CHAPTER I. INTRODUCTION

Chapter Overview

This introductory chapter gives the audience an insight of the study. Introduction, the background of the study, the problem statement, the purposes of the research, the research questions, the hypotheses, and the significance of the study, the delimitations and limitations, and finally a definition of the terms are all addressed, in order to introduce a thorough and comprehensive focus by the researcher.

Introduction

The present study will get to its focus by narrowing down from the general aspects, from the background of the study, the overview of the industry and the context in which IBM is currently running business, in the knowledge-based nowadays’ economy, moving to the purposes of the study – explaining IBM’s revolution, and underline the actions that made a difference in its financial position improvements, based on a change in the management system of the company, applying knowledge management systems (KMS).

The next step is going deeper into the questions of the study and explain the cycling evolution in profitability, and how, when and why HR strategies have changed inside IBM and what were their direct consequences. Further, we have the hypothesis to test, and these hypothesis concern financial results from different regions around the world, on a global perspective, strategic business units, human resource policies and strategy changes on a macro perspective. Furthermore, we discuss the significance of the study, and limitations and delimitations of this study.
Background of the Study

There can be no doubt that, in practical terms, the world is getting smaller, and whether the process of globalization is seen as a source of opportunity or as a destructive force that needs to be checked, it is clear that businesses are facing an array of new challenges. These in turn have only emphasized the importance of implementing an effective knowledge strategy.

Globalization is a very real phenomenon that is transforming the world economic system including nearly all aspects of production, distribution and other business processes. With the emergence of a new development model, particularly in the highly industrialized economies, knowledge and information take on increasing importance. Thus, the era of globalization has tremendous concomitant implications for knowledge, education and learning.

The nature of work has changed enormously with the shift from an industrial economy, focusing on commercial products, to a knowledge based economy, where service and expertise are the main business outcomes. Rapid advances in technology, the growing importance of international business and increasing recognition of individual needs and expectations have been major drivers in changing this focus. In the industrial era, wealth was created by using machines to replace human labour. Many people associate the knowledge economy with high-technology industries such as telecommunications and financial services. Unlike capital and labour, knowledge strives to be a public good. Tacit knowledge is knowledge gained from experience, rather than that instilled by formal education and training. In the knowledge economy tacit knowledge is as important as formal, codified, structured and explicit knowledge.

The knowledge-based economy is characterized by change and a turbulent business environment. The present study will try to show the means through which, in such a permanently evolving environment, characteristic for the knowledge-based economy, an IT company made history. IBM, as the majority of the IT companies in the 1980’s and 1990’s, had its ups and downs, but with the skills of a visionary CEO, it managed to revive.
An entrepreneur will need to know how to utilize the technological elite responsible for such efforts and tap the financial resources available to meet the challenges of knowledge-based business. To survive in the knowledge age, entrepreneurs must rethink how they operate, foster a new innovative culture within their organizations, and at the same time form knowledge networks or strategic alliances with others for mutual gain and competitive advantage.

**First, in 1992,** the CEO of IBM was frustrated, and there was a huge gap between his company's stated goals and its achievements. The value of the company’s stock reached its lowest point, morale was very low, and the company's products have not kept up with the changing market. Customers were complaining that new models were taking too long to emerge. IBM relied too long on mainframes at a time when rapidly
advancing semiconductor technology - some of it invented at IBM - was quickly changing the computer industry. IBM's shift from rental to sales in the early 1980’s began a dramatic change in the nature of the customer relationship, making the giant just another computer maker competing on price.

For employees, IBM's job security was legendary. It wasn't unusual to find two generations of the same family represented. There were never any layoffs or unions. And this loyalty to employees strengthened the promise to customers: a happy and motivated workforce meant good service. The bond between the company and its workers began to get loose with massive reorganizations in the 1990s, followed by layoffs. An unanticipated consequence was to sever long-term relationships employees had with customers. This was the context in which Gerstner entered the company, and started to make a difference. The study will also introduce the strategies used by him, successfully, underlining the financial consequences of this institutional change.

The second major turning point in IBM’s recent history was in 2002, when the company sold its hardware business to Hitachi. The decision was based on the desire to reduce the PC and component businesses altogether, due to a downturn in both the semiconductor and disk drive business. At that time, IBM had approximately 18,000 employees in its hard drive division worldwide, while Hitachi employed around 6,000. Nick Donofrio, IBM's senior vice president of technology and manufacturing, said the venture was aimed at cutting costs through large-volume production. "Size is the answer," Donofrio said. "We've got the technology and the people. We've got to get an economy of scale. Merging these businesses will give us the size we're looking for."

In October 2002, IBM closed a hard drive plant in Hungary, "due to weak global demand", as they stated. Nevertheless, the real reason for the Hungary pullout is because of “extremely poor quality and major product control and quality control failures” (The Inquirer).

The third major issue to debate is the vital role of a visionary CEO. During the years he spent in IBM, Gerstner revitalized the company, due to his ability to view the problems unemotionally, and, therefore, he could lay off employees when necessary and create new strategies. "It took Gerstner, who was dispassionate and who was not an IBM
lifer, to do that," said Sam Albert, a 30-year IBM veteran and now president of Sam Albert Associates, a consulting firm.

Part of the problem lay in the corporate culture, according to various sources. IBM prided itself on innovation and had long allowed executives and employees fairly free rein. "Think," after all, was the company's motto. The company promised lifetime employment, and instead of laying people off, it would perform "surplus actions," which amounted to eliminating a job but then recreating it in some other part of the company. A former IBM employee recalls how in the early '90s the company repainted entire buildings at its North Carolina campus in anticipation of a visit from then CEO John Akers.

One of Gerstner's first major acts was to bring fiscal responsibility to the company. He forced IBM managers to set financial goals and to meet them. He removed those who didn't. He eliminated some products while establishing other new categories inside IBM, and he advocated selling products as bundles that solved business problems. Massive layoffs also took place in 1993.

Gerstner helped IBM turn its focus from hardware such as mainframes to more complete offerings that included software and service. Those packages made the transition from PCs to supercomputers. The approach is represented by IBM Global Services and has become one of IBM's best ways of selling products.
Purposes of the Study

The political repercussions of the Second World War paved the way for a new type of corporate internationalism, which has only gathered force since the collapse of the physical and ideological barriers erected by the Cold War. And perhaps more than any other development in modern times, the emergence of web technologies and the internet has generated opportunities in markets that would otherwise have remained unreachable for the majority of businesses. More so than ever before, companies are competing on a global basis: customers are no longer obliged to buy goods or services in person; employees can carry out their work from offices or hotel rooms anywhere in the world; and multi-million transactions can be processed with the click of a mouse.

The bases of economic life and business have been extended, and knowledge assets, knowledge workers, and knowledge ventures have become the focus of attention. This new environment brings new challenges to entrepreneurship both at the individual and corporate levels.

In the 21st century, to a modern organization, business enterprise, knowledge tends to connote possession of experienced "know-how" and factual information or where to get it. From the economic perspective, "knowledge", as Peter Drucker described in his book Managing in a Time of Great Change, "has become the key economic resource and the dominant - and perhaps even the only - source of competitive advantage." Knowledge is increasingly vital to the transition of any economy to one that is innovation driven and knowledge based. The phrase "knowledge management", or KM, entered the lexicon in the early 90's. Knowledge management is an action.

In Knowledge Organizations knowledge flows are more important than financial flows. People are revenue creators, not cost items. Their true output is a better performance among their customers. It is a world in which the customer relation is no longer one-way market driven, but partnerships in which solutions are co-created and knowledge flows both ways. The managers no longer manage people or even knowledge, but the space in which knowledge is created. This space is both the intangible culture and the tangible environment, such as the office. The culture encourages knowledge sharing so people are recognized publicly and rewarded for sharing. Top management recognizes
trust as the bandwidth of sharing and has made investments in trust building one of their top priorities. Hoarding of knowledge and information as a means of career advancement is actively discouraged and the best knowledge workers are paid more than their bosses.

The management and organization of IT activities in firms is undergoing significant changes. A variety of forces are compelling IT executives to apply fresh thinking to the conduct of “IT business”, and the solution seems to be the same knowledge organization. Strategic focus in the IT industry requires tighter client relationships and direct contacts with the customers/clients and other business partners. How should the IT organization create more intimate partnerships with internal clients and external business partners? The answer lies in applying the same knowledge based strategy.

The main purpose of this study is trying to explain IBM’s revolution, as one of the most significant IT companies in the world, and underline the actions that have made a difference in its financial position improvements, based on a change in the management system of the company, namely – applying the knowledge management system.

Effective organizations are realizing that, of the varied factors that contribute to performance, the human element is clearly the most critical. Regardless of the size or nature of the organization, the activities it undertakes and the environment it operates, its success is determined by the decisions its employees make and the behaviors in which they engage. Managers are becoming increasingly aware that a critical source of competitive advantage comes from having the appropriate human resources.

Therefore, as shown in the figure below, two strategic paths emerge in discussing a company’s success: financial performance and human resource policies.
In order to attain the above mentioned objectives, and observe the evolution for the two directions mentioned above, a financial analysis will enable a better understanding of the situation, by focusing on a longitudinal time series study – highlighting the periods when change has taken place, between 1990 and 2006, paying special attention to the years 1993 and 2002 and to the factors which influenced the progress and development of the company.
Questions of the Study

In the history of modern business, many companies have gone from being industry leaders to the verge of extinction. Through the heroic efforts of a new management team, some of those companies have even succeeded in resuscitating themselves and living on in the shadow of their former stature. But only one company has been at the pinnacle of an industry, fallen to near collapse, and then, beyond anyone's expectations, returned to set the agenda. That company is IBM.

One of the most common questions popular among the worst critics of knowledge management is: **Can KM help make an organization profitable?** The purpose of the study is to compare performance and highlight the differences (before institutional change and after) in a company having implemented the Knowledge Management System, in the IT industry and state whether KMS as an institutional change factor is a key issues in determining the level of performance or not. Therefore, this study will analyse the transformations that took place in the evolution of a relevant company in the IT industry, IBM, transformations greatly determined by a thorough and systematical approach in establishing a functional KM system.

One other important issue will be to try to define and explain the cycling **evolution in profitability**, by underlining the same structural and institutional changes as the mean which lead to better performance.

Also, taking an investment perspective towards human resources is critical, considering the fact that all the other physical assets (products, technologies) can be imitated by the competitors. How, when and especially why **HR strategies** changed in IBM is another crucial issue to discuss.

The third aspect which has to be mentioned is the **importance of a leader**, capable of harmoniously balancing people-oriented skills with the task-oriented needs of an unbalanced, precarious microeconomic situation.

The **major objective** of the study is to try to measure the impact of knowledge management on a company’s performance. **Two sub-objectives** will be mentioned and underlined with the help of studying the case of IBM:
I. Explaining the cycling evolution in profitability

II. Defining the human resource strategy, by using the following dimensions:
   a) individuals benefiting from a retirement plan
   b) number of employees

Given all the above, 7 research questions have emerged:

*Regarding the first sub-objective*

1. Which region’s financial results (Europe / Middle East / Africa, Asia Pacific or the Americas) had a significant impact on the company’s economical performance (EPS)?

2. Which Strategic Business Units (Global Services, Hardware, Software and Global Financing) had a significant impact on the company’s economic performance (EPS)?

3. Did the human resource policy influence the company’s profitability (EPS)?

4. Did the strategy change in 1993 and 2002 have an impact on the company’s economic performance (EPS)?


Figure 1.3. Questions of the study I

Regarding the second sub-objective

5. Which region’s financial results (Europe / Middle East / Africa, Asia Pacific or the Americas) had a significant impact on the company’s human resource policy?

6. Which Strategic Business Units (Global Services, Hardware, Software and Global Financing) had a significant impact on the company’s human resource policy?

7. Did the strategy change in 1993 and 2002 have an impact on the company’s human resource policy?
Figure 1.4. Questions of the study II

I. Which region’s financial results (Europe / Middle East / Africa, Asia Pacific or the Americas) had a significant impact on the company’s human resource policy (Individuals benefiting from a retirement plan / Number of employees)?

Objective II: Human Resource Strategy

2. Which Strategic Business Unit (Global Services, Hardware, Software and Global Financing) had a significant impact on the company’s human resource policy (Individuals benefiting from a retirement plan / Number of employees)?

3. Did the strategy change in 1993 and 2002 have an impact on the company’s human resource policy (Individuals benefiting from a retirement plan / Number of employees)?
Testing Hypothesis

Based on the previously mentioned research questions, 7 hypotheses have emerged.

For the first sub-objective:
1. Which region’s financial results (Europe / Middle East / Africa, Asia Pacific or the Americas) had a significant impact on the company’s economical performance (EPS)?

Hypothesis 1:

H\(_0\): Financial results from the geographical areas (Europe / Middle East / Africa, Asia Pacific and the Americas) have no significant impact on the company’s economical performance (EPS)

\[ H_0: \beta_{YX_i} = 0 \]

H\(_1\): Financial results from the geographical areas (Europe / Middle East / Africa, Asia Pacific and the Americas) have a significant impact on the company’s economical performance (EPS)

\[ H_1: \beta_{YX_i} \neq 0 \]

2. Which Strategic Business Units (Global Services, Hardware, Software and Global Financing) had a significant impact on the company’s economic performance (EPS)?

Hypothesis 2:

H\(_0\): Strategic Business Units (Global Services, Hardware, Software and Global Financing) have no significant impact on the company’s economical performance (EPS)

\[ H_0: \beta_{YX_i} = 0 \]

H\(_1\): Strategic Business Units (Global Services, Hardware, Software and Global Financing) have a significant impact on the company’s economical performance (EPS)

\[ H_1: \beta_{YX_i} \neq 0 \]
3. Did the human resource policies (Individuals benefiting from a retirement plan / Number of employees) influence the company’s profitability (EPS)?

*Hypothesis 3:*

H\(_0\): There is no relationship between human resource policies (Individuals benefiting from a retirement plan / Number of employees) and the company’s profitability (EPS)

\[ H_0: \beta_{YX_1} = 0 \]

H\(_1\): There is a relationship between the human resource policies (Individuals benefiting from a retirement plan / Number of employees) and the company’s profitability (EPS)

\[ H_1: \beta_{YX_1} \neq 0 \]

4. Did the strategy change in 1993 and 2002 have an impact on the company’s economic performance (EPS)?

*Hypothesis 4:*

H\(_0\): There is no relationship between the strategy change in 1993 (X\(_1\)) and 2002 (X\(_2\)) and the evolution of the company’s profitability (EPS) (Y)

\[ H_0: \beta_{YX_1} = 0 \]

H\(_1\): There is a relationship between the strategy change in 1993 (X\(_1\)) and 2002 (X\(_2\)) and the company’s profitability (EPS) (Y)

\[ H_1: \beta_{YX_1} \neq 0 \]
For the second sub-objective:

5. Which region’s financial results (Europe / Middle East / Africa, Asia Pacific or the Americas) had a significant impact on the company’s human resource policies (Individuals benefiting from a retirement plan / Number of employees)?

**Hypothesis 5:**

H$_0$: Financial results from the geographical areas (Europe / Middle East / Africa, Asia Pacific and the Americas) have no impact on the company’s human resource policies (Individuals benefiting from a retirement plan / Number of employees)

H$_0$: $\beta_{YjX_i} = 0$

H$_1$: Financial results from the geographical areas (Europe / Middle East / Africa, Asia Pacific and the Americas) have a significant impact on the company’s human resource policies (Individuals benefiting from a retirement plan / Number of employees)

H$_1$: $\beta_{YjX_i} \neq 0$

6. Which Strategic Business Units (Global Services, Hardware, Software and Global Financing) had a significant impact on the company’s human resource policies (Individuals benefiting from a retirement plan / Number of employees)?

**Hypothesis 6:**

H$_0$: Strategic Business Units (Global Services, Hardware, Software and Global Financing) have no impact on the company’s human resource policies (Individuals benefiting from a retirement plan / Number of employees)

H$_0$: $\beta_{YjX_i} = 0$

H$_1$: Strategic Business Units (Global Services, Hardware, Software and Global Financing) have a significant impact on the company’s human resource policies (Individuals benefiting from a retirement plan / Number of employees)

H$_1$: $\beta_{YjX_i} \neq 0$
7. Did the strategy change in 1993 and 2002 have an impact on the company’s human resource policies (Individuals benefiting from a retirement plan / Number of employees)?

**Hypothesis 7:**

H$_0$: There is no relationship between the strategy change in 1993 and 2002 and the human resource policies (Individuals benefiting from a retirement plan / Number of employees)

H$_0$: $\beta_{Y_{jX_i}} = 0$

H$_1$: There is a relationship between the strategy change in 1993 and 2002 and the human resource policies (Individuals benefiting from a retirement plan / Number of employees)

H$_1$: $\beta_{Y_{jX_i}} \neq 0$
Significance of the Study

Although IBM is a gigantic corporation, having hundreds of employees in its financial departments, and being audited by some of the most famous and reliable public accounting firms in the world (Pricewaterhouse Coopers LLP), the present study brings a plus value, through its methodology of analyzing the data.

The use of econometrics as a way to measure IBM’s profitability and human resource policies has not been realized until now. Here, a model was built by Cheng-Ping Shih and Melinda Plescan, in December 2007, to measure the above 2 aspects, for a 16 year period, from 1990-2006.

In the company’s financial statements, management discussions or reports of independent registered public accounting firms, there can be seen various approaches to explaining the financial results, but none of them uses statistical methods or econometrics.

Therefore, the contribution of this study is made by using an econometric method, combining economic theory with statistics, to analyze and test hypothesis, and underline the critical factors leading to improved performance.
Delimitations and Limitations

The financial data used in the present study is provided via website, through IBM’s Corporate Archives Web, where the public financial statements can be found. It is stated that: “It is the intent of the IBM Corporate Archives to make selected information publicly available on this Web site in order to advance the study of science, information technology, and the IBM Corporation. The image and text files on the IBM Corporate Archives Web site are made available for noncommercial, educational, and personal use only.”

Additional data has been requested from IBM corporate headquarters, in New York, but unfortunately, there is no possibility to receive anything else except for the data published on the website, due to corporate policy. Had it been available, a more indepth analysis could have been done.

As of February 2008, the researcher contacted by mail, by live chat and by telephone representatives from benchmark companies offering financial information on specialised sites, but, invariably, extra data was unavailable, even for purchase.

The following sites were taken as reference:

- http://www.hoovers.com/ibm/--ID__10796--/free-co-factsheet.xhtml

- possibility to buy report, 99$, information from 1996
- tel: +15123744646 +18004264968 +18667209410
- live chat

  - data from 2004
  - data from 2002
  - data for 8 years
  - tel: +18004166651
  - live chat


- same information as for moneycentral, finance.google
Definition of Terms

The **knowledge based economy** is an expression coined to describe trends in advanced economies towards greater dependence on knowledge, information and high skill levels, and the increasing need for ready access to all of these by the business and public sectors. (OECD, 2005)

**International Business Machines Corporation** (known as IBM or "Big Blue"; NYSE: IBM) is a multinational computer technology and consulting corporation headquartered in Armonk, New York, USA. The company is one of the few information technology companies with a continuous history dating back to the 19th century. IBM manufactures and sells computer hardware and software, and offers infrastructure services, hosting services, and consulting services in areas ranging from mainframe computers to nanotechnology. IBM has been known through most of its recent history as the world's largest computer company; with over 350,000 employees worldwide, IBM is the largest information technology employer in the world. ([http://en.wikipedia.org/wiki/IBM](http://en.wikipedia.org/wiki/IBM))

**Information technology** (IT), as defined by the Information Technology Association of America (ITAA), is "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware." IT deals with the use of electronic computers and computer software to convert, store, protect, process, transmit and retrieve information, securely. ([http://en.wikipedia.org/wiki/Information_technology](http://en.wikipedia.org/wiki/Information_technology))

**Earn Per Share (EPS)** is defined as the portion of a company's profit allocated to each outstanding share of common stock. EPS serves as an indicator of a company's profitability. It is calculated as:

\[
\text{EPS} = \frac{\text{Net Income} - \text{Dividends on Preferred Stock}}{\text{Average Outstanding Shares}}
\]
In the EPS calculation, it is more accurate to use a weighted-average number of shares outstanding over the reporting term, because the number of shares outstanding can change over time. However, data sources sometimes simplify the calculation by using the number of shares outstanding at the end of the period.

(http://www.investopedia.com/terms/e/eps.asp)
CHAPTER II. LITERATURE REVIEW

Chapter Overview

The study will describe at the beginning the environment in which knowledge based economies function, and their exact definition, and will go deeper towards the knowledge based Information Technology, the industry to which IBM belongs. Next, the IBM timeline will illustrate the specific points in time when change occurred, followed by the profile of one of the most inspiring and remarkable CEOs in IBM’s history, Louis Gerstner. His most important strategy was switching the company’s focus towards people and that was the issue that made a difference, concluding with a successful institutional change.

The Knowledge Based Economy

What is the knowledge economy? "A knowledge-driven economy is one in which the generation and exploitation of knowledge play the predominant part in the creation of wealth" (United Kingdom Department of Trade and Industry, 1998).

Taking a high-level view of the concepts embodied in the discipline, it becomes clear that the potential contribution knowledge management has to make towards solving many of the negative effects of globalization is significant. Mark McElroy, president of Knowledge Management Consortium International hypothesizes that irrational, dysfunctional behaviours at the level of business processing are in turn the product of irrational, dysfunctional learning systems at the level of social systems. “To the extent that maintaining and improving the health of learning systems is of primary interest to KM, solving the world’s globalisation ills could well turn out to be a KM issue of the highest importance,” he says. “Anything that might improve the performance of business in the face of intensified competition accelerates the development of related fields. KM was simply one of many such fields affected by the rising intensification of business competition in the 1990s.”
Knowledge management is less than two decades old. Throughout the early 1990’s, the importance of the knowledge-based economy and the value of companies’ intellectual assets became increasingly apparent (Stewart, 1997). In the mid-1990s, prominent thinkers like Peter Drucker (1995) and Nonaka and Takeuchi (1995) published influential articles about how knowledge would become a significant basis of competition in the future. Leading-edge firms, like IBM, Skandia and Ernst & Young, then appointed chief knowledge officers (CKOs) to oversee the knowledge resources of their firms. Other companies followed soon over the next few years. By 2000, KM had gained a toehold in many large firms and was well-established in the major consulting firms.

On a more practical level, knowledge management has the capacity to help companies counter what Tom Knight, principal consultant at Fujitsu Services, describes as the tendency towards diseconomies of scale where knowledge is concerned. “The larger and more far-flung an organisation becomes, and the more expertise is dispersed, the less effective ‘natural’ knowledge sharing mechanisms become,” he says. “Hence the absolute necessity for organisations to consciously manage knowledge – the larger an organisation becomes, the more self-aware it needs to be about how it values information and knowledge.”

But what is the value proposition for KM? The answer lies in the Peter Drucker’s assertion that the “greatest challenge to business management in the 21st century is, and will be, improving the personal productivity and effectiveness of front-line workers doing increasingly complex and unique jobs”.

The new environment has been eloquently described by many authors: They outline a “new” dangerous (Toffler, 1990) society, age or era, labelled, the Third Wave (Toffler, 1970), Information Society (Masuda, 1980), Knowledge Society (Masuda, 1980, Naisbitt, 1982), or Post-Capitalist (Drucker, 1995). It will be the virtual (Rheingold, 1993) Knowledge Era (Savage, 1995) characterized by the Smart Machine (Zuboff, 1988) and Unreason (Handy, 1990).

Philip Ball (2006), makes an observation: “Of the largest five thousand U.S. firms operating in 1982...only 35 percent still existed as independent entities in 1996”.

Robert Axtell, a sociologist, found a typical pattern in the lifecycle of large firms: a period of exponential growth is followed by a sudden decline and gradual dwindling. He was
able to simulate the pattern using an agent-based computer model that demonstrates that
the rise and rapid decline of firms can be explained intrinsically.
Mark Buchanan (2007), gives this explanation:

“In a small firm, each person's effort has a large impact on the total output, so
what a worker gets out depends on what he or she puts in. In small firms,
therefore, no one has the incentive to free ride; all have the incentive to work
hard. In a large firm, however, any one person's contribution to the overall effort
becomes much smaller. So if someone doesn't really put in much effort, but only
pretends to work hard, he or she will still get just as much because the overall
productivity of the company will barely suffer...”
The Knowledge Based Information Technology

Remarkable innovations based on information and communications technology (IT) are changing our way of living and the very nature of economic activity. Some industry experts now expect IT’s potential impact to be as significant and pervasive as the major technological innovations of the past, including the harnessing of steam, the use of electricity, and the adoption of the internal combustion engine. In this context, it is important to understand the development implications of IT’s evolution and diffusion.

In order to survive and be competitive in a changing and evolving business environment, organizations need to have quick and professional responses to the external factors, by utilizing their limited resources and expertise. In the new knowledge economy, service and expertise constitute the main business outcomes, having shifted the focus from the classical understanding of commercial products. Knowledge Management is a process of effectively and efficiently managing knowledge, having its main objective to improve performance in a business setting.

The high-end services are meant to set IBM apart from low-cost technology suppliers such as Dell, and traditional computer consulting companies such as Hewlett-Packard, EDS and Accenture. The strategy is to combine IBM’s technology products and research with its business-minded consultants, which is something few other services companies can do, IBM executives claim.

Its restructuring efforts are designed to accelerate its move toward business consulting and away from traditional computing services. "The dilemma IBM faces is that they have the most coherent strategy and simultaneously the most retrograde businesses," said Mark Stahlman, an analyst at Caris & Company. "The traditional body-shop consulting and outsourcing components of Global Services are lagging."

Knowledge evolution is not about moving to wisdom or understanding, but about moving from mining to creation, from what the firm knows to what the market is telling. It is not about making better models, but about distributing intelligence and memory, it is not better faster cheaper tools, it is trust, sharing, critique, awareness.
IBM Timeline

• 1911/06/15 - IBM incorporates in New York as the Computing-Tabulating-Recording-Company.
• 1915/11/12 - IBM stock begins to sell publicly on NY Stock Exchange for $46 a share.
• 1924/02/14 - Computing-Tabulating-Recording-Company changes its name to International Business Machines
• 1964/04/07 - IBM introduces System 360, first large family of computers
• 1981/04/14 - Space Shuttle Columbia, aided by five onboard IBM computers, launched in first Shuttle flight.
• 1981/08/12 - IBM introduces the personal computer.
• 1984/05/05 - In Tokyo, IBM workers hold first international meeting
• 1987/01/12 - IBM workers from around the world discuss union issues at London conference
• 1991/01/31 - IBM announces 10% reduction in pension benefits
• 1991 (or 1992?) – Elimination of medical plan's "coordination of benefits".
• 1993/04/01 - Louis V. Gerstner Jr. becomes IBM Chairman and CEO
• 1994/02/17 - 320 employees laid of at IBM Endicott.
• 1994/07/27 - IBM announces Kingston, NY plant closing
• 1996/02/11 - IBM's "Big Blue" beats world chess champion, Gary Kasparov, marking a machine's first victory over a world chess grandmaster
• 1999/05/10 - IBM stock splits 2 for 1 (15th stock split).
• 1999/05/18 - IBM employees establish pension bulletin board at Yahoo.com.
• 1999/07/01 - Pension reductions for employees under 40 due to Cash Balance Plan conversion
• 1999/09/17 - Bowing to protests by employees, IBM partially restores "pension choice" to employees

1 Information found on the Alliance@IBM website http://www.allianceibm.org/
- 2000/03/27 - California pension system announces decision to vote 9.2 million shares in favor of IBM employee stockholder resolution to restore pension and medical benefits

In 1990, IBM had its most profitable year ever, but by 1993, the computer industry had changed so rapidly the company was on its way to losing $16 billion and IBM was on a watch list for extinction - victimized by its own lumbering size, an insular corporate culture, and the PC era IBM had itself helped invent. The PC revolution placed computers directly in the hands of millions of people. And then, the client/server revolution sought to link all of those PCs (the "clients") with larger computers that labored in the background (the "servers" that served data and applications to client machines). Both revolutions transformed the way customers viewed, used and bought technology. And both fundamentally rocked IBM. Businesses' purchasing decisions were put in the hands of individuals and departments - not the places where IBM had long-standing customer relationships. Piece-part technologies took precedence over integrated solutions. The focus was on the desktop and personal productivity, not on business applications across the enterprise.

In building and managing the technology infrastructure for the Sydney 2000 Olympic Games, IBM turns in a Gold Medal performance. The official Games Web site, powered by IBM, handles unprecedented Internet traffic with 11.3 billion hits, a 1,700 percent increase over the Nagano Games official site in 1998. More than 13 million lines of software code are written and thoroughly tested before the Games begin. Nearly 6,000 people provide technology support for 300 medal events in 37 sports competitions held in 39 venues.

IBM is awarded the 2000 U.S. National Medal of Technology for the company's record of innovation in storage technology. This marks the seventh time that IBM and its scientists have received the nation's highest award for technological innovation, more than any other company or organization.

IBM and PricewaterhouseCoopers agree in July 2002 that IBM will acquire the former's global business consulting and technology services unit -- PwC Consulting. Under the terms of the agreement, IBM will pay PricewaterhouseCoopers an estimated purchase
price of $3.5 billion in cash and stock. The transaction gives IBM an unmatched capability to help customers solve their business issues and to exploit world-class technology for improved business performance. The combination creates a new global business unit, IBM Business Consulting Services -- comprising more than 30,000 IBM and 30,000 transferring PwC Consulting professionals -- which becomes part of IBM Global Services.

IBM earns 3,415 U.S. patents in 2003, breaking the record for patents received in a single year and extending its run as the world's most innovative company to eleven consecutive years. Led by growth in patents that fuel the company's latest on demand computing and services offerings, IBM eclipses the nearest company by more than 1,400 patents.

At the end of 2004, IBM Chairman Samuel J. Palmisano authorizes a preliminary allocation of $1 million to support relief efforts for the victims of the tsunamis that struck southern Asia on December 26. IBM Crisis Response Teams in India, Indonesia, Sri Lanka and Thailand are deployed to assist local governments and relief organizations. Lenovo Group Limited - the leading Personal Computer brand in China and across Asia - and IBM announce in December a definitive agreement under which Lenovo will acquire IBM's Personal Computing Division to form the world's third-largest PC business.

Early in 2005, IBM provides technology and services valued at just over $3 million (and employees donate another $1.2) million to assist the victims of the tsunami that devastated parts of Asia in December 2004. In September 2005, IBM makes a $3.2 million donation of services and technology in support of relief and recovery operations following Hurricane Katrina in the United States.
The Profile of a CEO – Louis Gerstner

Lou Gerstner, Jr., served as chairman and chief executive officer of IBM from April 1993 to March 2002, when he retired as CEO. He remained chairman of the board through the end of 2002. Before joining IBM, Mr. Gerstner served for four years as chairman and CEO of RJR Nabisco, Inc. This was preceded by an eleven-year career at the American Express Company, where he was president of the parent company and chairman and CEO of its largest subsidiary. Prior to that, Mr. Gerstner was a director of the management consulting firm of McKinsey & Co., Inc. He received a bachelor's degree in engineering from Dartmouth College and an MBA from Harvard Business School.

Almost everyone watching the rapid demise of this American icon presumed Gerstner had joined IBM to preside over its continued dissolution into a confederation of autonomous business units. This strategy, well underway when he arrived, would have effectively eliminated the corporation that had invented many of the industry's most important technologies.

Instead, Gerstner took hold of the company and demanded the managers work together to re-establish IBM's mission as a customer-focused provider of computing solutions. Moving ahead of his critics, Gerstner made the bold decision to keep the company together, slash prices on his core product to keep the company competitive, and almost defiantly announced, "The last thing IBM needs right now is a vision." On his arrival, "there was a kind of hothouse quality to the place. It was like an isolated tropical ecosystem that had been cut off from the world for too long. As a result, it had spawned some fairly exotic life-forms that were to be found nowhere else." he said. One of Gerstner's first tasks was to redirect the company's attention to the outside world, where a marketplace was quickly changing and customers felt largely ignored. He succeeded mightily. Upon his retirement, IBM was undeniably "a company that mattered."

Shortly after Lou Gerstner was introduced as IBM's CEO in the spring of 1993, he met with the company's Corporate Management Board — roughly the top 50 people in the company. He laid out for them a number of troublesome areas in the company:

- Loss of customer trust, supported by low customer ratings on quality.
- The mindless rush for decentralization.
- Slow response to cross-unit issue.
- Tension over control of the marketing and sales processes.
- A confusing and contentious performance measurement system, resulting in serious problems when closing sales with customers.
- A bewildering array of questionable, even senseless, alliances.

Gerstner announced a program called "Operation Bear Hug." Each of the 50 members of senior management would, within three months, pay a personal visit to a minimum of five of IBM's biggest customers, find out first-hand what their needs and concerns were, and report back to Gerstner. The Bear Hug meetings became the first step in reducing the customer perception that dealing with IBM was difficult.

After only 100 days on the job, and with major news outlets and analysts alike calling for some visible, tangible proof of a turnaround at IBM, Gerstner went public with four key strategic initiatives:

1. **Keep the Company Together.** Gerstner decided very early on to keep IBM one unified enterprise, in the face of an increasingly diversified computer market. While IBM was slow to deliver distributed computing (delivering increased computing power to individual users), other companies moved in, supplementing IBM's basic systems with add-on applications and hardware that provided the powerful systems both business and home computer customers wanted and needed.

2. **Change the Company's Fundamental Economic Model.** In simplest terms, if a company's revenue, gross profit, and expenses are all moving in the right relationship, the net effect is growing profits and positive cash flow — the makings of a successful business. In 1993, those relationships at IBM were all wrong — revenue was slowing (due to the company's reliance on declining mainframe sales); gross profit margin was sinking (due to the discounted prices it had resorted to in order to sell mainframes); the company's expenses were out of control. Expenses were, however, the first issue tackled — $8.9 billion was slashed out of the budget. This required employment reduction of 35,000 people (in addition to the 45,000 jobs cut in 1992 — the first such layoff in the company's history).
3. **Reengineer How the Company Did Business.** Gerstner saw IBM’s business processes as cumbersome and highly expensive, requiring a reengineering program of gargantuan proportions, a top-to-bottom overhaul of its basic operations. Gerstner focused on six **core initiatives:** hardware development, software development, fulfillment, integrated supply chain, customer relationship management, and services. These were the processes most visible to external customers, and they were soon joined in reengineering efforts by several internal processes, including human resources, procurement, real estate, and information technology. From 1994 to 1998, the total savings from these reengineering projects was $9.5 billion.

4. **Sell Unproductive Assets to Raise Cash.** Only a handful of people understand how close IBM came to bankruptcy in 1993. Gerstner noted then that there were a number of assets that could be sold to make the company solvent again, and, thus began a wholesale jettisoning of nonessential, unproductive assets:
   - A. The corporate airplane fleet was sold.
   - B. The corporate headquarters in New York City was put on the block.
   - C. The bulk of the company's fine art collection was auctioned off.

As the years went by, Gerstner continued streamlining the company, in an effort to achieve and maintain focus in essential operations. Before Gerstner, IBM seemed to exist in the shadow of its founder, Thomas J. Watson, Sr., a self-made man who engendered a culture of respect, hard work, and ethical behavior at his company. Watson deliberately and systematically institutionalized three Basic Beliefs that had made IBM successful under his stewardship:
   - Excellence in everything we do.
   - Superior customer service.
   - Respect for the individual.

In order to breathe some fresh air into the organization, Gerstner did away with the Basic Beliefs, pointing instead to eight principles:

1. **The marketplace is the driving force behind everything we do.** Gerstner recognized that IBM was guilty of producing confusing technology, then making it instantly
obsolete. Under the first of Gerstner's principles, the company vowed to focus on serving customers and, in the process, beating the competition.

2. At our core, we are a technology company with an overriding commitment to quality. Technology was always IBM's greatest strength. Under Gerstner, the company needed to funnel that knowledge into developing products that served customer needs above all else.

3. Our primary measures of success are customer satisfaction and shareholder value. No company is a success, financially or otherwise, without satisfied customers.

4. We operate as an entrepreneurial organization with a minimum of bureaucracy and a never-ending focus on productivity. The warp-speed marketplace demands that the company accept innovation, take risks, and pursue growth, both by expanding existing businesses and finding new ones.

5. We never lose site of our strategic vision. Every business, if it is to succeed, must have a sense of direction and mission.

6. We think and act with a sense of urgency. Planning and analysis should never be carried out to the extent that the job that needs to be done now does not get done.

7. Outstanding, dedicated people make it all happen, particularly when they work together as a team. The best way to end turf wars is to cherish and reward teamwork, particularly teamwork that delivers customer value.

8. We are sensitive to the needs of all employees and to the communities in which we operate. People must have the room and resources to grow, and the communities in which we do business must become greater because of our presence.
Switching Focus Towards People

Communities of practice

In 1995, IBM Global Services began implementing a business model that included developing a set of communities of practice based on the core competencies of the organization.

Considerable attention is being focused on communities as an important element in the life of an organization. Driven by a knowledge economy, organizations need their employees to become “knowledge workers”. The interaction with others on work-related topics often leads naturally to the formation of communities of practice.

A community's evolution can be advanced or arrested, depending on the attention that a group pays to building a foundation at each developing stage. Some groups move forward quickly on some aspects of development and bypass others. Initially, this action may not impact the immediate performance of a community. However, if a community wants to increase its effectiveness or aspires to a more advanced evolution stage, it usually needs to return to restructure or build elements from earlier stages that it may have shortchanged.

Examples of communities of practice are found in many organizations and have been called by different names at various times, names such as “learning communities” at Hewlett-Packard Company, “family groups” at Xerox Corporation, “thematic groups” at the World Bank, “peer groups” at British Petroleum, and “knowledge networks” at IBM Global Services, but they remain similar in general intent.

The approach taken by IBM Global Services that pulls together the people, process, and technology factors into a knowledge management framework facilitates both community evaluation and successful development.

Online knowledge sharing

Another example, a system called “Babble” is an on-line multiuser environment that is intended to support the creation, explication, and sharing of knowledge through text-based conversation. Over the last several years, IBM have deployed Babble to a number of work groups: about 15 groups within IBM and one group formed by a
university class outside IBM. They have had mixed experiences with the adoption of Babble. If IBM should consider Babble deployment successful it is when used more or less daily, by several people, for more than six weeks.

Babble also supports group awareness through the timeline proxy. Babble participants have reported uses such as: looking to see who has visited a topic in which they had posted questions; looking to see whether a colleague who had not posted recently had been on line; and using the timeline to get a sense for the activity of the community as a whole.

Another phenomenon that can be observed in Babble is the development of social norms. That is, one participant may develop a particular way of doing something, and others will imitate it. Examples of this include what users include in their on-line nickname (e.g., in some Babble groups, users append "@mylocation" after their name), the types of on-line conversations created (e.g., some Babble groups have categories for "personal places" or "offices"), and naming conventions.

These social practices help to forge an identity for the group and allow individuals to become more fully dimensional as communicative partners: that is, they emerge not just as disembodied words on the screen, but as real people who might be liked or disliked, trusted or treated with caution, with reputations that can grow or be tarnished, and so forth. The fact that these effects emerge from long-running, day-to-day, work-related interactions in Babble is also important. Informal interaction in Babble, and the blend of social and work talk contribute to the formation and maintenance of a social fabric that underlies collaboration with distant colleagues. Through our work on Babble, IBM has begun to create an infrastructure that can support rich forms of social interaction.

**Storytelling**

“Knowledge socialization” is the term IBM uses to describe their work. First, knowledge is heavily influenced by social and cultural factors: it is entwined, on the one hand, with human cognition, and, on the other, with the social context of teams, organizations, and communities. They claim that **storytelling** is useful in creating, capturing, disseminating, and internalizing knowledge and that it accomplishes all of
these simultaneously, not sequentially. Storytelling is also a representative knowledge socialization process in that it typically includes both instrumental and expressive aspects.

In order to provide a common underpinning for the various story-related tools that IBM have developed, they have proposed “StoryML” comprising of Story Form (what is in the story); Story Function (what are the purposes of the story); and Story Trace (what is the history of the story). There are many uses of story and storytelling in business. Stories can be useful ways for a business to find out about the needs of its customers in a deeper way. Stories can also help advertise a product or service; they help in showing the proper context for the use of a product or service and allow us to see the benefits.

This is the way how it began the building of one of the biggest and greatest knowledge structures. Today, IBM’s KM system has gone through two generations of technology solutions that has made the company a highly profitable one and post profits irrespective of economic conditions. In the beginning, “There was info-glut with endless information pouring into islands, surrounded by a sea of data,” explains Arun Sawhney, IBM Consulting Group, Global Services India. “Until we did the organization network, we were unable to reach the level of detail which now exists. We now lead with community-based intellectual capital.”
HR Policies

The men and women around the world employed by IBM have always been its priority. For example, IBM’s founder, Thomas J. Watson, told employees in October 1926 “They say a man is known for the company he keeps. We say in our business that a company is known by the men it keeps”.

The value placed on IBM employees was codified in one of IBM’s three fundamental principles. In 1969, IBM chairman wrote to his management team “Our basic belief is respect for the individual, for his rights and dignity. It follows from this principle that IBM should help each employee to develop his potential and make the best use of his abilities; pay and promote on merit, and maintain two-ways communications between manager and employee, with an opportunity for a fair hearing and equitable settlement of disagreements”.

The company and its US subsidiaries have defined benefit postretirement plans that provide medical, dental and life insurance for retirees and eligible dependents.

It is the company’s practice to fund amounts for pensions sufficient to meet the minimum requirements set forth in applicable employee benefit and tax laws, and such additional amounts as the company may determine to be appropriate from time to time. The assets of the various plans include corporate equities, government securities, corporate debt securities and income producing real estate.

US Plan – US regular, full-time and part-time employees are covered by a noncontributory plan which is funded by company contributors to an irrevocable trust fund, which is held for the sole benefit of the employee. Retirement benefits are determined based on points accumulated for each year worked and final average compensation. Benefits become vested upon the completion of five years of service.

Non-US Plan – Most subsidiaries and branches outside the US have retirement plans covering substantially all regular employees, under which funds are deposited under various fiduciary-type arrangements, annuities are purchased under group contracts, or reserves are provided. Retirement benefits are based on years of service and the employee’s compensation, generally during a fixed number of years immediately prior to
retirement. The range of assumptions used for the non-US plans reflect the different economic environments within the various countries.

Net periodic pension cost is determined using the Project Unit Credit actuarial method. Prior service cost is amortized on a straight line basis over the average remaining service period of employees expected to receive benefits. An assumption is made for modified career average plans such that the average earnings base period will be updated to the years prior to retirement.

In 1994 the accumulated postretirement benefit obligation decreased $649 million as a result of the change in the assumed discount rate. Curtailment losses in 1994 and 1995 resulted from the significant reduction in the expected years of future service caused by termination programs and represent the immediate recognition of associated prior service cost and a portion of previously unrecognized actuarial losses.

Effective January 1, 2001, the company increased pension benefits to recipients who retired before January 1, 1997. The increases range from 2.5 percent to 25 percent, and are based on the year of retirement and the pension benefit currently being received. This improvement is expected to result in an additional cost to the company of approximately $100 million in 2001.

Effective July 1, 1999, the company amended the IBM Retirement Plan to establish the IBM Personal Pension Plan (the U.S. Plan). The new plan establishes a new formula for determining pension benefits for many of its employees. Under the amended U.S. Plan, a new formula was created whereby retirement benefits are credited to each employee’s cash balance account monthly based on a percentage of the employee’s pensionable compensation. Employees who were retirement eligible or within five years of retirement eligibility with at least one year of service, or who were at least forty years of age with at least ten years of service as of June 30, 1999, could elect to participate under the new formula or to have their service and earnings credit accrue under the preexisting benefit formula. Benefits become vested on the completion of five years of service under either formula.

Effective July 1, 1999, the company established a “Future Health Account” (FHA) for employees who were more than five years away from retirement eligibility. Employees who were within five years of retirement eligibility are covered under the
company’s prior retiree health benefits arrangements. Under either the FHA or the preexisting plan, there is a maximum cost to the company for retiree health benefits. For employees who retired before January 1, 1992, that maximum became effective in 2001. For all other employees, the maximum is effective upon retirement.

One of the principal components of the net periodic pension cost/ (income) calculation is the expected long-term rate of return on plan assets. The required use of expected long-term rates of return on plan assets may result in recognized pension income that is greater or less than the actual returns of those plan assets in any given year.

Over time, however, the expected long-term returns are designed to approximate the actual long-term returns and therefore result in a pattern of income and expense recognition that more closely matches the pattern of the services provided by the employees.

In 2006, certain non-U.S. pension plans were no longer considered material and, accordingly, prior-year amounts presented have been reclassified to conform to current-year presentation. In December 2005, the company amended the IBM Japan Pension Plan, which modified certain plan terms including a change in the method of calculating benefits for certain participants at December 31, 2005.

In 2006, the company redesigned certain non-U.S. defined benefit pension plans. The majority of the reduction was attributed to modified plans in the United Kingdom, Switzerland and the Netherlands. There were no significant amendments of the significant U.S. retirement-related benefit plans during the year ended December 31, 2006.
IBM Recruiting

IBM is committed to a diversified workforce and actively seeks qualified candidates who reflect the various markets served, including women, minorities, people with disabilities and gays and lesbians.

Each year, IBM recruiters attend more than 40 diversity focused conferences and career fairs to recruit from these constituencies.

IBM’s innovative “Why work?” marketing campaign, which began in the spring of 1999, is designed to reach the best and brightest campus and professional talent through a compelling dialogue about IBM’s strengths: its people, the work, the rewards, and its global presence. The recruiting campaign asks a series of provocative questions to get candidates to better evaluate their goals in seeking an employer.

Regarding its minority recruiting campaigns and the one for people with disabilities, IBM is working to promote the benefits of careers in technology in the African American community in cooperation with Career Communication Group.

IBM is an active participant in Entry Point, a program sponsored by the American Association for the Advancement of Science, IBM and NASA, dedicated to placing disabled young people in business and industry and preparing them for corporate and community leadership.

Its Project View, a national university recruitment program targets graduating seniors of diverse backgrounds for employment in a variety of technical fields.

In 1999, for the second year, WE Magazine recognized IBM as the best employer in America for people with disabilities.
Institutional Change

There is a number of ways in which change can be categorised, and the most are related to the extent of the change and whether it is seen as organic (often characterised as bottom-up) or driven (top-down).

Ackerman (1997) has distinguished between three types of change: developmental, transitional and transformational.

- Developmental change may be either planned or emergent; it is first order, or incremental. It is change that enhances or corrects existing aspects of an organisation, often focusing on the improvement of a skill or process.

- Transitional change seeks to achieve a known desired state that is different from the existing one. It is episodic, planned and second order, or radical.

- Transformational change is radical or second order in nature. It requires a shift in assumptions made by the organisation and its members.

Transformation can result in an organisation that differs significantly in terms of structure, processes, culture and strategy. It may, therefore, result in the creation of an organisation that operates in developmental mode – one that continuously learns, adapts and improves.

Episodic versus continuous change

Another distinction is between episodic and continuous change. Episodic change, according to Weick and Quinn (1999), is ‘infrequent, discontinuous and intentional’. Sometimes termed ‘radical’ or ‘second order’ change, episodic change often involves replacement of one strategy or programme with another. Continuous change, in contrast, is ‘ongoing, evolving and cumulative’. Also referred to as ‘first order’ or ‘incremental’ change, continuous change is characterised by people constantly adapting and editing ideas they acquire from different sources. At a collective level these continuous adjustments made simultaneously across units can create substantial change.

The distinction between episodic and continuous change helps clarify thinking about an organisation’s future development and evolution in relation to its long-term
goals. Few organisations are in a position to decide unilaterally that they will adopt an exclusively continuous change approach. They can, however, capitalise upon many of the principles of continuous change by engendering the flexibility to accommodate and experiment with everyday contingencies, breakdowns, exceptions, opportunities and unintended consequences that punctuate organisational life (Orlikowski, 1996).

“In all of my business career, I would have always said that culture is one of the five or six things you worry about if you're a leader. You worry about markets, and competitors, and financial assets and strategy. And somewhere on the list is culture. What I learned at IBM is that culture isn’t part of the game. It is the game.” - Louis Gerstner Jr.
CHAPTER III. METHODOLOGY

Chapter Overview

This chapter contains the research framework, and research model. The chapter also explains the financial statements and the source of the data. The framework shows how the variables are being tested and the research process explains the steps taken. Details of the method, procedure and instrumentation are given.

Research Framework

In order to understand the appropriate research approaches for producing new knowledge, and to make these activities manageable, a research framework is needed. It defines the categories of outputs that research can produce, and it also defines a set of different research activities. Moreover, it defines what kind of research activities can be used to produce specific outputs.

![Research Framework for analyzing the two models of the study](image)

*Figure 3.1. Research Framework for analyzing the two models of the study*
For this study, we have the below mentioned two research models.

**Model I** - aims at measuring profitability, represented by EPS, as a function of 4 independent variables, in time series, for the time period between the years 1990 and 2006.

\[ Y = f(x) = a_0 + b_1*x_1 + b_2*x_2 + b_3*x_3 + b_4*x_4 + \epsilon \]

The independent variables can be categorized into 4 main types:

1. Regional variables
   - Revenues for Europe/Middle East/ Africa geographical area
   - Revenues for Asia Pacific geographical area
   - Revenues for Americas geographical area
2. Strategic Business Units
   - Strategic Business Unit – Global Service
   - Strategic Business Unit – Hardware
   - Strategic Business Unit – Software
   - Strategic Business Unit – Global Financing, other Investments
3. Human Resource Strategy
   - Employee number evolution
   - Individuals benefiting from a Retirement Plan
4. Strategy variables
   - dummy variable – measuring the impact of a new CEO in 1993
   - dummy variable – measuring the impact of selling the Hardware department in 2002
Model II – aims at measuring the Human Resource Strategy, by using the number of employees and the number of individuals benefiting from a retirement plan, as a function of 3 independent variables, for the time period between the years 1990 and 2006.

\[ Y = f(x) = a_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + \epsilon \]

The independent variables can be categorized into 3 main types:

1. Regional variables
   - Revenues for Europe/Middle East/ Africa geographical area
   - Revenues for Asia Pacific geographical area
   - Revenues for Americas geographical area

2. Strategic Business Units
   - Strategic Business Unit – Global Service
   - Strategic Business Unit – Hardware
   - Strategic Business Unit – Software
   - Strategic Business Unit – Global Financing, other Investments

3. Strategy variable
   - dummy variable – measuring the impact of a new CEO in 1993
   - dummy variable – measuring the impact of selling the Hardware department in 2002
Research Model

The paper will try to explain IBM’s revolution and underline the actions that have made a difference in its financial position improvements, based on a change in the management system of the company, namely – the knowledge management system.

In order to attain this objective, a financial analysis will enable a better understanding of the situation, by focusing on a longitudinal time series study – highlighting the periods when change has taken place, between 1990 and 2006, with special focus on 1993 and 2002.

We can establish two research models, pertaining to the two independent variables measuring profitability (EPS), and the human resource policy (employee number):

Model I

\[ Y = f(x) = a_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + \varepsilon \]

Where:

\( Y = \textbf{Economic performance}, \) measured by EPS
\( x_1 = \text{Region variable (Europe/Middle East/Africa, Asia Pacific, America)} \)
\( x_2 = \text{Product variable (Global Service, Hardware, Software, Global Financing)} \)
\( x_3 = \text{Human resource policy} \)
\( x_4 = \text{Strategy variable (dummy variables related to the 1993 and 2002 strategic periods)} \)
Model II

\[ Y_i = f(x) = a_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + \varepsilon \]

Where:

Y = Human resource policy, measured by

a) the number of individuals benefiting from a retirement plan
b) the number of employees

\[ x_1 = \text{Region variable (Europe/Middle East/Africa, Asia Pacific, America)} \]
\[ x_2 = \text{Product variable (Global Service, Hardware, Software, Global Financing)} \]
\[ x_3 = \text{Strategy variable (dummy variables related to the 1993 and 2002 strategical periods)} \]

The most important thing to consider for variable selection would be to examine the meaning of the variables, according to Gorsuch (1988), that is, to check whether a variable is a good indicator of a factor extracted. For the data analysis, a stepwise variable selection will be used, the backward elimination process.

In backward elimination process, we derive formulas for fit measures of resultant models when one variable is removed successively from \( x_1 \) to \( x_n \) in the current model, starting with the full model and then eliminating at each step the one variable whose deletion will cause the residual sum of squares to increase the least.

In the backwards elimination procedure, we proceed as follows: fit the maximum model, examine the p-values and eliminate the variable with the highest p-value if it is greater than a pre-specified level, and to recompute the regression equation for the reduced model. The process is repeated until the variable with the highest p-value is below the criterion value.
The Financial Statements

Financial statements (or financial reports) are formal records of a business’ financial activities. These statements provide an overview of a business' profitability and financial condition in both short and long term. There are four basic financial statements:

- The Income Statement
- The Balance Sheet
- The Cash Flow Statements
- The Statement of Retained Earnings

The Income Statement

The income statement is basically the first financial statement we will come across in an annual report, containing the numbers most often discussed when a company announces its results - numbers such as revenue, earnings and earnings per share. Basically, the income statement shows how much money the company generated (revenue), how much it spent (expenses) and the difference between the two (profit) over a certain time period.

The amount of profits that a company produces during a specific period, is usually defined as a quarter (three calendar months) or a year. Earnings typically refer to after-tax net income. Ultimately, a business's earnings are the main determinant of its share price, because earnings and the circumstances relating to them can indicate whether the business will be profitable and successful in the long run.

Earnings are perhaps the single most studied number in a company's financial statements because they show a company's profitability. A business's quarterly and annual earnings are typically compared to analyst estimates and guidance provided by the business itself. In most situations, when earnings do not meet either of those estimates, a business's stock price will tend to drop. On the other hand, when actual earnings beat estimates by a significant amount, the share price will likely surge.
The balance sheet

The Balance Sheet is a financial statement that summarizes a company's assets, liabilities and shareholders' equity at a specific point in time. These three balance sheet segments give investors an idea as to what the company owns and owes, as well as the amount invested by the shareholders. It must follow the following formula:

\[ \text{Assets} = \text{Liabilities} + \text{Shareholders' Equity} \]

Each of the three segments of the balance sheet will have many accounts within it, that document the value of each. Accounts such as cash, inventory and property are on the asset side of the balance sheet, while on the liability side there are accounts such as accounts payable or long-term debt.

The balance sheet is one of the most important pieces of financial information issued by a company. It is a snapshot of what a company owns and owes at that point in time. The income statement, on the other hand, shows how much revenue and profit a company has generated over a certain period. Neither statement is better than the other - rather, the financial statements are built to be used together to present a complete picture of a company's finances.

Cash flow statements

Cash flow statements report a company’s inflows and outflows of cash. While an income statement can tell whether a company made a profit, a cash flow statement can tell whether the company generated cash. It uses and reorders the information from a company’s balance sheet and income statement.

The bottom line of the cash flow statement shows the net increase or decrease in cash for the period. Generally, cash flow statements are divided into three main parts. Each part reviews the cash flow from one of three types of activities: (1) operating activities; (2) investing activities; and (3) financing activities.
The statement of retained earnings

The statement of retained earnings also known as "statement of owner's equity" and "statement of net assets" for non-profit organizations, is one of the basic financial statements as per Generally Accepted Accounting Principles, and it explains the changes in company's retained earnings over the reporting period. It breaks down changes affecting the account, such as profits or losses from operations, dividends paid, and any other items charged or credited to retained earnings. It may appear in the balance sheet, in a combined income statement and changes in retained earnings statement, or as a separate schedule.

Source of Data

The financial data used in the present study is provided via website, through IBM’s Corporate Archives Web, where the public financial statements can be found. (http://www.ibm.com/annualreport/).

Additional data referring to revenues corresponding to each strategic business unit from all geographical areas have been applied for at IBM’s New York headquarters. Unfortunately, all requests have been denied.

The geographical delimitations have been originally set in the financial statements as presented above.
CHAPTER IV. RESULTS AND FINDINGS

Chapter Overview

This chapter contains two major sections: Descriptive Results; Empirical Results. The empirical section is further subdivided into: Empirical Results I and Empirical Results II which has two sub-objectives. The Discussion section is a thorough analysis of the implications from the descriptive and empirical results; this at the end of each section.

Descriptive Statistics

Before presenting the empirical results for the 2 models of the thesis, descriptive statistics will ease the better understanding of the evolution for the regional variables, strategic business units, human resource strategies, institutional change variables and for the EPS.

Figure 4.1. Time sequence evolution for EPS
In the evolution of EPS, the 2 strategy change turning points show the lowest values. In 1993, when Gerstner came to IBM, the company was going through a crisis, with a value close to 0 for EPS. The years that followed brought increasing financial performance. The second turning point, in 2002, shows another low point in the evolution of EPS. Nevertheless, in the following years the company’s profitability indicates exponential growth.

![Graph showing time sequence evolution for revenues from Europe/ Africa/ Middle East, Asia and America regions](image)

*Figure 4.2. Time sequence evolution for revenues from Europe/ Africa/ Middle East, Asia and America regions*

The evolutions for Europe and Asia regions follow a similar pattern, with the lowest point in 1993, the year when Gerstner came to IBM. Immediately after his arrival, and after he has introduced his restructuring policies, the evolution in revenue for the 2 areas started an ascending path. A second low point is observed in 2002, once with
selling the Hardware department of the company. After that point, an exponential growth in revenue can be seen, for both areas, underlining that the decision was favorable for the company.

America region’s evolution follows a slightly different pattern, where the effect of Gerstner’s policy change can be observed later than for the previous 2 areas, but the effect of these policies is much stronger for this area. In 2002 there is a low point in the evolution, comparable with the other regions. After 2002, America also has a growth in revenues, but not as strong as the other 2 regions.

As a conclusion, both strategy changes, in 1993 and 2002 had positive effects on all regions.

Figure 4.3. Time sequence evolution for revenues from Europe/ Africa/ Middle East, Asia and America regions and EPS

The above graph presents the evolution of the 3 regions in terms of revenue, and the according evolution of the EPS. Comparatively, the evolution of the EPS is similar and follows the same trends, presenting the lowest points in 1993 and 2002.
Table 4.1. Evolution of EPS, and revenue from the Regional Variables

<table>
<thead>
<tr>
<th>Year</th>
<th>EPS</th>
<th>Europe/ Africa/ Middle East</th>
<th>Asia</th>
<th>America</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>0.62</td>
<td>26125</td>
<td>11547</td>
<td>26851</td>
</tr>
<tr>
<td>1993</td>
<td>-0.02</td>
<td>22850</td>
<td>11472</td>
<td>28394</td>
</tr>
<tr>
<td>1994</td>
<td>1.24</td>
<td>24821</td>
<td>13241</td>
<td>25990</td>
</tr>
<tr>
<td>1995</td>
<td>2.55</td>
<td>27768</td>
<td>16590</td>
<td>27582</td>
</tr>
<tr>
<td>1996</td>
<td>2.71</td>
<td>27735</td>
<td>17533</td>
<td>30679</td>
</tr>
<tr>
<td>1997</td>
<td>3.29</td>
<td>26432</td>
<td>18721</td>
<td>33355</td>
</tr>
<tr>
<td>1998</td>
<td>4.12</td>
<td>25700</td>
<td>15200</td>
<td>42434</td>
</tr>
<tr>
<td>1999</td>
<td>4.44</td>
<td>24300</td>
<td>17700</td>
<td>43089</td>
</tr>
<tr>
<td>2000</td>
<td>4.35</td>
<td>24000</td>
<td>17200</td>
<td>41867</td>
</tr>
<tr>
<td>2001</td>
<td>2.06</td>
<td>24260</td>
<td>17153</td>
<td>39773</td>
</tr>
<tr>
<td>2002</td>
<td>3.76</td>
<td>29102</td>
<td>19317</td>
<td>40712</td>
</tr>
<tr>
<td>2003</td>
<td>4.38</td>
<td>32068</td>
<td>21276</td>
<td>42949</td>
</tr>
<tr>
<td>2004</td>
<td>4.91</td>
<td>30428</td>
<td>18618</td>
<td>42088</td>
</tr>
<tr>
<td>2005</td>
<td>6.06</td>
<td>30491</td>
<td>17566</td>
<td>43367</td>
</tr>
</tbody>
</table>

Figure 4.4. Time sequence evolution for Global Service, Hardware and Software strategic business units
Table 4.2. Evolution of revenue from the SBU

<table>
<thead>
<tr>
<th>year</th>
<th>Global Service $ million</th>
<th>Hardware $ million</th>
<th>Software $ million</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>14987</td>
<td>33755</td>
<td>11103</td>
</tr>
<tr>
<td>1993</td>
<td>17006</td>
<td>30591</td>
<td>10953</td>
</tr>
<tr>
<td>1994</td>
<td>16937</td>
<td>32344</td>
<td>11346</td>
</tr>
<tr>
<td>1995</td>
<td>20123</td>
<td>35600</td>
<td>12657</td>
</tr>
<tr>
<td>1996</td>
<td>22854</td>
<td>36316</td>
<td>13052</td>
</tr>
<tr>
<td>1997</td>
<td>25166</td>
<td>36630</td>
<td>11164</td>
</tr>
<tr>
<td>1998</td>
<td>28916</td>
<td>35419</td>
<td>11863</td>
</tr>
<tr>
<td>1999</td>
<td>32172</td>
<td>36083</td>
<td>12662</td>
</tr>
<tr>
<td>2000</td>
<td>33152</td>
<td>34476</td>
<td>12598</td>
</tr>
<tr>
<td>2001</td>
<td>34971</td>
<td>32313</td>
<td>12958</td>
</tr>
<tr>
<td>2002</td>
<td>36360</td>
<td>27456</td>
<td>13074</td>
</tr>
<tr>
<td>2003</td>
<td>42635</td>
<td>28239</td>
<td>14311</td>
</tr>
<tr>
<td>2004</td>
<td>46283</td>
<td>31193</td>
<td>16141</td>
</tr>
<tr>
<td>2005</td>
<td>47407</td>
<td>24343</td>
<td>16830</td>
</tr>
<tr>
<td>2006</td>
<td>48277</td>
<td>22499</td>
<td>18204</td>
</tr>
</tbody>
</table>

The 3 SBUs have different evolutions. Hardware SBU was decreasing by the time Gerstner came to IBM, but in the following years it started going back on tracks. Still, in 2002, when it was sold to Hitachi, it reached its lowest point.

Software SBU had a relatively constant evolution, but with a visible improvement after 2002, when revenues from this sector grow at a higher rate, after selling the Hardware SBU.

Global Service SBU had a dramatic improvement in its evolution after Gerstner came into the company. In the years that followed, the development of this SBU was exponential. In 2002 started the second period of exponential growth; once IBM changed its focus from the Hardware production towards offering Global Services.
Figure 4.5. Time sequence evolution for number of employees and retirement plan beneficiaries

The number of employees was decreasing even before Gerstner’s arrival, but after he reshaped the company’s strategies, the number increased again. Even after selling the Hardware department, the good human resources policies allowed keeping a relatively constant number of employees.

The number of individuals benefiting from a retirement plan kept the same evolution a linear growth, with no dramatic fluctuations.
Table 4.3. Evolution of HR policies

<table>
<thead>
<tr>
<th>year</th>
<th>Employees</th>
<th>Retirement Plan Beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>344000</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>302000</td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td>256000</td>
<td>78000</td>
</tr>
<tr>
<td>1994</td>
<td>220000</td>
<td>85000</td>
</tr>
<tr>
<td>1995</td>
<td>225000</td>
<td>92000</td>
</tr>
<tr>
<td>1996</td>
<td>241000</td>
<td>101000</td>
</tr>
<tr>
<td>1997</td>
<td>269000</td>
<td>108000</td>
</tr>
<tr>
<td>1998</td>
<td>291000</td>
<td>117000</td>
</tr>
<tr>
<td>1999</td>
<td>307000</td>
<td>124000</td>
</tr>
<tr>
<td>2000</td>
<td>316000</td>
<td>129000</td>
</tr>
<tr>
<td>2001</td>
<td>320000</td>
<td>131000</td>
</tr>
<tr>
<td>2002</td>
<td>316000</td>
<td>136000</td>
</tr>
<tr>
<td>2003</td>
<td>319000</td>
<td>136000</td>
</tr>
<tr>
<td>2004</td>
<td>329000</td>
<td>140000</td>
</tr>
<tr>
<td>2005</td>
<td>329000</td>
<td>137000</td>
</tr>
<tr>
<td>2006</td>
<td>356000</td>
<td></td>
</tr>
</tbody>
</table>
Empirical Results

The empirical results for model I

By using the backward elimination process, after examining the p-values for the 10 independent variables, the highest not significant one is eliminated. This process is repeated 4 times, in 4 equations, until all remaining independent variables reach at least the 10% level of significance.

The parameter for each variable represents the percent change in the EPS due to a 1% change in the independent variable.

Table 4.1 shows the empirical results for earn per share (EPS) as a function of regional variables, strategic business units, human resource policy and institutional change.

Eq. 1 presents the effect of 10 variables, among which only 1 is significant. This happens because we lose one degree of freedom for each parameter estimated prior to estimating the residual standard deviation. Degrees of freedom are calculated from the size of the sample. For this study, we have information available for only 16 years, and for the present equation, 10 variables. They are a measure of the amount of information from the sample data that has been used up.

Out of the 10 variables, 3 of them have negative parameters, and one of them, (x₈) is significant at 10% level. The other 7 variables have positive parameters, but are not significant.

The parameter for the number of individuals benefiting from a retirement plan (x₈) is negative (-0.201), with the t ratio (-2.425), indicating that it is significant at the 10% level. The higher the number of individuals benefiting from a retirement plan (x₈), the lower the company’s EPS.

The R² for this equation is 0.995. It explains 99.5% of the variance of EPS using Regional variables, SBU, HR related Strategies and variables for Institutional change.

In Eq. 2, one of the Institutional Change variables (x₁₀) is no longer included. This is the first variable dropped, because of the lowest t ratio in Eq. 1.
We have 2 variables with negative parameters ($x_1$ and $x_8$), both of them significant at 5% level. The other 7 variables have positive parameters, and one ($x_9$) became significant at 10% level.

The parameter for Europe/Asia/Middle East ($x_1$) is negative (-0.445), and significant, with t ratio (-2.896), at the 5% significance level. The other 2 regional variables, Asia and America, ($x_2$) and ($x_3$) are positive, but not significant.

The parameter for the number of individuals benefiting from a retirement plan ($x_8$) is negative (-0.201), with a ratio (-3.244), significant at 5% level.

The results from ($x_9$), Gerstner’s strategy change, are positive and became significant, t ratio (2.660) at the 10% significance level. The Institutional change in the company had a positive effect on IBM’s financial performance.

$R^2$ for Eq$_2$ remains at the previous value, 0.995, explaining 99.5% of the variance in the EPS.

For Eq$_3$, after dropping $x_7$, out of the 8 variables, 5 are significant. Two have negative parameters. Two variables are significant at 10% level, 1 at 5% level and 2 at 1% level.

The parameter for Europe/Middle East/Africa is negative (-0.438) and significant at the 5% significance level. Results from Asia and America continue to be not significant.

For the SBU variables, Global Services ($x_4$), and Software ($x_6$), became significant at the 10% significance level.

The significance for $x_8$ grew as a result of dropping $x_{10}$ in the previous equation. The t ratio (-5.098) indicates significance on 1% level. The higher the number of individuals benefiting from a retirement plan, the lower the company’s profitability.

The significance for $x_9$ has also risen. The t ratio (5.363) shows a significance on the 1% level. For this equation, this is the dominant variable, due to its highest t ratio. Gerstner’s policy changes had a positive impact on IBM’s profitability.

$R^2$ continues to have the value from the previous 2 equations, (0.995), explaining 99.5% of the variance in EPS.

57
In Eq.4, all variables became significant at least at 10% level. Of the 7 significant variables, 2 have a negative parameter, 1 is significant at 10% level, 1 at 5% level and 5 at 1% level.

Table 4.1. Multiple regression analysis of Earn Per Share and Regional variables, Strategic Business Units, Human Resource Policy and Institutional Change

<table>
<thead>
<tr>
<th>x_i</th>
<th>Region/Variable</th>
<th>Eq.1</th>
<th>Eq.2</th>
<th>Eq.3</th>
<th>Eq.4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>β value (t-value)</td>
<td>β value (t-value)</td>
<td>β value (t-value)</td>
<td>β value (t-value)</td>
<td>β value (t-value)</td>
</tr>
<tr>
<td>x_1</td>
<td>Europe/Middle East/Africa</td>
<td>-0.444 (-1.938)</td>
<td><strong>-0.445</strong> (-2.896)</td>
<td><strong>-0.438</strong> (-3.271)</td>
<td><strong>-0.345</strong> (-3.541)</td>
</tr>
<tr>
<td>x_2</td>
<td>Asia</td>
<td>0.311 (1.317)</td>
<td>0.311 (1.521)</td>
<td>0.311 (1.693)</td>
<td><strong>0.464</strong> (4.415)</td>
</tr>
<tr>
<td>x_3</td>
<td>America</td>
<td>0.249 (1.082)</td>
<td>0.250 (1.262)</td>
<td>0.260 (1.528)</td>
<td><strong>0.418</strong> (6.091)</td>
</tr>
<tr>
<td>x_4</td>
<td>Global Services</td>
<td>0.296 (1.292)</td>
<td>0.295 (1.875)</td>
<td>0.287* (2.129)</td>
<td><strong>0.153</strong>* (5.299)</td>
</tr>
<tr>
<td>x_5</td>
<td>Hardware</td>
<td>0.154 (0.792)</td>
<td>0.154 (0.921)</td>
<td>0.152 (1.015)</td>
<td></td>
</tr>
<tr>
<td>x_6</td>
<td>Software</td>
<td>0.400 (1.244)</td>
<td>0.402 (1.792)</td>
<td>0.411* (2.095)</td>
<td><strong>0.387</strong>* (1.985)</td>
</tr>
<tr>
<td>x_7</td>
<td>Employee</td>
<td>0.004 (0.150)</td>
<td>0.004 (0.175)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>x_8</td>
<td>Individuals benefiting from Retirement plan</td>
<td>-0.201* (-2.425)</td>
<td>-0.201** (-3.244)</td>
<td>-0.193*** (-5.098)</td>
<td>-0.208*** (-5.989)</td>
</tr>
<tr>
<td>x_9</td>
<td>td 1 – Gerstner</td>
<td>3.745 (2.297)</td>
<td><strong>3.744</strong>* (2.660)</td>
<td><strong>3.535</strong>* (5.363)</td>
<td><strong>3.833</strong>* (6.478)</td>
</tr>
<tr>
<td>x_10</td>
<td>td 2 – selling Hardware</td>
<td>-0.14 (-0.008)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

R^2  | 0.995 | 0.995 | 0.995 | 0.994 |

*p < 0.1  **p < 0.05  ***p < 0.01
Hypothesis 1 – Regional Variables

a) The parameter for Europe/ Middle East/ Africa is negative (-0.345) and significant at the 5% level, with t ratio (-3.541).

The European market contributes negatively to the company’s profitability. At this point, the market reached its saturation point, when any additional investment would lead only to decreasing returns on investment. It is recommended to shrink the size of the market.

Financial results from Europe/ Middle East/ Africa ($x_1$) have a significant impact on IBM’s profitability.

Reject the null hypothesis, and accept the alternative

$\beta_{yx} \neq 0$

b) The parameter for Asia is positive (0.464), with t ratio of (4.415) and significant on the 1% level.

The Asian market contributes positively to increasing the company’s EPS, and it should be further expanded. Additional investment would bring increasing ROI.

Financial results from Asia ($x_2$) have a significant impact on IBM’s profitability.

Reject the null hypothesis, and accept the alternative.

$\beta_{yx} \neq 0$

c) The parameter for America is also positive (0.418), with t ratio of (6.091) and it is significant on the 1% level.

The American market contributes positively to increasing IBM’s profitability, and it should be further expanded. Additional investment would bring increasing ROI.

Financial results from America ($x_3$) have a significant impact on IBM’s profitability.

Reject the null hypothesis, and accept the alternative

$\beta_{yx} \neq 0$
Hypothesis 2 - SBU

a) The parameter for Global Services SBU ($x_4$) is positive (0.153) with t ratio (5.299). The variable is significant at the 1% level. The higher the activity for the Global Service department of the company, the higher the EPS.
Reject the null hypothesis, and accept the alternative
$\beta_{YX} \neq 0$

b) The parameter for Hardware SBU ($x_5$) is not significant at 10% level.
Accept the null hypothesis
$\beta_{YX} = 0$

c) The parameter for the Software SBU ($x_6$) indicates a positive relationship (0.387), with a t ratio of (1.985), significant at the 1% level. The higher the activity for the Software department of the company, the higher the EPS.
Reject the null hypothesis, and accept the alternative
$\beta_{YX} \neq 0$

Hypothesis 3 – Human Resource Strategies

a) The number of IBM’s employees ($x_7$) is not significant at 10% level.
Accept the null hypothesis
$\beta_{YX} = 0$

b) The parameter for $x_8$ is negative (-0.208), with a high t ratio (-5.989), and significant at 1% significance level. The higher the number of individuals benefiting from a retirement plan, the lower the company’s profitability.
Reject the null hypothesis, and accept the alternative
$\beta_{YX} \neq 0$
Hypothesis 4 – Institutional Change Variables

a) The parameter for $x_9$ is positive (3.833), with the highest t ratio (6.478), which make this Institutional Change variable the dominant one in the equation. It is significant at 1% significance level. Gerstner’s policy changes had a positive impact on IBM’s profitability.

Reject the null hypothesis, and accept the alternative

$\beta_{yX} \neq 0$

b) Selling the Hardware department ($x_{10}$) has no significant impact in determining the company’s profitability.

Because the Hardware department was sold in 2002, the time period until now is not enough to denote a significant impact of the change.

Accept the null hypothesis

$\beta_{yX} = 0$

$R^2$ stands at 0.994, therefore, the model can explain 99.4% of the variance in EPS.
Table 4.2 shows the empirical results for **Individuals benefiting from a Retirement Plan**, as one of the Human Resource policies, as a function of regional variables, strategic business units, human resource policy and institutional change. In order to measure HR policies, the same process will be used, as in model 1, the backward elimination process.

The 10 independent variables are run against the dependent variable, and the one showing the highest not significant p value will be eliminated. The process is repeated until all the independent variables left are significant at least at 10% level.

**Eq1** and **Eq2** present the effect of 8, respectively 7 variables, among which none is significant.

In **Eq3**, after 2 of the SBU variables are dropped ($x_4$ and $x_6$), 4 variables are significant. Two have negative parameters. Three variables are significant on the 1% level, and one on the 10% level.

$x_1$ and $x_7$ have positive parameters, but are not significant.

The parameter for Asia ($x_2$) and America ($x_3$) are both positive and significant at 1% level. The higher the revenues from the 2 areas, the higher the number of individuals benefiting from a retirement plan.

The parameter for Hardware SBU ($x_5$) is negative (-1.558), t ratio (-3.555), significant at 1% level. Global Service SBU ($x_4$) and Software SBU ($x_6$) are not significant.

The parameter for Selling the Hardware department ($x_8$) is negative (-13.653) and significant at 10% level. The second Institutional Change variable, ($x_7$) is not significant.

The $R^2$ for this equation is 1.00. It explains 100% of the variance of the number of individuals benefiting from a retirement plan, using Regional variables, SBUs and variables for Institutional change.

In **Eq4**, after dropping $x_7$, 4 variables are significant, 3 at 1% level and 1 at 5% level, of which 1 has a negative parameter.
Table 4.2. Multiple regression analysis of Individuals benefiting from a Retirement Plan, Strategic Business Units, Human Resource Policy and Institutional Change

<table>
<thead>
<tr>
<th>Y = Individuals benefiting from a Retirement Plan</th>
<th>Eq1</th>
<th>Eq2</th>
<th>Eq3</th>
<th>Eq4</th>
</tr>
</thead>
<tbody>
<tr>
<td>x_1 Europe/ Mid East/Africa</td>
<td>1.262 (0.748)</td>
<td>1.011 (1.227)</td>
<td>1.102 (1.745)</td>
<td>1.139 (1.630)</td>
</tr>
<tr>
<td>x_2 Asia</td>
<td>2.361 (1.568)</td>
<td>2.409 (1.775)</td>
<td><strong>2.644</strong>* (4.408)</td>
<td><strong>3.087</strong>* (5.175)</td>
</tr>
<tr>
<td>x_3 America</td>
<td>2.142 (1.516)</td>
<td>2.180 (1.705)</td>
<td><strong>2.430</strong>* (16.064)</td>
<td><strong>2.459</strong>* (14.776)</td>
</tr>
<tr>
<td>x_4 Global Services</td>
<td>0.375 (0.227)</td>
<td>0.285 (0.198)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>x_5 Hardware</td>
<td>-1.364 (-0.984)</td>
<td>-1.328 (-1.058)</td>
<td><strong>-1.558</strong>* (-3.555)</td>
<td><strong>-1.631</strong>* (-3.378)</td>
</tr>
<tr>
<td>x_6 Software</td>
<td>-0.420 (-0.176)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x_7 td 1 – Gerstner</td>
<td>6.306 (1.036)</td>
<td>6.715 (1.303)</td>
<td>7.172 (1.676)</td>
<td></td>
</tr>
<tr>
<td>x_8 td 2 – selling Hardware</td>
<td>-15.841 (-1.403)</td>
<td>-14.596 (-1.810)</td>
<td><strong>-13.653</strong>* (-2.261)</td>
<td><strong>-15.499</strong>* (-2.358)</td>
</tr>
</tbody>
</table>

R^2

1.00 1.00 1.00 0.999

*p < 0.1  **p < 0.05  ***p < 0.01

Hypothesis 5.1 – Regional Variables

a) The parameter for **Europe/ Middle East/ Africa** is not significant at the 10% level.

Accept the null hypothesis

β_YX = 0
b) The parameter for **Asia** is positive (3.087), with t ratio of (5.175) and significant on the 1% level.
Financial results from Asia \( (x_2) \) have a significant impact on the number of individuals benefiting from a retirement plan. The larger the revenues from this area, the larger the number of beneficiaries.
Reject the null hypothesis, and accept the alternative
\[ \beta_{yx} \neq 0 \]

c) The parameter for **America** is also positive (2.459), with t ratio of (14.776) and it is significant on the 1% level.
Financial results from America \( (x_3) \) have a significant impact on the number of individuals benefiting from a retirement plan. The larger the revenues from this area, the larger the number of beneficiaries.
Reject the null hypothesis, and accept the alternative
\[ \beta_{yx} \neq 0 \]

**Hypothesis 6.1 - SBU**

a) The parameter for **Global Services** SBU \( (x_4) \) is not significant at 10% level.
Accept the null hypothesis
\[ \beta_{yx} = 0 \]

b) The parameter for **Hardware** SBU \( (x_5) \) is negative (-1.631), with t ratio (-3.378), significant at 1% level.
The higher the activity for the Hardware department of the company, the lower the number of individuals benefiting from a retirement plan.
Reject the null hypothesis, and accept the alternative
\[ \beta_{yx} \neq 0 \]

c) The parameter for the **Software** SBU \( (x_6) \) is not significant at 10% level.
Accept the null hypothesis
\[ \beta_{yx} = 0 \]
Hypothesis 7.1 – Institutional Change Variables

a) Gerstner’s policy changes ($x_7$) is not significant at 10% level.
   Accept the null hypothesis
   \[ \beta_{YX} = 0 \]

b) The parameter for $x_8$ is negative (-15.499), with t ratio (-2.358). It is significant at 5% significance level.
   Selling the Hardware department had a negative impact on the number of individuals benefiting from a retirement plan.
   Reject the null hypothesis, and accept the alternative
   \[ \beta_{YX} \neq 0 \]

R² stands at 0.999, therefore, the model can explain 99.9% of the variance in the number of individuals benefiting from a retirement plan.
The empirical results for model II, sub-objective 2

Table 4.3 shows the empirical results for **Individuals Number of Employees**, as one of the Human Resource policies, as a function of regional variables, strategic business units, human resource policy and institutional change. In order to measure HR policies, the same process will be used, as in model I and II, sub-objective 1, the backward elimination process.

The 10 independent variables are run against the dependent variable, and the one showing the highest not significant p value will be eliminated. The process is repeated until all the independent variables left are significant at least at 10% level.

**Eq1** presents the effect of 8 variables, among which only 1 is significant.

Out of the 8 variables, 5 of them have negative parameters, and one of them, \(x_7\) is significant at 5% level. The other 3 variables have positive parameters, but are not significant.

The parameter for Gerstner’s strategy change \(x_7\) is negative (-68.882), with the t ratio (-3.346), indicating that it is significant at the 5% level.

The \(R^2\) for this equation is 0.998. It explains 99.8% of the variance of the number of employees using Regional variables, SBUs and variables for Institutional change.

In **Eq2**, one of the SBU variables \(x_4\) is no longer included. This is the first variable dropped, because of the lowest t ratio in Eq1.

We have 4 variables with negative parameters, of which one \(x_7\) is significant at 5% level. The other 3 variables have positive parameters, and one \(x_3\) became significant at 1% level.

The parameter for America \(x_3\) is positive (6.606) and significant at 1% level. The other 2 regional variables are not significant.

The parameter for Gerstner’s strategy change \(x_7\) is negative (-69.241) and significant at 5% level. The second Institutional Change variable, \(x_8\) is not significant.

The \(R^2\) for this equation is 0.998. It explains 99.8% of the variance of the number of employees.
In Eq3, after dropping $x_6$, 5 variables are significant, 2 at 1% level and 1 at 5% level, and 2 at 10% level. Three of them have negative parameters.

Table 4.3. Multiple regression analysis of Number of Employees, Strategic Business Units, Human Resource Policy and Institutional Change

<table>
<thead>
<tr>
<th>$Y = \text{Number of Employees}$</th>
<th>Eq1</th>
<th>Eq2</th>
<th>Eq3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$x_i$</td>
<td>$\beta$ value (t-value)</td>
<td>$\beta$ value (t-value)</td>
<td>$\beta$ value (t-value)</td>
</tr>
<tr>
<td>$x_1$</td>
<td>Europe/Mid East/Africa</td>
<td>9.635 (1.414)</td>
<td>9.574 (1.533)</td>
</tr>
<tr>
<td>$x_2$</td>
<td>Asia</td>
<td>3.009 (0.466)</td>
<td>2.754 (0.964)</td>
</tr>
<tr>
<td>$x_3$</td>
<td>America</td>
<td>6.864 (1.164)</td>
<td><strong>6.606</strong>* (5.798)</td>
</tr>
<tr>
<td>$x_4$</td>
<td>Global Services</td>
<td>-0.299 (-0.045)</td>
<td></td>
</tr>
<tr>
<td>$x_5$</td>
<td>Hardware</td>
<td>-4.557 (-0.770)</td>
<td>-4.338 (-1.399)</td>
</tr>
<tr>
<td>$x_6$</td>
<td>Software</td>
<td>-2.805 (-0.324)</td>
<td>-2.833 (-0.351)</td>
</tr>
<tr>
<td>$x_7$</td>
<td>td 1 – Gerstner</td>
<td>-68.882** (-3.346)</td>
<td>-69.241** (-3.905)</td>
</tr>
<tr>
<td>$x_8$</td>
<td>td 2 – selling Hardware</td>
<td>-58.984 (-1.305)</td>
<td>-60.140 (-1.734)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.998</td>
<td>0.998</td>
<td>0.998</td>
</tr>
</tbody>
</table>

*p < 0.1  **p < 0.05  ***p < 0.01
Hypothesis 5.2 – Regional Variables

a) The parameter for **Europe/Middle East/Africa** is positive (7.563), with t ratio of (3.190) and significant on the 5% level.
   Financial results from Europe / Middle East/ Africa ($x_1$) have a significant impact on the number of the company’s employees. The larger the revenues from this area, the larger the number of employees.
   Reject the null hypothesis, and accept the alternative.
   $\beta_{yx} \neq 0$

b) The parameter for **Asia** ($x_2$) is not significant at 10% level.
   Accept the null hypothesis
   $\beta_{yx} = 0$

c) The parameter for **America** is positive (6.299), with t ratio of (9.084) and it is significant on the 1% level.
   Financial results from America ($x_3$) have a significant impact on the number of IBM’s employees. The larger the revenues from this area, the larger the number of employees.
   Reject the null hypothesis, and accept the alternative
   $\beta_{yx} \neq 0$

Hypothesis 6.2 - SBU

a) The parameter for **Global Services** SBU ($x_4$) is not significant at 10% level.
   Accept the null hypothesis
   $\beta_{yx} = 0$

b) The parameter for **Hardware** SBU ($x_5$) is negative (-3.467), with t ratio (-1.959), significant at 10% level.
   The higher the activity for the Hardware department of the company, the lower the number employees.
Reject the null hypothesis, and accept the alternative

\[ \beta_{YX} \neq 0 \]

c) The parameter for the Software SBU \((x_6)\) is not significant at 10\% level.
Accept the null hypothesis

\[ \beta_{YX} = 0 \]

**Hypothesis 7.2 – Institutional Change Variables**

a) The parameter for \(x_7\) is negative (-69.169), with t ratio (-4.106). It is significant at 1\% significance level.

*Gerstner’s policy changes* \((x_7)\) had a negative impact on the number of employees.

Reject the null hypothesis, and accept the alternative

\[ \beta_{YX} \neq 0 \]

b) The parameter for \(x_8\) is negative (-52.982), with t ratio (-1.987). It is significant at 10\% significance level.

*Selling the Hardware* department had a negative impact on the number of the company’s employees.

Reject the null hypothesis, and accept the alternative

\[ \beta_{YX} \neq 0 \]

R\(^2\) stands at 0.998, therefore, the model can explain 99.8\% of the variance in the number of employees.
CHAPTER V. CONCLUSIONS AND RECOMMENDATIONS

By using this approach, in order to measure the impact of global strategies, strategic business units and policy change strategies on IBM’s performance, an econometrics model was first built by Shih and Plescan. The above mentioned dimensions proved to be highly significant when facing change. On facing globalization, the multinational company had to focus on the regional development strategies. Also, due to the rapid technology changes, it had to find its core competencies, and efficiently expand them, as part of the company’s strategic business units. The final touch was given by the new, charismatic CEO, who brought a different vision, introducing new business strategies, dramatically changing IBM’s financial performance and human resource policies. The thesis provides a better understanding of what are the strategic revenue sources for the company, as well as where the company should reconsider further investment. It also highlights the factors that work together towards the employees’ wellbeing inside the company, through its human resource policies.

Regarding the regional variables, the Europe/ Africa/ Middle East market contributes negatively to the company’s profitability. At this point, the market reached its saturation point, when any additional investment would lead only to decreasing returns on investment. It is recommended to shrink the size of the market. The financial results from this area have a significant impact on the number of the company’s employees which implies the larger the revenues from this area, the larger the number of employees. On the other hand, the Asian and American markets contribute positively to increasing IBM’s profitability, and it should be further expanded. Additional investment would bring increasing ROI. Also, financial results from these 2 areas have a significant impact on the number of individuals benefiting from a retirement plan which suggests the larger the revenues, the larger the number of beneficiaries.

Regarding the SBU, Global Services and Software SBU positively influence IBM’s financial performance, remarkably without negatively influencing the HR policies, and indirectly the employees’ wellbeing. Regarding the institutional change variables, Gerstner’s policy change had a positive impact on IBM’s financial performance, correlated with a negative impact on the number of employees.
Conclusions

From the financial point of view, for objective I of the study, it can be concluded that Asia and America are the regions where IBM should increase its investment. Parameters for both areas are positive (0.464), respectively (0.418), and significant on 1% level. These markets still have a potential for growth, absorbing the products and the services, with a good return of investment. On the other hand, further investment in Europe/ Middle East/ Africa seems to reduce the company’s profitability, having a negative parameter (-0.345). Divestment is recommended.

As for the internal business structure, Global Service SBU and Software SBU are the income sources, bringing plus value to the company. Parameters for both SBU are positive (0.153), respectively (0.387), and significant on 1% level. The higher the activity for these departments of the company, the higher the EPS. Gerstner was the first to understand the vital importance of developing these 2 SBU, and therefore introduced the knowledge intensive policies meant to put an emphasis on service offering.

Investments in retirement plans reduce the company’s profitability. The parameter is negative (-0.208) and significant at 1% significance level.

Gerstner’s policies brought improved financial performance. The parameter is positive (3.833), and significant at 1% significance level. His fresh overview over the general situation had the necessary clearness and precision required for optimizing the company’s strategies, and improve its financial performance. Among all variables considered in determining the financial performance of IBM, Gerstner’s new policies had the strongest impact.

Regarding the human resource policies, for sub-objective one, the number of individuals benefiting from a retirement plan is positively affected by the revenues from Asia and America. Parameters for both areas are positive (3.087), respectively (2.459), and significant on 1% level, meaning that the larger the revenues from these areas, the larger the number of retirement plan beneficiaries.

As for the internal business structure, the activity in the Hardware SBU has a negative effect. The parameter is negative (-1.631) and significant at 1% level, leading to a decreasing number of individuals benefiting from a retirement plan.
Selling the Hardware department leads to a serious reduction in the number of retirement plan beneficiaries. The parameter is negative (-15.499) and significant at 5% level. Among all variables considered in determining the number of retirement plan beneficiaries, selling the Hardware department had the strongest impact.

For the second sub-objective in human resource policies, the number of employees, Europe/ Middle East/ Africa and America regions have a positive influence, with positive parameters, (7.563), respectively (6.299), growth in these areas leading to an increasing number of employees.

Nevertheless, the increased activity in the Hardware SBU led to a decreasing number of employees. The parameter is negative (-3.467) and significant at 10% level.

The same negative effect was noticed after Gerstner’s policies in 1993, when he laid off an increased number of employees, and also, after selling the hardware department in 2002. Both parameters are negative and extremely high (-69.169), respectively (-52.982). Among all variables considered in determining the evolution of the number of employees, these last 2 variables have the strongest influence.

One highly important finding is the fact that the Institutional Change variables (Gerstner’s policy change and selling the hardware department) have constantly had the strongest impact in determining both financial performance and human resource policies.

A second important finding is the fact that IBM successfully succeeded to combine and manage both aspects – financial capital and human capital. Even though financial performance is any company’s objective, in IBM’s case the 2 objectives are efficiently interconnected and work together in a lucrative manner. IBM understood the importance of the “fit person to the job” concept, and the importance of a knowledge-based working environment, meant to support and help employees develop their skills.

IBM’s financial strength is given by its people.
Discussions

In order to put into evidence not only the theoretical effect of the independent variables (regional, strategic business units and institutional change variables) on the three dependent variables, but also the practical significance of the findings, the following figure (Fig. 5.1.) is used.

In analyzing the external factors that contribute to the evolution of EPS, it is becoming clear that the markets that have a beneficial effect on increasing the level of profitability are Asia and America, while Europe/ Middle East/ Africa are absorbing the resources rather than have a positive effect on the company’s ROI. Given the fact that the revenues in IBM’s financial statements are presented consolidated for the 3 areas (Europe, Middle East and Africa), if considered separately, in a future research, the outcomes of the analysis could change significantly.

Figure 5.1. Independent variables distribution in terms of positive / negative effect on the dependent variable
Regarding the **internal structure** of the company, the SBUs, Global Service and Software are the major profitability sources. Gerstner’s new policies also contributed significantly to raising the level of the EPS. On the other hand, retirement plans have shown a negative effect on profitability, still, the company did not reduce the number of beneficiaries. This strategy is meant to underline the skillful way in which IBM managed to successfully combine both good human resource policies - oriented towards the employees, with profitability growth strategies, not putting an emphasis solely on generating money.

When considering both dimensions the same time (financial aspect and human resources policies), it becomes clear that America region is present in all cases among the positive aspects, both profit generator and positively contributing to the HR policies as well. On the other hand, hardware SBU and selling the hardware department had a negative impact on both aspects of HR policies.
Recommendations

Recommendations for IBM

Starting from the 90’s, Gerstner reshaped IBM’s vision and reconsidered its objectives. It is an ongoing process, but IBM presently has the necessary flexibility to adapt and quickly respond to the market fluctuations. Gerstner’s coming into IBM brought the “shock therapy” which has put back on track the stranded giant. Since the 90’s, the evolution was positive on both financial perspectives and human resource policies, with increasing performance and competitiveness in all areas.

Future market evolution is difficult to predict. Nevertheless, in trying to anticipate and foresee future challenges, the eyes of the company have to be wide open, its ears listening and its internal communication has to be perfect.

The past experiences stand as a proof in time and as an example of what is Not to be done, since global costs of damage control are increasing and the time for taking rectifying actions is shrinking. The measure unit for time is changing, and IBM understood.

Recommendations for future research

Due to the limitations and delimitations previously mentioned in chapter I, and to the fact that further information was unavailable during the time the research was in progress, a number of suggestions for further research arise:

1. Research pertaining to a longer period of time, before 1990 and after 2006 (in order to observe the implications of selling the Hardware department);

2. A comparative study, analyzing the parallel evolution of IBM and its direct competitors;

3. A research with respect to employee satisfaction (working environment, financial packages), before and after Gerstner’s coming into the company;
4. An in-depth analysis of Europe/ Africa/ Middle East region, regarding its special financial performance related evolution;

5. Research on detailed profit sources, by analyzing strategic business units by regions, and therefore exactly pinpoint the most and the least profitable of IBM’s activities.
REFERENCES


Buchanan, M. (2007). The social atom: Why the rich get richer, cheaters get caught and your neighbor usually looks like you. Bloomsbury, USA.


79
http://www.hoovers.com/ibm/--ID__10796--/free-co-factsheet.xhtml
http://pro.edgar-online.com/profile.aspx?ticker=ibm
http://srv0.velaro.com/visitor/requestchat.aspx?siteid=3378&showwhen=inqueue
http://finance.yahoo.com/q/ks?s=IBM
http://stocks.us.reuters.com/stocks/financialHighlights.asp?symbol=IBM


80


The Inquirer. Retrieved November 15, 2007 from URL


