to be negative as launching costs (R&D, raw materials and promotion) are superior to revenues. Marketing expenses are usually important in order to inform customers of the novelty and insure the product distribution in the maximum of outlets. The duration of this phase can vary and depend on the consumers’ response to the innovation. In addition, different factors may delay the growth on the market such as production problems, difficulties to find distribution channels, weak production capacity or existence of substitutes to the product. In general, prices following the introduction of a new good tend to be high but diverse pricing strategies are conceivable: upscale strategy (high prices and sizable promotion), penetration strategy (low prices and massive advertisement), down-market strategy (low prices and little promotion) or selective penetration strategy (high prices without important promotional expenses).

The second phase of PLC (Growth) will start if the new product meets a satisfactory demand and a positive word-of-mouth during the introduction stage. New competitors attracted by the optimistic development perspectives and by the rising sales will slowly enter the market and erode the pioneer’s market share. Regarding the distribution network, efforts are carried out to widen it with signatures of new partnerships on the domestic market and abroad. Moreover, to sustain growth durably and seduce a more exigent clientele such as the early adopters (13.5% of the population) or a part of the early majority (34%), companies facing growth need to enhance their product quality, broaden their range of products, continue the sales campaigns and slightly reduce
their prices. Habitually, all the actors present on the market see their turnover and profits increasing given the fact that the new product is strongly demanded. Therefore, the competition can be considered as moderate. The average prices tend to diminish during this period which entices a lot of new consumers. Sales rise rapidly and companies start to generate profits which allow them to maintain or increase their promotional expenses. Then, companies have the choice to take immediately advantage of the benefits obtained or can use the money to reinforce their position on the long term by augmenting the production capacity in response to the demand. The second solution implicates to sacrifice money on the short term in hopes of earning more at the next PLC stage.

The third stage of PLC appears when the product reaches maturity that is when the sales reach their maximum. Then, their rhythm is characterized by a slowdown. At this point, the product is easily accessible on the market (wide distribution) and well recognized by the population. In order to face the stronger competition and to maintain their market share, companies are pushed to reduce their prices and outsource a part of their production in low cost locations. This phase can last a long time. Indeed, most of consumer goods (notably food) stay mature as long as organizations manage to keep their current customers and seduce new ones. To revive sales and develop client’s loyalty, leaders can try to penetrate new segments of the market or modify the product by adding new features to improve its style and quality. They can also modify their market through a repositioning or adjust one of the 4P’s of the marketing mix. For example, they can minimize their promotional expenses with the only purpose to remind the product in their customer’s mind. During this PLC step, companies will attract first clients from the remaining “early majority” (34%) and then from the late majority (34 % also). Three kinds of maturity are possible: an increasing maturity characterized by a slowdown of sales; a saturation situation in which demand mainly comes from replacement sales; and a declining maturity in which consumers chose new or substitution products. As competitors continue to enter the market, competition becomes fierce and creates a production overcapacity. Consequently, only the strongest firms with the biggest market share will manage to survive in a market evolving towards an oligopolistic situation.

The decline constitutes the last phase of the PLC. Due to the product obsolescence, sales collapse and only few customers are still interested in the product. Laggards (19%) correspond to population members who don’t like change and novelties or are not aware of it. Thus, they are always the last to adopt new products. Production and distribution are rapidly reduced in response to profit margins decline and to face consumers’ vanishing demand. Developing countries become net importers and the production is realized in low costs locations. Everything is put in place to make some economies. This stage can be more or less fast depending on the products nature. For
example, technologic products such as mobile phones, Mp3 players or computers are likely to be replaced and disappear very quickly. The trend is similar with goods from the fashion industry. Sales decline can result from different factors such as technologic breakthroughs and innovations, changing customers’ tastes or habits, or the arrival of cheapest foreign products. As one goes along that profits disappear, some firms decide to leave the market. To keep their business profitable, the remaining companies tend to reduce their range of products, focus their distribution on the main channels, decrease their advertising budget, and cut their prices. Afterwards, the product exploitation is finally abandoned by all the organizations which marks the end of its life cycle. After another R&D period, a new product is launched and the cycle restarts.

### 3.2.2 Managing the Product Life Cycle in High-Tech Firms

In the PC industry, one model has approximately a product life cycle of 3 months and then a new upgraded one assembling higher capacities will be launched. On the one hand, PC is following software product development led by Microsoft or other key components’ progress such as Intel and AMD. Accordingly, once a new product or technology is created, computer makers are forced to upgrade their goods. On the other hand, the computer product life cycle is reduced against the fierce competition among competitors on purpose.

![Figure 25: Three elements of HP’s Marketing Strategies](image)

In general, HP’s Marketing Strategies are composed of three elements: customers’ feedback, competitors’ force and market analysis. They launched more models during Christmas and “Back to School” seasons due to the increase of market demand. This process is usually started from the Marketing Department and ends with the R&D achievement. In sum, HP’s Marketing Department is in charge of launching and removing products but the process cannot be completed if the R&D Department is not able to support it. Therefore, the R&D Department possesses a strong power to influence the product life cycle but the final decision remains in the hands of the Marketing Department.
According to Mrs. Perrufel, the creation of a new technology in one of FTO’s R&D entities necessitates between five to ten years. To support her point, she takes the example of the digital television on mobile phones. *We need this time to evaluate if there is a demand for such a technology, to test, to find industrial partners, to assess if the market can reach a future maturity.* They also have to design and conceive products and services around this new technology.

When it comes to the development of a new product, it takes in average less time. She indicates that the conception of a new product or service takes *three or four years*. This duration includes the research and exploration of ideas, the realization of a mock-up as well as phases of tests and implementation.

Later, products are launched on the market, throughout the year, during specific periods with the purpose of obtaining a balance in the sales. To reach this objective, Lombard has introduced in 2006 a concept called “the collections” imitating the fashion industry model. During this event organized three times a year which takes the appearance of a trade show, Orange unveils its last novelties that will become the trendy products and services of the coming months. The “collection” proposes an overview of the last moment and state-of-art innovations to selected customers and Medias. To address its new offer in the best possible manner to the public, Orange doesn’t hesitate to copy lateral industries’ best practices. For example, the car and fashion industries help to improve the introduction of products on the market. Besides, to attract new clients or new industrials, Orange implements appealing methods from the cinema industry such as awards ceremonies or the utilization of stars to increase the prestige of their products.

Concerning the average life cycle of FTO’s products, Micheline Perrufel specifies that in the Telecommunications industry, offers change every 18 to 24 month. In her view, Internet, mobile phones or landlines represent the products and therefore are seldom modified although they follow the innovation rhythm. For instance, FTO sells packages including a mobile phone and communications. It is more the offer of communications that changes and permits to animate the product life and to boost sales. Mobile phones remains mobile phones even if they are upgraded every six months with the last innovations (MP3 player, Camera, etc.).

Members of the Marketing Direction and of the Customer Relationship Direction are in charge of the decision, after a thorough analysis, to add or remove a product or service from the portfolio.
3.2.3 iPods Classic Case Study (Apple)

Apple launched its first iPods on the market in 2001. Since then, the American firm took another dimension and is considered by BusinessWeek as the first global innovative company in the period 2006-2008. Today, Apple holds a worldwide market share of 70% in the MP3 Player market with its iPods portfolio: Classic, Mini, Nano, Shuffle and Touch (france24.com, 2008). In September 2007, more than 150 million iPod units had been sold making it the best-selling MP3 player of the industry (apple.com, 2008).

With this case study, we aim to observe the lifecycle evolution of the iPods Classic between the first and sixth generation.

From one generation to another, prices tend to remain stable and iPods features are upgraded with additional memory and with the last innovations available. At the exception of the second revision, several models can be released within a generation. Since September 2007, Apple only sells the sixth generation of the iPod Classic.

![Figure 26: 6 iPod Classic Generations (mactracker.dreamhosters.com)](image)

From the previous table, one can learn that the production and distribution of a particular generation is done, in average, during 10 to 19 months until a new one starts. It also indicates that most of the iPods Classic are launched between July and October. This can explain why Apple sells essentially its products during the first quarter of each year. Indeed, creative people, early adopters, young adults and new technology chasers are rapidly attracted by the new Apple device but it is only after 5-6 months that the majority of customers decide to purchase the new digital device, notably during the Christmas season.
We can observe with this chart that the lifecycle of the iPods Classic tends to diminish given the fact that the first generation lasted 19 months and the fourth and fifth generations 12 months. It is likely that the sixth generation will follow this trend and be discontinued around the month of September 2008 that is when the seventh generation will be launched. The second generation appears in this framework as an exception which prevents us to totally generalize this observation. Nevertheless, we can note that the iPod Classic lifecycle is following a downward trend.

### 3.2.4 Case Study Consoles (Nintendo)

Firstly, a video game console is an interactive entertainment computer which differs from a personal computer and the machine is designed for consumers to use solely for playing video games. This case study is going to analyze Nintendo’s products, thus its company profile is introduced accordingly. Nintendo Company Ltd. is a Japanese multinational company founded by Fusajiro Yamauchi in Kyoto in 1889 (Nintendo.com, 2008). Its initial business was Japanese handmade playing cards and then it became a successful video game company competes with two other giant players, Sony (PS series) and Microsoft (XBOX series). Below figure demonstrates the worldwide sales volume of game consoles:

<table>
<thead>
<tr>
<th>Market</th>
<th>Nintendo Wii</th>
<th>Microsoft XBOX360</th>
<th>SONY PS3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>5.96</td>
<td>0.6</td>
<td>2.09</td>
</tr>
<tr>
<td>USA</td>
<td>11.14</td>
<td>11.72</td>
<td>4.88</td>
</tr>
<tr>
<td>Others</td>
<td>8.35</td>
<td>6.4</td>
<td>5.4</td>
</tr>
<tr>
<td>Total</td>
<td><strong>25.46</strong></td>
<td><strong>18.72</strong></td>
<td><strong>12.37</strong></td>
</tr>
</tbody>
</table>
Nintendo was acknowledged as the 7th most innovative corporation (BusinessWeek.com, 2008) and honored the 59th Annual Technology and Engineering Emmy Awards in this year. Then, Nintendo’s consoles (NES, SNES, N64, GCN, NDS, NDS Lite and Wii) of Product Life Cycles are analyzed as the following figure.

The chart is based on the period from the product launching year to next product available, hence they are nearly figures as some of the obsolete years are unavailable to get. Moreover, the Wii console is still on the market, thus its PLC cannot be measured. However, the perspective of growth is excellent and the Wii can last several years on the market. In conclusion, we can see from the above bar chart that the consoles’ Product Life Cycle inclines to decrease passing from height years to three years in only eighteen years.
4. Results and implications of the Thesis

In this section, first, we will express connections between the creative process and PLC according to what we find out from previous parts (II. Depicting the Creative Process of High-Tech Firms and III. Creative Process and PLC). Second, the paradox between these two processes will be addressed as well. Finally, we will give practical recommendations for leaders in high-tech companies.

4.1 Conceptualization of the Creative Process and PLC

4.1.1 Connections between the Creative Process and the PLC

4.1.1.1 Model of the Creative Process

First of all, the first outcome of this thesis is the conceptualization of a model representing our understanding of the creative process. The following figure depicts the model of the creative process:

![Figure 30: Model of the Creative Process](image)

In the beginning of the creative process, it is the Idea Generation stage which involves leaders, employees, customers, Governments and other stakeholders who participate and influence during this phase. The ideas come from the mind of anybody or from brainstormings organized in specific frameworks. Then, the second stage is the Idea Exploration in which creative people will filter and select those ideas considered potentially profitable.

The third stage is the Idea Experimentation which is associated labs, budget, mockup, tests and internal customers. After the second step, potentially profitable ideas will be experimented during this stage in labs. Moreover, the R&D budget shall be allocated to permit a small implementation of few prototypes and mockups which are tested by internal customers (partners, staff or suppliers) for obtaining feedback. Afterward, the comments received allow the firm to improve the product. The entire tests during the 3rd phase are quite confidential and the company normally signs contracts with internal customers to avoid any reveal. The final stage is the Idea Implementation which
involves R&D centers, factories, internal customers and the Marketing Department. A larger scale trial run is essential at this phase before launching the product. The Marketing Department starts to think about the 4P’s strategies, to select the market niche for the new creation and to decide the Target Market. During 4th step, the firm keeps R&D for the improvement until realizing the invention.

In conclusion, we believe that the creative process is composed of four stages and each phase is influenced by internal or external elements. Once the creative process is carried out successfully, it can increase the customer value on the market. As for the industrialization process, we consider it as outside of the creative process.

4.1.1.2 Paradox between the Creative Process and the PLC

The second main result of this thesis copes with the paradox between the creative process and the PLC.

On the one hand, if an organization achieves to design a successful creative process that is to say a process allowing a continuous release of new creative and innovative offers, then the company can lose control on the related products and services lifecycle. Indeed, by creating improved products, the firm is pushed to stop offering the current product on sale by different stakeholders (notably customers and employees) which consequently reduces its lifecycle. Competitors can minimize as well the possible benefits of the designed creative process as the launching of new products is generally decided in function of what rivals are doing. Furthermore, the creative destruction process has a propensity to punish the weakest companies for their low rhythm of creativity and innovation and to exclude them from the market.

<table>
<thead>
<tr>
<th>Effective Creative Process</th>
<th>Control of the PLC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of Control on the PLC</td>
<td>Better control of the PLC</td>
</tr>
<tr>
<td>Launching of new products (and Withdrawal of current products) decided by the Market</td>
<td>Launching of new products (and Withdrawal of current products) decided by the Firm</td>
</tr>
<tr>
<td>High impact of competition on firm’s decisions</td>
<td>Low impact of competition on firm’s decisions</td>
</tr>
<tr>
<td>&quot;Negative effect&quot; of the creative destruction process</td>
<td>&quot;Positive effect&quot; of the creative destruction process</td>
</tr>
</tbody>
</table>

Figure 31: Elements of the Paradox between the Creative Process and the PLC

On the other hand, if a firm manages to build a successful creative process, then the organization in question can better master its Product Life Cycle. Obviously, there are always elements that you cannot control such as clients’ reaction towards the new product even if studies were saying that customers would buy it. Nevertheless, these factors of uncertainty are part of any businesses and therefore, firms shall dare to take the audacious or risky decision to stop selling a
product earlier than planned or; on the contrary, to extend the lifecycle that had been initially decided. For instance, if an offer reaches a good phase of maturity and happens to be very profitable, leaders should not hesitate to end this product if they realize that they succeed to design an even better one. Perhaps, their company will lose money on the short term but this situation will be rapidly compensated by the launching of the new attractive product on the market. It is likely that this point can explain why Apple generally decides to stop selling a generation of products after only few months. As regards customers, although they were particularly interested to buy one of Apple’s products, they could not buy it for the simple reason that the offer was not available anymore. As regards competitors, their impact on other firms’ decisions is not systematically negative. Companies may benefit from their lack of audacity and their reluctance to take risks. Likewise, the creative destruction process may allow firms to save money by improving their learning curve and better manage the lifecycle evolution of their high-tech products. All these conditions tend to reinforce the attractiveness of the market towards the new product.

In addition, we will see later in the practical recommendations that releasing a new offer not only permit to master better the PLC but also has a tremendous impact on the motivation and happiness of the organization’s employees.

The best way to deal with this paradox consists of finding a balance between the two sides by building an effective creative process in which the firm can decide, at least a minimum, of the evolution of its products lifecycle.

4.1.2 Downward Trend of the PLC

An important point within this thesis concerned our will to demonstrate that the lifecycle of high-tech products was following a downward trend.

Correspondingly, to develop our idea, we examined the lifecycle of Nintendo’s consoles (NES, SNES, N64, GameCube, Wii) and we investigated the lifecycle of Apple’s iPods Classic (1st to 6th generation).

We conclude that the lifecycle of high-tech products tend to diminish but only in the long term. This evolution can be explained mainly by the creative process improvements (as seen in the paradox), the reduction of the time-to-market process and by customers’ fast changing choices.

However, our conclusion cannot be generalized in the short term as the lifecycle of a product can be longer than the precedent (as it is the case between the second and third generation of the iPod Classic). To reach this conclusion, we applied the falsification test (Popper, 1959) which
stipulates that whenever an observation diverges with the original proposition, then the establish conclusion cannot be considered as valid any longer and must be either discarded or adjusted. Accordingly, we answer partially our second research question.

4.1.3 Parallel between the Creative Process and PLC

The previous conceptualizations of the Creative Process, PLC and of their connections allow us to finally establish a parallel between the Creative Process and the PLC. The following chart constitutes our most advanced theoretical framework.

First of all, it worth mentioning that these two combinations of four stages constitute an ongoing process that never really stops. The PLC succeeds naturally to the creative process and vice-versa. In order to launch a new product on the high-tech industries markets, firms need to design a creative process constituted of four successive steps: Idea Generation, Idea Exploration, Idea Experimentation and Idea Implementation. After a period of industrialization, that is located in time between the creative process and the PLC; the product follows the four classic phases of its lifecycle: Introduction, Growth, Maturity and Decline.

Second, to design a new high-tech product, it can take in average between one to four years. This also means that the creative process can be shorter or longer. For instance, we learned through the different cases study that the idea exploration step lasts generally three months and that the time-to-market, which includes the idea experimentation, implementation and industrialization stages, is in average of 6 months.
Later, after the industrialization step, the brand-new high-tech product is released on the market and lasts in average between 10 and 30 months. Nevertheless, if we take the example of the iPod Classic which was launched in 2001, his lifecycle largely overruns thirty months.

Following the idea of our previous paradox, we can see that by building an effective creative process, high-tech organizations may achieve to master effectively their PLC. This parallel between the creative process and the PLC responds thoroughly to our first research question.

4.2 Practical Recommendations for Leaders

We suggest four practical recommendations that leaders of high-tech organizations can apply to enhance their activities. They shall maintain their organization as an open system, establish an implicit competitiveness between project teams, launch frequently new offers and avoid sanctions in a disproportional way towards team members whose project failed.

4.2.1 Open System

Our first practical recommendation consists of saying that companies should preserve an open system with their environment.

Firstly, firms need to study their industry in order to be aware of their competitors’ actions and can benchmark organizations from lateral industries so as to use their best business practices. For example, since 2005, Orange is using techniques from the Cinema, Automotive and Fashion
Secondly, observing customer’s usages on the market, receiving feedback from clients and detecting coming trends of the industry are not enough to generate business opportunities or to improve the business model. In fact, firms should accept cooperation and/or collaboration with most of their stakeholders. For instance, if high-tech organizations accept to work with some of their competitors, they will both gain new skills and know-how through knowledge transfers. This could help the two entities to build a competitive advantage on a specific market niche.

Thirdly, by building an open system, companies can integrate clients at the heart of their creative process. Given the strategic importance of the information exchanged, specific customers must be selected meticulously and sign a contract in order to minimize disclosure of confidential information. Then, technologic organizations can ask them to test a prototype during few days and gather their priceless comments considering the development stage of the product. This will allow them to enhance the product in terms of design, quality, ergonomics, etc.

### 4.2.2 Implicit Competitiveness between Project teams

Leaders need to build an internal environment encouraging in a gentle manner a “race” between employees working on creative projects.

To be effective, this implicit contest needs to be cultivated in time and most of all to be unwritten. The aim is to avoid that project team members stop sharing strategic information with their colleagues’ and start “shooting each other in the feet”. If executives succeed in designing this internal challenge within their creative process, important increases of workers’ productivity and efficiency could be obtained. Thus, the time-to-market can be shortened which permits to meet customers’ demand and lead competition.

Accordingly, the introduction of an internal system enhancing in an implied way the competitiveness of the project teams constitute our second managerial recommendation.

### 4.2.3 New Products or Services Offer

The analysis of our interview with an Engineer R&D from France Telecom allowed us to notice a phenomenon. Micheline Perrufel told us that FTO’s employees perceive the arrival of new products and services in their firm’s portfolio as a real pleasure. But what kind of practical recommendation can we draw from this idea?

Although they are working on interesting products, it seems that staff motivation decline after several months. If we take the example of Apple; when they released a device like the iPhone, their
workers felt proud and happy to be part of a world famous organization producing the last fashion mobile that everyone wanted. This boosted their intrinsic motivation. But in time, employees finished by falling again in a daily routine.

Therefore, to solve this issue, leaders should not hesitate to replace a profitable mature product by a new one. Perhaps, their firms will lose money in the short term but workers’ motivation will rise considerably which will generate new sources of revenues. However, the decision to remove a profitable product should only be taken if the firm already possesses “in stock” a new product ready to be launched and whose sales previsions are optimistic.

4.2.4 “Personal Sadness”

This phenomenon was also extracted from our interview with Mrs. Perrufel. She indicates that, whenever a creative project fails, team members are initially sanctioned with a “personal sadness” as they strongly believed in its perspectives of success. They have the feeling that they spent many time and efforts for nothing.

Therefore, we advise executives not to sanction more their employees, facing this kind of situation, than they already are. As a matter of fact, they can learn a lot from their mistake and help their company not to redo similar errors in the future.
CONCLUSION

To conclude on this thesis which deals with the creative process and the Product Life Cycle of high-tech firms, we are going to summarize the main ideas that we have developed and the main results that we found during this research work. In brief, we started to depict the creative process of high-tech firms; then, we examined the lifecycle evolution of the high-tech products and finally we explained some of the existing connections between the creative process and PLC. After a summary of the main ideas and results of this four months thesis, we will indicate directions to follow to further develop this topic.

Main ideas of the thesis

Firstly, not only differences between creativity and innovation but also between the creative process and the innovative process are explained. One considers that creativity represents an invention whereas innovation consists of improving something already existing.

Secondly, a multitude of actors participate and influence the creative process of high-tech firms. Moreover, resources need to be allocated to creative projects notably in terms of creative people, time and budget.

Thirdly, creative employees need to be lead in a specific way to provide their organization with new ideas. To foster a creative culture, leaders shall convey their vision towards all their staff. Furthermore, democratic and laissez-faire management styles are recommended when working with creative people.

Last but not least, many obstacles (time pressure, resistances to change, absence of freedom, lack of resources, absence of support from the hierarchy or from the whole organization, etc.) can impact on creativity. To build an effective and creative process, firms may need to take risks, experiment, accept errors and accidents.

Main results of the thesis

We conceptualized the creative process and the connections between the creative process and Product Life Cycle in order to respond to our first Research Question. The creative process is depicted in four stages: idea generation, idea exploration, idea experimentation and idea implementation. We found a paradox that firms may encounter and need to deal with when they managed to design an effective creative process. We highlighted the fact that the PLC of high-tech goods is following a downward trend in the long term to reply to our second research question. However, in the short run, this conclusion is partially valid.
Finally, we propose four recommendations that leaders from high-tech industries can apply to improve their organization’s creative process and help it to cope with the globalization and increasing competition. We advise executives to:

- maintain their corporation open to new opportunities notably from lateral industries;
- establish an implicit competitiveness between members of project teams to improve workers’ productivity and reduce the time-to-market;
- renew frequently their company’s portfolio of products and services to boost the intrinsic motivation of their employees even if this could result in a temporary loss of benefits;
- not sanction more members of creative projects which fail than they already are with their “Personal Sadness”.

**Further research on this topic**

We consider that deeper researches can be carried out on the connections between the creative process and the Product Life Cycle notably between the industrialization or production phase and the launching of the product or service on the market. Likewise, it is perhaps possible to generalize the downward trend followed in the long term by the lifecycle of high-tech products with other types of products. In addition, we noticed similarities between the creative process of firms from High-Tech industries and companies from the Fashion and Cinema industries that worth to be studied.
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Appendix: Fifty Phrases that Kill Creativity by Dave Dufour

Dave Dufour developed this list in the late 80s which is now spread to many corners of the web. These are typical phrases you'll hear in committee, staff and other supposed "brainstorming" sessions that end up going awry. These phrases eventually stifle any creative thinking in a group, because they destroy the part of brainstorming that allows good ideas to sprout from the offbeat or "bad" idea. People end up thinking alike, and usually stop contributing to the group because they can't be free to come up with ideas that don't get shot down.

1. Our place is different
2. We tried that before.
3. It costs too much.
4. That's not my job.
5. They're too busy to do that.
6. We don't have the time.
7. Not enough help.
8. It's a change too radical.
9. The staff will never buy it.
10. It's against company policy.
11. The union will scream.
12. That will run up our overhead.
13. We don't have the authority.
14. Let's get back to reality
15. That's not our problem.
16. I don't like the idea.
17. I'm not saying you're wrong but...
18. You're two years ahead of your time.
19. Now's not the right time.
20. It isn't in the budget.
21. Can't teach an old dog new tricks.
22. Good thought, but impractical.
23. Let's give it more thought.
24. We'll be the laughingstock of the industry.
25. Not that again.
26. Where'd you dig that one up?
27. We did alright without it before.
28. It's never been tried.
29. Let's put that one on the back burner for now.
30. Let's form a committee.
31. It won't work in our place.
32. The executive committee will never go for it.
33. I don't see the connection.
34. Let's all sleep on it.
35. It can't be done.
36. It's too much trouble to change.
37. It won't pay for itself.
38. It's impossible.
39. I know a person who tried it and got fired.
40. We've always done it this way.
41. We'd lose money in the long run.
42. Don't rock the boat.
43. That's what we can expect from the staff.
44. Has anyone else ever tried it?
45. Let's look into it further.
46. We'll have to answer to the stockholders.
47. Quit dreaming.
48. If it ain't broke, don't fix it.
49. That's too much ivory tower.
50. It's too much work.

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