IBM - a century of leadership in technology

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Abstract: *Established in 1911, IBM is an example of leadership in technology. IBM has been linked since the beginning of computing, being the company that invented the tabs (forerunner of the current computer). In 2012, IBM ranked No. 2 in the U.S. in terms of number of employees (435,000 worldwide, 100,000 in the United States). IT vertical market is characterized by a very important contribution to innovation and, therefore, the rankings are very dynamic field. IBM was able to create a value system in the organization and also a leadership system, thus managing to retain its leading position in the market.*

Key words: IBM, technology, leadership

1.Introduction

Google, Apple and Facebook attract all eyes in the tech audience lately, but the ease of using the latest technologies is mainly due to IBM, the American IT giant that recently celebrated 100 years of life. Automated gestures for us, like saving a file on our laptops, withdrawing money from cash machines and even scanning goods we bought are all due to IBM. More than that, we simply cannot refrain from asking ourselves what would Google be without the PC or how would Groupon look like without the bar code.

IBM launched the magnetic hard drive during 1956. It also launched the removable disk during 1971 and the bar code during 1960, plus the processing systems that allow ATM transactions. At the same time, IBM also created the magnetic tape technology that is still used today for magnetic cards.

For a large chunk of the twentieth century, IBM was the raw model of a dominant paternalistic corporation. Also IBM was among the first companies that granted its employees paid leaves of absence and life insurances. The corporate giant set "socialization clubs" for the employees several generations before Google started to offer massage sessions and free meals.

According to a recent study carried out within the US boundaries, only 13 percent of the companies succeed in getting over the ten years of activity threshold. According to another study, only 16 companies of those alive by the end of 1911 (the year when IBM was founded) are still alive. One century of outstanding activity stands as proof for leadership and values maintained and transferred for more than four generations. Even more, it proves an outstanding appetite for change. IBM invented the Personal Computer (PC), but gave it up when the personal computer became a commodity and couldn't generate added value anymore. After giving up its PC business, the company was able to completely reinvent itself, as today IBM mainly targets the software and services business area.

This paper highlights the most important moments in the IBM history.

2.Milestones from IBM history of leadership

2.1. The Watson era

Over the past century IBM has transformed the way we record, compute and process information – changing forever business, science, engineering, government, and leisure. Far more than any other firm, IBM created the IT revolution. Its history includes punch card tabulation, entrance into computing, and the transformative IBM hardware (IBM 650, IBM 1401, System/360) and software (FORTRAN, SABRE, IMS) that changed the world.

By the beginning of its life, IBM manufactured weighing machines, cheese slicing devices and machines that could read card stored data, an important element for what would eventually IBM mean. Today such machineries may seem completely worthless, but they represented true sophisticated technologies for that era.

In the beginnings, the human force behind the company was Thomas J Watson Sr., a very demanding manager that standardized everything, from the employees' dressing code at work to their creativity.

Thomas John Watson Sr. (1874-1956) was the company's president that put IBM on a continuous growth path between 1914 and 1956, when the company became an

international business force. Watson developed a management brand and a unique culture within IBM, thus changing it into an extremely effective organization that operated computing machinery based on punched cards. Watson condensed his management philosophy with a single-word motto: "THINK". Actually, on June 6th, 1935, the motto became the first US registered trademark for IBM, described as "periodical publications". The IBM name was trademarked only fourteen years later. A biographical story published in 1940 said that "the word is shown on walls in every single room inside IBM. Each employee has a notebook with the word THINK labeled on it, where he or she writes down ideas. All the consumables, matches and documents are THINK labeled. Employees even receive a monthly magazine called "Think"".

On of Watson's favorite and famous quotes was "All the problems of the world could be settled easily, if men were only willing to think." THINK remains even today an important element of IBM's culture. The motto was also used during the marketing campaigns carried out by the company to promote its notebook line of products, IBM ThinkPad.

Watson understood that one of his most important tasks as manager was to link all the components within the organization between themselves, not just operationally, but also as a common set of beliefs and processes.

We speak today of this aspect as being "corporate culture", the way Professor Edgar Schein (MIT Sloan School) defined as " a set of basic tacit assumptions about how the world is and ought to be that is shared by a set of people and determines their perceptions, thoughts, feelings and, to some degree, their overt behavior."

Today Watson is seen as the first organizational leader that convincingly and knowingly took steps toward generating a culture within his company.

THINK may have been the main idea, yet it made only for an aspect of IBM culture. The company developed over years and official set of so-called Basic Beliefs that were conceived to guide employees in behavioral terms:

- Respect for the individual
- Best worldwide services for customers
- Excellence

Standing itself truthful to principles like continuous reviewing and placing great importance on basic beliefs, by the end of 2003, IBM reviewed and reformulated its basic values.

"We believe an organization will stand out only if it is willing to take on seemingly impossible tasks," Thomas J. Watson Jr. explained to a Columbia University audience in 1962. Those "who set out to do what others say cannot be done are the ones who make the discoveries, produce the inventions, and move the world ahead."

Another leader of IBM was Thomas J. Watson Jr. Thomas J. Watson Jr. was chairman and chief executive officer during IBM's most booming period of growth. He led the company from the age of mechanical tabulators and typewriters into the computer era.

During his leadership, IBM grew from a medium-sized business to one of the dozen largest industrial corporations in the world. When Mr. Watson became CEO in 1956, IBM employed 72,500 people and had a gross income of $892 million. When he stepped down in 1971, employees numbered more than 270,000 and gross revenue was $8.3 billion. Fortune magazine once called him "the

greatest capitalist who ever lived."

Thomas Watson Sr. and Thomas Watson Jr. pointed IBM toward the computer age, as IBM machinery were used everywhere where computing was needed, from banking transactions to space launches. WWII meant a boom for the company, which used significant resources to keep its dominant share on the market.

2.2. The Sixties

By the end of 1960's, the American corporation was the only Top 10 Fortune 500 high-tech company, as a result of up to USD 5 billion in investments made for developing a wide range of computers to be used for the development of companies.

On April 7th, 1964, Thomas Watson Jr., IBM CEO, officially launched the System/360 mainframe line of computers, and said, during a press conference, that "the product means the beginning of a new generation, not only for computers, but also for business, academic and governmental applications." And he was right. Market pundits now say that System/360 represent one of the most important industrial achievements. During the following five decades, the 360 off springs – mainframe computers, like IBM zEnterprise now – made possible the code bar creation, ATMs, electronic trades, online ticket bookings, weather modelling and other inventions that changed the world we live in. Over 70 percent of the data belonging to an organization is currently stored on mainframes. Likewise, some 71 percent of the Fortune 500 companies are operating their business via a mainframe computer.

The 1964 IBM System/360 computer opened up the mainframe age. At the time it was the largest private investment made by a company for technological development. It was a huge effort IBM made during the sixties in order to find solutions for a paradigm shift related to data and information processing inside companies. This is one of our company's characteristics, as every time we see a need emerging, we allocate important resources for the trends with high potential of (re)generating significant values for the society we live in. After more than 50 years, mainframes are today a perfectly viable platform, which is widely used with significant results.

As we try to describe the mainframes in figures, we should mention:

- 92 out of Top 100 banks in the world use the mainframe for supplying customers with at-your-fingertip financial;
- 23 out of Top 25 trade companies in the world use the mainframe for ensuring the delivery of client customized services;
- 9 out of Top 10 insurers in the world use mainframe based cloud in order to save their customers money;
- more than 225 states and local administrations worldwide count on the mainframe for supporting police and firefighting departments, waste collection, hospital and public parks management.

2.3. The 70s and the 80s

During the 1970s and the 1980s, IBM had become the preferred supplier of computers for a large number of leader companies in the world. It reached an outstanding market share of some 60 percent. The company designed its computers according to standards developed internally. Consequently, the machines were incompatible with computers

manufactured by others. IBM offered big, fast and reliable computers that performed tasks unknown for any other equipment: maintaining accountancy logs, billing and market bordereaux writing. Such large computing operations were performed by autonomous and stand-alone units set into special insulated and acclimatized rooms. They were called central units. Although capital expenditures for such equipment were quite large – they stood, for example, at over GBP 1 million for a medium size computer – IBM clients were achieving substantial levels of savings in terms of the number of computers used, their reliability and the data processing speed. Yet, above all, a call for IBM services meant cutting down the risks taken by customers: "Nobody has ever been fired for buying an IBM computer". Thus, IBM dominated the market and reached some 60 percent of profits from selling central units.

As the years went by, a large percent of small sized computers became worldwide integrated to such an extent that IBM had no more a realistic view upon the profitability of computer components market: for example, the company took first measures to separate its AS/400 medium size computers manufacturing division only by 1993. In order to apply such measures, IBM had to make changes inside its enterprise culture and, at the same time, invent whole new control and reporting systems. By 1994, IBM was so satisfied with the success registered by the AS/400 range of computers that it began expanding the specialization process upon other product ranges worldwide.

Considering itself as a large company, IBM worked according to a stability policy in terms of shareholder dividends. It also had in place well defined staff and professional development procedures. For example, IBM took pride in the fact that it never forcefully licensed its employees. Mirroring the dominant position of the company on the global electronic equipment market, IBM culture was portrayed by lack of formality and absolute trust in the company's capabilities and internal resources.

2.4. The personal computer market development

By the end of the 70s and the 80s, the worldwide computer market witnessed a distinctive parallel evolution, as personal small size computers were created, with names like Osborne, Commodore and Sinclair. Unlike previous years, IBM kept an arrogant technical distance. It also adopted a vision where the personal computer market was very small, while such devices would never reach a stage where they could solve problems central processing units were solving. Some of these small computing devices were built based on microprocessors and common data processing alghoritms. Although none of these had the ability to solve any of the complex computing tasks of the central processing units, the personal computer market witnessed a fast development – with percentages reaching more than 100 percent for certain periods of time. By the end of the 1970s, IBM finally noticed the trend and decided to launch its own personal computer on the market.

As the internal operational structure of the company was too big, too slow and too integrated, IBM chose to found a wholly separated and new subsidiary for manufacturing and selling its first personal computer. More than that, IBM decided not to use its

own microprocessors and operating systems, chosing instead to buy such components from a large American microprocessor manufacturer, Intel, and, accordingly, from an American unknown software programming company called Microsoft. IBM encouraged both Intel and Microsoft to develop their products according to standards, as it considered that through standardization at the worldwide level it will provide the best service both for the suppliers and for PC buyers. IBM was proud of becoming the worldwide refference standard for both the niche market and for the larger central processing units market. The "IBM compatible" mark become the accustomary standard for most PCs, excepting the Apple manufactured devices.

During the 80s, when the company began facing dramatic changes within the technological environment, doubled by red tape stiffling innovation, IBM entered a downward path. By 1981, the company launched its personal computer, which only registered market success once IBM called Microsoft, a start-up company at the time, for hekp in terms of software. Shortly afterwards, IBM found itself captive inside a market it created, as the company completely depended upon Intel for processing units and upon Microsoft for software. Consequently, the company became vulnerable once the PC industry began to expand explosively. The technology inside the PC was more important than the wrapping, and IBM had no intellectual property rights for the inside of its own machines. Even more, the development of smaller computers that roughly performed the same tasks as IBM computers considerably thinned IBM's main source of income. Subsequently, the company was forced to go into massive layoffs.

2.5. The 90s

By mid 1990s, IBM found itself on the brink of a crash. Corporate strategy is important, as it approaches major and fundamental issues, which influence the future of the organizations. When an organization makes serious mistakes in terms of corporate strategy, it will stand consequences, thus risking, perhaps, even its own survival. With a correct strategy, the organization fully benefits from its outcomes. The corporate strategy refers to the whole organization. It covers all areas and functions of the economic entity by taking over best practices registered with every component and combining them to generate something larger than their sum (Lynch, 2006). IBM enjoyed a certain level of success, but was slow and full of red tape in terms of involving the organization as a whole into strategic decision making.

Between 1991 and 1993, IBM, as the world's largest computer manufacturer, suffered net losses amounting to billions of USD – one of the most important corporate profit crisis ever registered. Still, IBM continued benefit from an excellent reputation, to hold a dominant market share, to have exquisite personnel policies and reliable products (perhaps among the most innovative), to nurture close relationships with governments in different parts of the world, to issue responsible community policies on local and national levels, to register a sound financial position and to invest extensively in modern manufacturing facilities worldwide. Its main problem largely came from a corporate strategy failure.

2.6. The technologic progress

During the above mention period of time, world economies had minor influence

upon such evolution. The computer markets were essentially fueled by innovation, new ideas and changes to the extent that they were not influenced by individual national economic difficulties.

The competitors saw that the IBM-compatible standardization contributed to the market expansion. Yet, sales continued to grow also due to technological progress, aggressive marketing promotions and the emergence of low manufacturing cost economies like Taiwan and Singapore. Added to that, innovative companies like Sun Microsystems identified ways to expand small computers capabilities, by means of inventing workstations and computer networks. Microprocessors became more powerful, while software programs became more sophisticated. By mid 1980s, personal computers began to perform tasks previously performed only by smaller size central processing units.

2.7. Marketing and services innovations

During the 1980s, personal computers became more reliable. Consequently, IBM's quality and reliability brand began losing importance. Personal computers could now be sold, deployed and maintained without resourcing to IBM's vast and expensive service structure. They could be even sold via postal orders, with technical support granted by specialized operators – an innovation that belongs to Dell Computers. Such dedicated companies had smaller costs than IBM suppliers, with less overhead expenses, while offering the same quality like IBM. Due to their smaller size, they could also react faster at market shifts.

IBM and other computer manufacturers continued to use their funds for attributing trademarks to their products. Accordingly, their suppliers began to spend considerable amounts of money on such items.

By the beginning of the 1990s, IBM's dominance gradually began to soften. We should mention here that other computer manufacturers, like Olivetti from Italy, DEC from the United States and Bull from France, were more severely affected than IBM. All these companies rushed into issuing new corporate strategies. Yet, by the end of the 1990s, many of them continued to be confused.

At the same time, the profits registered by the two above mentioned IBM main suppliers soared. Intel and Microsoft channeled profits generated by the cooperation with IBM and other manufacturers into developing their own branded technologies – like the "Pentium" processor Intel launched by 1993, or the "Windows" operating system launched by Microsoft. By the end of the 1980s, they reached a stage where they dominated the global software programs market. Both suppliers spent huge amounts of money from their marketing funds in order to get trademarks for their products sold worldwide.

2.8. The Gerstner era. IBM, a practical model for the "re-engineering" theory

The way IBM reorganized itself after events that took place during the 1990s may be seen as one the the company's greatest achievements. The red tape mad IBM a corporation unable to cope with competition. This is the reason why a new CEO from outside the company, who had no idea about IBM's organizational culture, was brought in during 1993 with a special aim to recovery.

According to Slater (1999), "when Lou Gerstner arrived as IBM's newest CEO in 1993 - after what The New York Times called <<the most vividly watched talent search in the history of American business>> - the world's premier corporation was hemorrhaging money and teetered on the verge of break-up. Now, Lou Gerstner - whom Fortune lauded as <a sharp, even brilliant, energetic man who thrives on overhauling corporate cultures> - faced the challenge of his lifetime: Reviving a dying IBM. Saving Big Blue is the spellbinding saga of how, true to his legend, Lou Gerstner rolled up his sleeves, dug in, and resurrected IBM from and all-but-certain death into a textbook example of corporate turnaround wizardry. "

As the new CEO for IBM, he began his work by cutting down both prices and the number of employees. Out of the 406,000 employees IBM had in 1985, Gerstner fired some 150,000 during the 1990s. However, the new CEO "heroically" opposed attempts to split the corporation and chose to focus instead on services like data storage and technical support.

It was a risky move for a company that created the PC industry, but IBM eventually succeeded to recover and soon became the world's largest supplier of technological services. With incomes around USD 100 billion, IBM currently is number 35 on Forbes 500 index (for 2014).

2.9. Changing the business model –steps toward the establishment of a knowledge-based organization

Business model innovation is difficult, but it can be done. Rethinking process, place, purpose and perspective is a daunting but achievable goal. Managers who want to turn their companies into knowledge-based organizations need to focus on several key actions, such as: RETHINK THE BUSINESS MODEL. IBM is one great example is that. IBM saw the need for innovation in its business model and effectively reinvented it. In the 1960s and 1970s, IBM was a large, successful, well managed company. But by January of 1993, the company was in need of a new approach. That month, IBM announced what was then the largest loss in US corporate history. Soon after that announcement, IBM fired its chief executive officer and brought in the first outside CEO the company had ever had in its history, Lou Gerstner. IBM's business-model innovation was the result and the solution for the financial crisis they faced during those years.

According to Chesbrough "Once IBM realized that it had to change its business model, it began a fervent hunt for new revenue sources. One experiment was to offer IBM's semiconductor lines to act as a foundry for other companies' products. This brought in new revenue and increased the utilization rate of IBM's equipment and facilities. IBM's need to generate greater profits also led it to rethink its whole approach to managing its patents and technology. The company was able to raise hundreds of millions of dollars a year by licensing its intellectual property. However, the most successful experiment was the discovery that IBM's expertise could be the basis for a services business, taking care of customers' IT needs. More than half of the company's revenue in 2006 came from its IBM Global Services arm, a business that didn't exist 15 years earlier." (Chesbrough, 2007).

2.10. The Palmisano era

Joining IBM in 1973, Samuel J. Palmisano was president and chief executive officer of IBM until 2012. Palmisano was appointed president and chief operating officer (COO) effective in October 2000. He was promoted to CEO in March 2002, while retaining the title of president, and named chairman effective in 2003. Palmisano's mandate was to move into new unique businesses with high profit margins and potential for innovation. This included purchasing PricewaterhouseCoopers Consulting in 2002, so that IBM could go beyond selling computers and software. PwC's consultancy business was absorbed into IBM Global Business Services, increasing the size and capabilities of IBM's growing consulting practice. During his tenure the company also acquired 25 software companies that specialized in data mining and analytics. Palmisano also prepared the company for cloud computing, originally known inside IBM as on-demand computing, where the center of innovation would be services and software, delivered over the Internet from data centers and connecting to PCs and other devices.

Palmisano also led the sale of the PC group to Lenovo which closed in 2005. The move was controversial inside IBM at the time, as it had been the inventor of the personal computer in the 1980s, and the PC was one of the few products from the company that was widely used by the masses and created strong brand recognition for IBM.

Palmisano focused intently on getting out of "low-margin businesses that were fading," (Palmisano's interview) and not surprisingly, the outfit's personal computer business was first on the chopping block. Although it fell behind rivals during the 1990s, that division helped to drive sales of other IBM products in corporate accounts, and its purchasing power helped lower the cost of components for larger IBM offerings like mainframes and servers. However to Palmisano, moving to new high-margin businesses meant exiting low-margin businesses like PC manufacturing. Beside this, PC manufacturing was becoming commoditized and offered few opportunities for innovation.

In 2008, he launched IBM's Smarter Planet initiative which applies computer intelligence to create more efficient systems for numerous applications including utility grids and traffic management. It took five years but Palmisano was vindicated from 2010 onwards as the Post-PC era of technology took hold, with smartphones and tablet computers supplanting PCs as the primary computing devices of choice. Also recognizing that drives were becoming a commodity, he sold off IBM's disk drive business to Hitachi and then signed a five-year deal to buy Hitachi drives. Palmisano once said that he felt the "hub of innovation would shift to services and software."

2.11. The transformation

IBM currently undergoes a transformational phase, as reflected by the investments the company announced for the Watson supercomputer, the basic platform for the new cognitive IT era. Outstanding for the new era is the intelligence computing and the cognitive development of technology, which learned self-evolution based on initial information and data accumulated. The new era will have an important impact upon the whole industry. The investments announced

for Watson are boosted by the fact that we entered the Big Data age. The speed of data accumulation significantly increased, while over 80 percent of the data is still unstructured. A technological platform to face such a challenge was needed. Investments made by IBM in recent years for new intelligence computing, big data and cloud computing technologies development or acquisition reach over USD 10 billion. Continuous investments made in R&D allowed IBM to become the company that registered the most technological patents for the last 21 years.

The technologic shift was followed by a shift in the way the market is approached. Companies are giving up discussions related to technology as currently the main important issue at hand is not related to the technology itself, but to the reason behind implementing it.

We could mention the important financial investments made by IBM during the last four years:

• USD 1.2 billion – for expanding the SoftLayer cloud infrastructure;

• USD 1 billion – for developing Bluemix, a Platform-as-a-Service facility;

• USD 1 billion – for launching the Watson Group;

• USD 7 billion – for acquiring 17 cloud companies (Aspera and Cloudant among them) beginning with 2010.

Huge amounts of data were generated for the last years. Data is generated from different sources: sensors, RFID networks, mobile devices, Web portals, social media, etc. Under the circumstances, it is increasingly important for companies to be able to extract value from such a data "mountain" that year after year becomes higher and larger. Data content will become the most valuable resource of the humankind in the future. And the data volumes stored by people are both increasingly valuable and mostly free of charge. One has to learn how to monetize value out of structured data and especially out of unstructured data. The latest solutions that IBM announced help to extract needed useful knowledge out of such huge amounts of data in order to increase competitiveness.

Conclusions

Imagine a technology that works so well, you aren't even aware it is used. The information technology means also the technology "behind the scenes", being currently as relevant and important for daily operations as it was some fifty years ago. Beginning with ATMs and moving on toward medical offices and to the traffic light networks or police departments, the information technology stands out as one of the most important innovations that influence/determine almost every detail of our daily lives. Even that we talk about the cloud or mainframes, or more consumer-like technology such as a tablet or a mobile device, the technology generated a real revolution in terms of business and computing and is continuing to influence the consumers.

The secret of longeviv IBM existence is due, among other things, to the outstanding leadership of many influential people working for IBM, during this century.

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