Signs of a new S curve with Motorola?

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Abstract

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The current paper analyses aspects to generate innovation, both incremental and radical (O'Reilly and Tushman 2004). We analyse the Motorola's abilities to innovate before been acquired by Google and what happened by Google's acquisition.

We begin the study with a review of leading authors in innovation area (Christensen 1997, Christensen and Raynor 2003, Crossan and Apaydin 2010), passing to a company historic survey (Barbieri 2004), its trajectory along the time, key innovations, revenue in S format (Chandy and Tellis 2000, Foster 1986), going to the moment when Google acquired Motorola Mobility and what happened after it.

We concluded trough a historic analysis that the company is a systematic innovative enterprise, even though not enough to sustain its leadership and as well even to keep its longevity (De Geus 1997). And after its "death", when Motorola Mobility has been bought by Google, we see nowadays some signals (Day and Schoemaker 2006) that Motorola Mobility still is an innovative company, starting again to foster out a S curve format of innovation and revenue recovery.

Keywords: Innovation, radical, Motorola.

Introduction

How an innovative company such as Motorola has suffered an acquisition? The American Handset Manufacturer Motorola has a strong innovative brand built along its lifetime started by the beginning of century 20th. In fact it created many new product such as radio for automobile, the first mobile cellular, the equipment used for the astronauts to communicate from the moon, etc. whose ones could characterize a radical innovation (Christensen 1997). And as well

Motorola has implemented new practices such as the Six Sigma as a key quality reference (one defect in one million parts) and this attribute can also characterize the company such incremental innovator. Therefore, we could say the company is an ambidextrous innovative company (O'Reilly and Tushman 2004). By their studies, O'Reilly and Tushman (2004) the conclusion is that the companies have a called dynamic capability (Dosi and Teece 1993), which means they are able reconfigure its resources and adapt to a new environment and need. In other words it means a company to have both behaviors, efficiency focus and innovative, or focus on in incremental improvement and in jumps, or more radical innovation. Therefore this could a magic formula to increase a firm longevity. About longevity Ari De Geus (1997), when he was an executive of Shell, studied scenarios and foresight for companies to become more enduring and his conclusion can be summarized in 4 main points:

- The companies are sensitive to the environment where they are inserted in harmony with society,
- The companies are cohesive and there is a sense of belonging among their coworkers,
- The lived companies allow distributed powers and are more tolerant to limits, to errors, to outliers,
- The lived companies financial oriented, it means "when you have money you have free choice, not dependent to anyone; moreover, a company with a corporate healthy means a financial healthy but not the opposite;

In summary we see in the above statements behaviors are related to an innovative company according innovation authors such as Crossan and Apaydin (2010). But the initial question remains unanswered: how has Google acquired a so innovative (ambidextrous) company (Motorola)? What happened? Missed something in the path? We decided to search some signals to investigate better.

Methodology

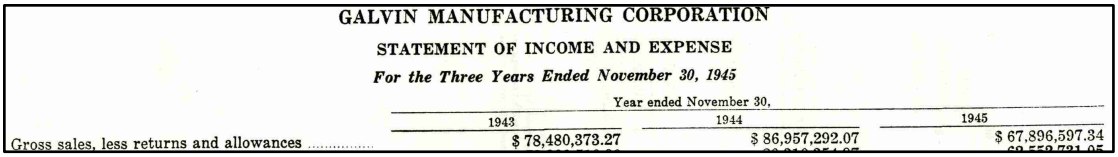
The research approach is qualitative. The qualitative approach has often been used in studies directed toward the understanding of human life in groups, in fields such as Sociology, Anthropology, Psychology and other Social Sciences. This approach has different meanings throughout the scientific evolution thought, but it can be argued, as a generic definition, that it covers studies that locate the world viewer, thus constituting a naturalistic and interpretative focus of reality (Bryman 1989). The qualitative approach offers three different possibilities to carry out a research: documentary research, case study and ethnography (Godoy 1995). For this paper documental analysis was chosen. The analysis technique to better understand the study in question is the case study, which is justified by the fact that it is proposed to study the determinant factors in an innovative organization, since this is a contemporary phenomenon whose events the investigator has no control. Yin (2003) states that the adoption of the case study method is suitable when there are questions such as "how" and "why" in the research, and it is a scientific research investigates a phenomenon in their real-life context, especially when the boundaries between phenomenon and context are not clearly defined; hence facing a situation technically unique, where there will be more variables of interest than data points. As a result, the case study method is based on multiple sources of evidence and benefits from the prior development of theoretical propositions to conduct data collection and analysis.

Barbieri (2004), through the Innovation Forum of FGV EAESP, developed a methodology for innovation case study, consisting of three steps:

- A company's timeline, that is, the historical survey of the major events possibly related to the construction of the innovative environment of the company, seeking to identify innovations carried out in the period; technical, economic and managerial events that somehow led to or conditioned the innovation in the enterprise;
- Survey the company employees about their perception of the innovation environment; in this case through statements given by company staff members and specialized analysts on the subject, or even by academic papers;
- Selection of interesting innovations and detailed study;

Considering that the interest of this study is to identify the determining factors of an innovative organization, the research strategy of this study was based on the methodology described above.
The object of the study, Motorola, was chosen intentionally for being recognizably innovative in the mobile communication sector, developing and supplying products and solutions in the areas of broadband, embedded systems, wireless networks and handsets. Motorola operates in a highly unstable market environment, where changes are constant (Tidd et al. 2005) and innovations become central for companies to have increasing levels of excellence and sustainable competitiveness.

Motorola case study – the innovative history



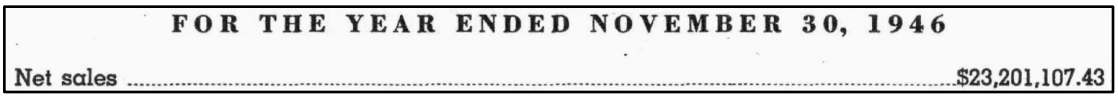
GALVIN MANUFACTURING CORPORATION

STATEMENT OF INCOME AND EXPENSE

For the Three Years Ended November 30, 1945

	Year ended November 30,		
	1943	1944	1945
Gross sales, less returns and allowances	$ 78,480,373.27	$ 86,957,292.07	$ 67,896,597.34

Figure 1: Motorola archives; Financial Report 1945
Source: Motorola (2012a)



FOR THE YEAR ENDED NOVEMBER 30, 1946

Net sales	$23,201,107.43

Figure 2: Motorola archives; Financial Report 1946
Source: Motorola (2012a)

Since the beginning of its history even when Motorola was not called Motorola it shows a lot of innovations in its history. As well also we can see since the beginning some aspects in the financial results (Figure 1 and 2) which shows "ups and downs" in the revenue starting to create an S curve. In a very fast change market such as technological environment it is typical the oscillation (Foster 1986).
In 1928 the brothers Paul and Joseph Galvin founded the Galvin Manufacturing Corporation in Chicago, Illinois, United States, an electronic company, with the intention to improve quality of life to people. They started with battery eliminator products going later with the idea to have a radio in the car. The name changed from Galvin Manufacturing occurred when they created a car radio, so the name Motorola comes from the words "motor" (of the cars) and "ola" frequent in that time as a suffix of sound (such as "victrola" or "crayola" or "granola") so Motorola could mean something like "sound in movement".
From then on, many incremental innovations were developed based on the car radio: in 1931, the company launched radios for public safety car use and in 1936, the radio to make police

broadcast streams, which functioned in specific frequencies, and enabled networked communication of specific groups of users. In 1939, radios were released focused on home entertainment. In the same year the company introduced the radios for two-way public safety, which enabled communication in both directions.

The handie-talkie SCR536 AM, a portable two-way radio, released in 1940, enabled the communication of US Army troops during World War II. Also in 1940, the company structured its research and development program, with the arrival of Daniel E. Noble (a pioneer and inventor in the areas of semiconductor and radio) who became the company research director of. In 1941, 13 years after the beginning of its activities, the company had already got sales of over $ 17 million dollars, indicating its commercial success. The Galvin Manufacturing Corporation (Motorola) recorded a significant sales increase in that time, going from $ 17.6 million (1941) to $ 86.9 million dollars (1944), almost 400%. In 1941, Motorola introduced its first FM two-way radio system, selling it to the private market and for the US armed forces, which were in the midst of World War II.

In 1943, Motorola launched the first portable two-way FM radio in the world, introducing a disruptive innovation (Christensen and Raynor 2003, Kim and Mauborgne 2005), because it created a new market. In 1943, the company made its initial public offering, with a price of $ 8.50 per share. The Galvin Manufacturing Corporation has recorded a sharp decline in the results of net sales, going from $ 67.9 million dollars in 1945 for $ 23.2 million dollars in 1946, with a 65% drop. Even so, it maintained its innovative status in the communications sector by launching the first automotive radio in 1946, resulting in an increase of more than 100% net sales in a year. The major innovation of that time would come in 1947, the year of the corporate name change to Motorola, with the commercial launch of the company's first television set, the Golden View VT71, with prices at $ 200 at the time, which led to increased sales at 280%, until 1950. More than 100,000 units were sold in the first year and in 1949 more than 3,000 TV sets a week were manufactured and sold. In 1949, Motorola began its research and development operations in semiconductor technology with a laboratory in Phoenix, Arizona, United States. In 1950, the Motorola started its international operations, starting a subsidiary in Canada, Motorola Canada Ltd. This installation produced radios and televisions, and in this time Motorola had 75% market share of car radios.

It is noticeable that Motorola´s latest innovation, television, could maintain sales growth trend of that period, even though this innovation was not radical, but incremental, in the face of its dissemination by the market, at a time when Motorola launched. In 1954, television and radio sets accounted for 70% of overall sales.

The first high-power transistor in the world, released by Motorola, did not result in increased sales results until the release of the next innovation, which was the first two-way vehicle radio (Motrac). In practice, both the transistor and the Motrac were improvements for the radio system and became incremental innovations.

It is worth noting that in 1953 the Motorola Foundation was created, an organization that connected the Motorola to the best universities in the United States, for research and educational projects. In 1956, Robert W. Galvin, son of founder Paul V. Galvin, became the company President.

As to international operations, in 1959 the company created the Motorola International Corporation with headquarters in Zurich, Switzerland, to conduct licensing and manufacturing activities in international markets. The first rectangular tube shape color TV in the world

released by Motorola in 1963 resulted in an increase in sales results until 1966. In 1964, Robert W. Galvin became the board of director's chairman and CEO.

In 1967, Motorola expanded its operations to Australia, France, Hong Kong, Israel, Italy, Japan, Malaysia, Mexico, Puerto Rico, South Korea, Taiwan, United Kingdom and Germany. In 1970 Motorola formed the SABA to recognize relevant technical employee contributions considered exceptionally creative. In 1974, Motorola spins-off its television units, including the popular Quasar brand. Motorola needed 11 years of research (1973 to 1983) and a US$ 100 million investment in R&D to launch a big change in people's communication: the mobile phone, a disruptive innovation (Christensen and Raynor 2003), which began with a lower voice quality in comparison to landlines, serving less demanding customers, but offering the convenience of mobility, creating a new consumer market and setting a performance new track record. The sales results increased from US$ 1.3 billion to US$ 5.5 billion.

In this way, the results were leveraged, especially by the great acceptance of the innovations created, mainly the mobile phone, the two-way radios and electronic components as well as a series of incremental innovations as Motrac (car radio data system) and the microprocessor MC6800 (used for automotive applications and entertainment). A new period of growth of net sales started in 1986, with the process of six-sigma quality improvement (6 σ). In statistics, the Greek letter sigma (σ) determines the failure rate. The default used for midsize businesses in the United States is three-sigma (3 σ), corresponding to 1% of failures per million procedures, which represents 10,000 failures. However high-quality corporations and high levels of customer satisfaction, have three or four crashes per million procedures, equivalent to 6 σ. From then onwards, Motorola established as a quality goal the attainment of 6σ until 1993. During this period, the company also focused on continuous improvement of their processes and product quality (Dewar and Dutton 1986, Ettlie and Bridges 1984, Freeman 1982, Imai 1988), characterized as a period of exploitation and operational efficiency (Benner and Tushman 2003). The word exploitation in this case refers to the exploration of internal resources to the company. Currently, numerous companies adopt the system six-sigma with its dissemination after General Electric announcing the largest profit in its history, in 1997, two years after implementation of this process.

From 1990, Motorola directed its research for the digital telecommunications system, introducing HDTV standards for television and the GSM standard for mobile phones, culminating with the trade of the iDEN digital radio standard. The digital standard in radio communication is considered a radical innovation, because it replaced the analog standard, which existed previously. The tendency of decreasing the weight and size of mobile phones, like the launch of the MicroTac in 1989, becomes an incremental innovation, because the mobile phone functionality is not changed.

With the strategic focus in the use of the 6σ tool and the disruptive innovations introduced during this period, the company achieved a balance in the application of its strategies of exploitation and exploration (Corso and Pellegrini 2007, Tushman and Benner 2003). In 1986, William J. Weisz (former COO) becomes the company CEO, replacing Robert Galvin. William remained as the CEO for two years and was replaced by George M. Fisher in 1988. In the same year, the company received the Malcolm Baldrige National Quality Award, an award bestowed by the US Congress to manufacturers of high quality products and practitioner of best practices and quality processes.

On the whole, incremental innovations occurred in the period from 1999 to 2007, because if on the one hand the innovations added functionalities, on the other hand it improved the performance of existing Motorola telecommunications equipment.
In 2004, with the introduction of the mobile device model RAZR (V3), which won first place in sales worldwide and for 13 consecutive quarters was the best-selling mobile in the US, there were incremental innovation in terms of product design, which then became the dominant design. In addition, Motorola introduced the radio functionality in mobile phones with Push-to-Talk (PTT). Also in 2004, two important facts in the company's evolution happened: firstly the semiconductor sector spin-off, thus creating the independent company, Freescale. Secondly, Edward J. Zander takes over as CEO. In 2004, in a ceremony at the White House, the Chairman and CEO of Motorola, received from the American President the National Medal of technology, the highest honor in the United States in terms of technological innovation in the business world (Prnews 2004). In 2007, Motorola was awarded the Best Corporate Citizen in the United States, focused on performance in governance, environment, community and employment practices. The 2007 ranking marked the second year in a row that Motorola achieved the fourth position on the list and the fourth time that the company appeared amongst the top ten, in a clear demonstration of the company's concern with the staff and with the external environment.

Ambidexterity - Google acquires Motorola Mobility in 2011

On August 15, 2011 a surprising piece of news is broken in the major news websites and media vehicles, such as Wall Street Journal, Financial Times, Techcrunch, Mashable, BBC, etc.: Google buys Motorola, along with many speculations about what would be the driving force. In one of the main analyses and justifications (Bosker 2011) the central motivator would be the purchase of patents. It is well known that Motorola has always had a systematic policy of innovation and patent generation, with over 17,000 patents approved plus 7,000 in approval process, resulting therefore in a volume of 24,000 patents. Could this be a form for Google to be on the mobile phone market and shield against the numerous processes for breach of patent. Now Google wouldn't be breaking patents, and thus more than 40 lawsuits from Apple, Microsoft and Oracle against Google were filed immediately. Bosker (2011) also analyses the inclusion of Google in the mobile world, enabling its use as a social network (Google+) or enabling bill payments through Google Wallet, or even having control of the user's geographical location. In addition, it must be highlighted the construction and development of Google's operating system platform: Android. For its development in 2007 the Open Handset Alliance was created (OHAa 2012), a consortium of 84 companies (OHAb 2012), whose one of the founding companies of the OHA was Motorola. We can analyze all this ecosystem as an integrated system across a supply chain making Google's operating system, Android, or to generates innovation trough a open innovation network (Chesbrough 2010, Sakamoto et al. 2011). As examples of mobile handset manufacturers: Samsung, LG, HTC, etc. With the Motorola acquisition in 2011 Google becomes the owner of one of the elements of the supply chain, with, at least, the possibility to pressure the other chain links, whether in order to streamline processes, or to reduce costs, and in various aspects of the chain control. In their history, it can be noted a mixed policy of incremental and radical product innovations, and another radical innovation through the hardware acquisition by a software developer. This form is an invocation of ambidexterity (O'Reilly and Tushman 2004). The ambidextrous organization analysis and the effect of incremental and radical innovations in some moments of the story reflect on what Foster (1986) termed as the "S" curve, seen in the next 9 charts showing a growth trajectory period (Figure 3).

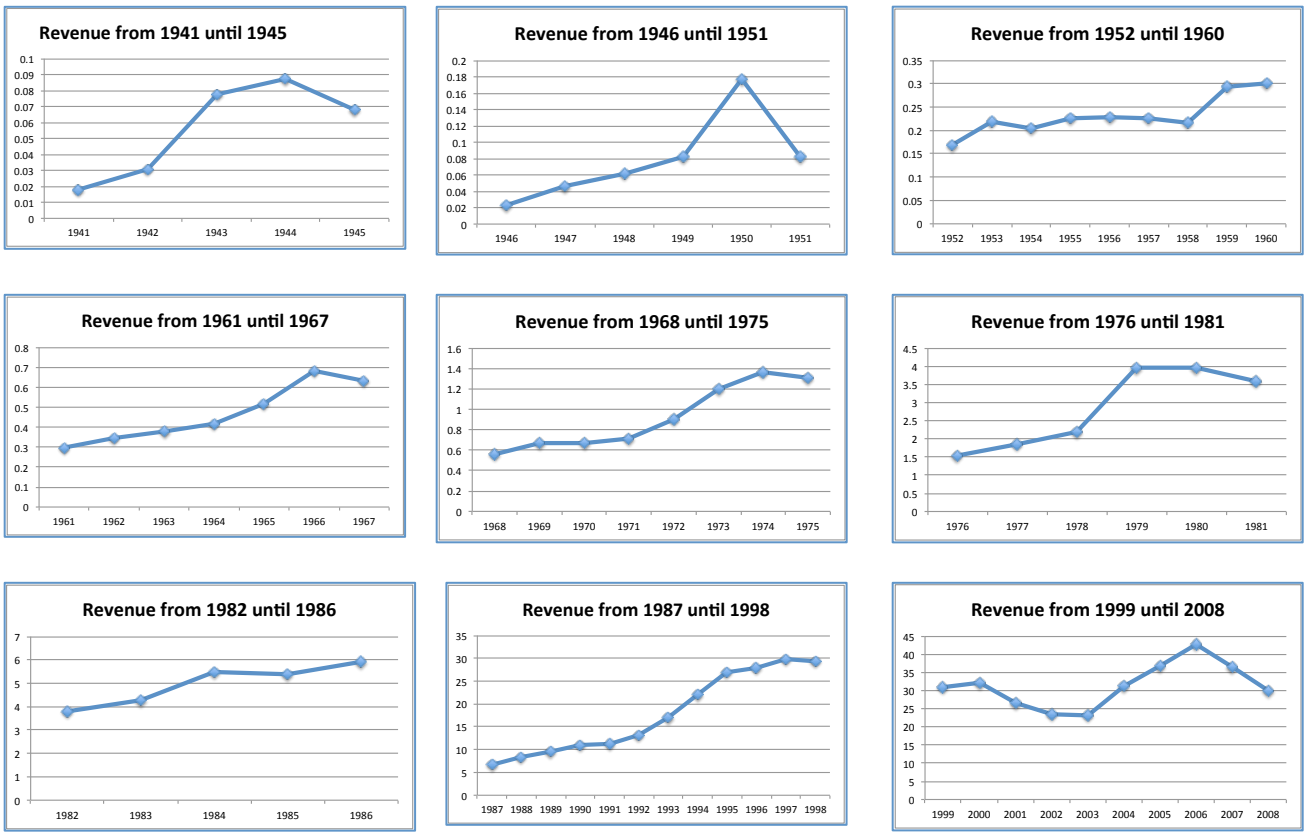


Figure 3: Motorola Revenue presented in "S Curve" from 1941 until 2008
Source: Motorola (2012a)

The next 4 charts (Figure 4) represent the period of turbulence, when Motorola has split in two independent businesses, spin off and sells Motorola Mobility (MMI) Company to Google.

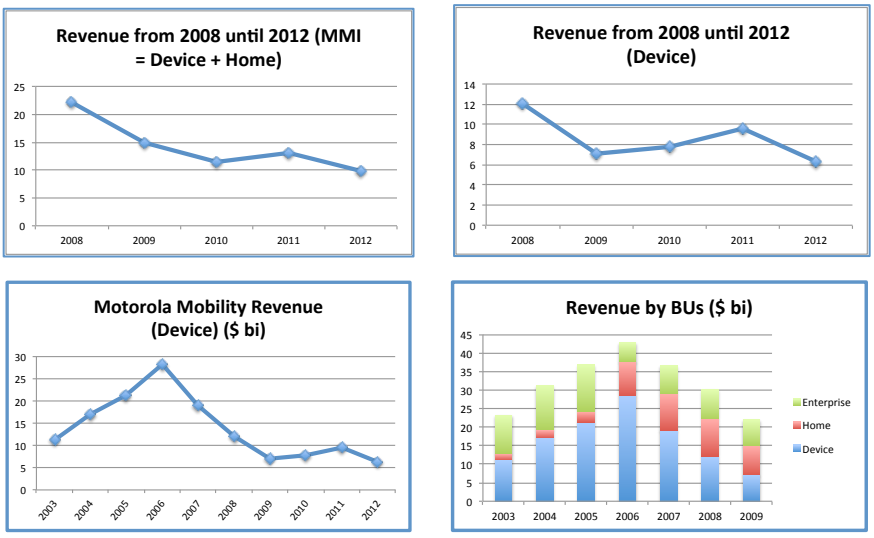


Figure 4: Motorola Revenue presented in "S Curve" from 2008 until 2012
Source: Motorola (2012a)

When we observe the last two charts in the figure 4 we clearly face the strong fall of revenue. We can follow the same fall in the chart of global market share of mobile devices (Figure 5). In

2006 Motorola had the second place behind Nokia, and year after year it lost positions in the global ranking. The very fast and aggressive mobile market created a lot if victims, those were not connected to the market and did not launched fast and appropriated products. We see the decline of others manufacturers such as Nokia, RIM, Sony. In ascension Samsung, Apple and many others device manufacturer, which use Android Operating Systems, such as HTC, Google, since is currently dominating the market.

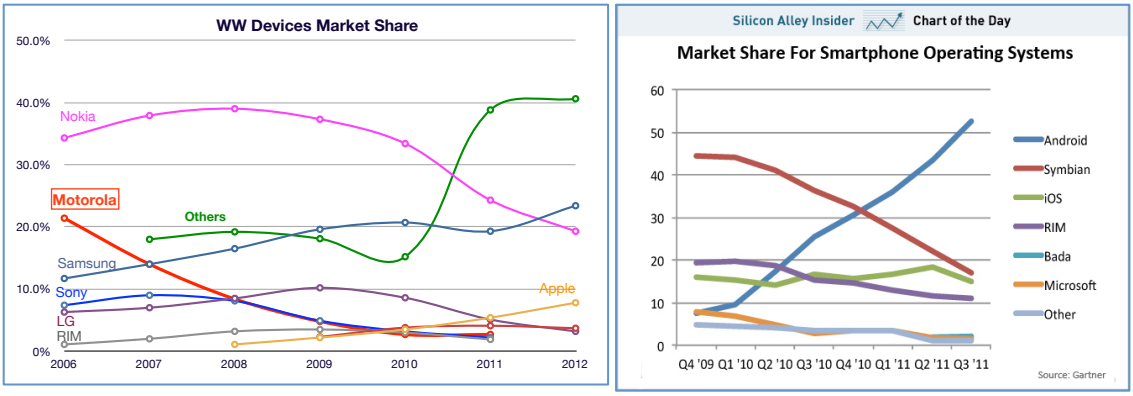


Figure 5: Global Mobile Device and Mobile Operating System Market Share
Source: Teleco Website (2012) and Gartner apud Andersen (2013) Adapted by Authors

So, what happened from 2006 until 2012? From the Motorola 2006 Financial Statement (MOTOROLAa 2012) we see the results were very good in 2006. All the divisions had good results; the unique perceived sign is there is no plan or intention about device business (at least declared in the 10K Report's CEO future vision page). This could mean a sign of mislead of leadership second place in mobile business or it could mean Motorola did not have a mechanism to evaluate the environment such as a filter to read even weak signals (Ilmolaa and Kuusib 2006) from the market, including competitors. But the point is Motorola had a "predictor market" (Burnham 2012). Analyzing the results ratio from 2006-2007, 2007-2008, 2008-2009 we see the Device Business Unit revenue has felt 33%, 36%, 41% respectively, which makes the device BU revenue represents 66%, 52%, 40% and 32% respectively to the years 2006, 2007, 2008 and 2009 out of the total Motorola revenue. One interesting point is that during almost three years (2005, 2006 and 2007) Motorola just launched few (or one) mobile devices (MOTOROLAb 2012). In 2010 Motorola has been split in two main businesses and in 2011 Google acquired Motorola Mobility focus of our study. So again, what happened with so innovative company?
In a research with more than 300 global executives Day and Schoemaker (2006) said, "more than 80% felt that their organizations had less capacity for peripheral vision than they would need". Schoemaker, Day and Snyder in recent paper (2012) discuss about weak signals, and scenario planning proposing a strategic radar creation in order to avoid threats and capture emerging opportunities. Also Ghemawat (2010) suggests phases to generate scenarios about future:

1. Information Collection
2. Establishing boundaries
3. Identifying group of participants
4. Understanding the negotiation power to group level
5. Thinking dynamically
6. Adapting and shaping the business scenario

Another perspective we can add analyzing the peripheral vision and weak signals (Day Schoemaker 2004) reading as a process of knowledge creation (Nonaka Takeuchi 1997) or transfer. Knowledge transfer (Szulanski 1996) we can split it in three dimensions: 1st, a formal and intentional knowledge exchange, 2nd, unintentional knowledge transfer, also called spillover (Mesquita et al. 2008), and the 3rd one, when the knowledge transferred intention is not the original and planed one, also called externality. Other strong concept can be used to evaluate the company ability to read the market signals is the absorptive capacity (Cohen and Levinthal 1990), where the authors propose the companies are able to recognize the value of a new knowledge (external to the company), absorb and apply it internally. As precedent: path dependency, knowledge base (repertory), knowledge complexity, appropriability (barriers such as patents), technological opportunity, knowledge amount and appropriate routines to occur the process (Nelson and Winter 1982). And as an outcome of knowledge transfer Tsai's study (2001) confirms the hypothesis that information sharing and knowledge drives to more innovation and better company performance (Damanpour and Evan 1984, Di Serio and Vasconcellos 2009). And last but not least, considering the companies today are more and more dependent of others in a network environment we could suppose Motorola is in many networks and could read the signals. About this specific circumstance, Hansen (1999) affirms that the more complex is the knowledge to be transferred more the ties need to be strong.

Coming back to Motorola last years' performance, after the turbulence of years 2006, 2007, 2008 and 2009, we realize in the years 2010 and 2011 they start to recover a growth curve! Therefore, despite the new fall in 2012 can we read this positive signal as a new S curve; and it may be a new innovative period?

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