

Can IBM Survive today

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Introduction

IBM is a massive and complex enterprise, almost as difficult to analyze as it is to manage.

From its inception IBM has been about BIG: Solving BIG problems for BIG enterprises, with BIG innovations in Information technology. It still is today, in 2015. To understand why, we need to delve into its history a bit.

We will try to answer the question: Can IBM survive? We will look first at the Vision and Strategies introduced by Thomas Watson and his son Thomas Watson Junior that led IBM to dominate the IT industry for over 6 decades. Then we will look at the Vision and Strategies articulated by Lou Gerstner in his book: Who Says Elephants Can't Dance? that were so successfully implemented by IBM in the 1990's and 2000's. We will look at whether this Vision and those Strategies are still relevant in the much changed and ever changing world of Information Technology today.

We will find that the Vision, in general, has not changed, while the main strategies have changed dramatically to meet the changing Information Technology environment. Effective execution of the strategies put in place by Lou Gerstner in the 1990's can give IBM a significant and profitable position in today's IT world, as a leader in the segment of the market that we have labelled "Solving Big Problems of Big Business with innovative technology". But in the changing IT market place, IBM will not be among the leaders of the Industry with this Vision and these Strategies. The leadership of the Industry has passed to companies such as Apple, Google and Facebook. We will explain why. We will also suggest some things that IBM could do to rectify this.

Some pre 1990's IBM History

We need to start by delving into the early history of IBM and the IT world since history has a long tail and clearly is a significant influence on where IBM is today.

In 1886, Herman Hollerith developed the Electric Tabulating Machine to win a contest by the U.S. Census Bureau to enable it to process and store electronically the vast data collected in the Census.

In 1911 this technology and three others were merged by Charles Flint to form IBM, originally known as The Computing-Tabulating-Recording Company (C-T-R) with 1300 employees. The company made and sold a wide variety of largely unrelated equipment, ranging from commercial scales and industrial time recorders, meat and cheese slicers and clocks and typewriters. "Of prime importance---IBM was a pioneer in computation equipment long before most people talked about computers". "The company's early electro-mechanical tabulation and punch card devices introduced computation to business".¹

In 1914, Thomas Watson Sr. was hired from NCR to become the CEO, a position he held for almost 40 years when in 1952 he handed the reins to his son, Thomas Watson Jr. Thomas Watson Sr. foresaw the role that computing machines would come to play in business. He led the transformation of IBM from a medium sized manufacturer of tabulating equipment and typewriters into a position of leadership in the age of the computer. Under the senior Watson the company "focussed on providing large-scale, custom-built tabulating solutions for

¹ Gerstner, p113

businesses, leaving the market for small office products to others.” (Solving Big problems of Big enterprises with Big innovations.)²

Watson Senior established a three pronged set of values for IBM: a focus on customer service, an evangelical fervor for instilling company pride and loyalty in every worker (Mike Markula’s “Infusion”), this, in part by building an enterprise that showed great respect for each individual employee, and the famous insistence on well-groomed, suit-and-tie salesmen.

The latter insistence was designed to reinforce the professionalism of the sales force as people who were well trained, well informed, well equipped and well directed; people who could be TRUSTED to solve the business problems of customers using the latest technologies. The suit-and-tie requirements were dropped in the 1990’s by Lou Gerstner when it became clear that new dress codes for professionals, among others, became fashionable.

But the concept of professionalism is pervasive throughout IBM to this day. I have known many IBMers, from CEO’s of the Canadian subsidiary, to senior management personnel, front line sales/service individuals, to one of my best friends, a senior researcher for over 30 years at the IBM Almaden, California Research center. Each of these people was and is a bright, highly skilled professional. So, based on my own experience, the professionalism in IBM is a key value to this day (2015).

1920, CTR develops a Printing Tabulator to automate for the first time the process of totalling data in the electronic tabulating machine.

1923, CTR develops the first Electric Key Punch, gaining a competitive advantage over competitors’ manual data entry systems.

In 1924, the company was renamed: International Business Machines Corporation, (“IBM”) to reflect its primary business in computation equipment.

In the Depression Era of the 1930’s, IBM continued to be successful. It was noted as a leader in providing employee benefits, including sales bonuses, group insurance (1934), survivor benefits (1935), and paid vacations (1937). In 1933, IBM established the IBM Schoolhouse to provide education and training to employees.

² Wikipedia

In 1935, IBM received a large contract from the U.S. government to record and maintain the employment records for 26 million people for the U.S. social security Act administration. This formed the basis of the line of computing equipment enabling businesses to record and process unprecedented amounts of data of many different types. This in turn was what gave IBM the leadership in the new business of large scale computing, a business in which IBM's revenue and profits grew for decades.

1948, IBM introduces the first large scale digital calculator, the IBM 604, a card-programmed electronic calculator.

1952, IBM launches the 700 series of mainframes with the 701, a vacuum tube computer, capable of 17,000 calculations per second. It was initially used in government and research work, but was quickly applied to business applications such as payroll, billing and inventory control.

1957, IBM introduces a magnetic disk storage system, RAMAC, replacing the old tape storage systems.

1957, IBM makes FORTRAN, a scientific programming language, available to customers.

In 1952, Thomas Watson turned the leadership of the business over to his son, Thomas Watson, Jr.

In 1964, IBM announced the System/360. This was a revolutionary family of computing equipment and peripherals. It was revolutionary in several ways.

The new family was based on the early transistorized electronic integrated circuits that we now know as Semiconductor Chips. The semiconductor chips replaced vacuum tubes that took up a large amount of space and required elaborate cooling systems to keep them functioning. The result was large savings in space, costs, and speed of computing. The System/360 line gave IBM a huge competitive advantage and allowed it to dominate the IT industry for almost 3 decades.

Another important advantage of the System/360 line for IBM's customers was the fact that it was a coherent set of computing machines and peripherals. It was in fact a family of computers all running the same software and using peripherals such as data entry and data storage devices that were common to the entire family. Using the System/360 family allowed businesses to scale up as their needs grew. It was a closed system, exclusive to IBM.

1969, IBM scientists develop experimental devices using laser beams to store huge amounts of information.

1971 IBM uses the first operational application of speech recognition technology.

1972, IBM introduces the Winchester Disk technology, doubling the amount of data stored on a disk.

1974, IBM announces Systems Network Architecture (SNA), a networking protocol for computing systems for communicating through local, national, and international computer networks. SNA becomes the most widely used system for data processing until more open architecture standards were approved in the 1990s, with the arrival of the Internet.

1975, IBM introduces the IBM 5100 Portable Computer, a 50 lb. desktop machine that put computer capabilities at the fingertips of engineers, analysts, statisticians, and other problem-solvers. More "luggable" than portable, the 5100 could serve as a terminal for the System/370 (Successor to the System /360 family). It cost from \$9000 to \$20,000.

1976, The IBM 3800 printer is installed, the first printer to combine laser technology and electrophotography.

1977, IBM's Data Encryption Standard (DES), an enciphering and deciphering algorithm, is accepted as a standard by National Bureau of Standards. The new standard provided a high level of security for data transmitted over communication lines.

1978, IBM announces the mid-range IBM System/38, a general purpose computer that incorporated new semiconductor technology. The System/38 was the only commercial computer, at that time, with a built-in Relational Database.

1981, IBM launches the IBM Personal Computer (PC), contracting out the Operating system (DOS) to Microsoft and the Processor design to Intel, and making the systems open to all producers.

1988, IBM announces the Enterprise System/3090 Model 600S, the industry's most powerful general purpose processor.

1988, New software products include Enterprise Systems Architecture/370, to give customers with large systems access to 8,000 times more virtual storage than IBM's previous architecture.³

Other famous inventions by IBM, in this period, include the ATM, the Floppy disk, the Hard disk drive, Reduced Instruction Set Computing ("RISC"), the Relational Database, and the Universal Product Code ("UPC").⁴

We can see from this limited sampling of IBM's history that it is a history of industry leading innovations and new products aimed at solving the Big Problems of Big business. It is these innovations and products, sold to customers worldwide that allowed IBM to be the dominant leader of the IT industry as it existed for many years.

Now we will compare the IT industry environment of those beginning years with the IT environment in the 1990's when Lou Gerstner took over the leadership of IBM and then with the IT environment that we see now in the 2010's.

The Information Technology Environment

In the Thomas Watsons' time

For the first 7 decades of its life, IBM was the clear leader in the business of large scale computing. As the excerpts from the IBM archives indicate, IBM was continually introducing new technology that kept the company well ahead of its competitors. In this period IBM dominated the computing market, and competitors fell by the wayside. (A list of defunct computer companies can be found in Wikipedia. It is 4 pages long.) IBM was so successful that it attracted the attention of the Anti-combine regulators in the United States. In 1969, the U.S. government filed an anti-trust suit against IBM. "For thirteen years IBM lived under the spectre of a federally mandated breakup".⁵ The suit was eventually dropped in 1982, perhaps as a result of IBM's declining influence in the world of the personal computer.

³ Historic data extracted from IBM archives

⁴ Wikipedia: IBM , Research and Inventions

⁵ Gerstner: page 118

During this long period from 1911 to the 1980's, IBM operated as a virtual monopoly. While this enabled it to be the clear leader in the Computing industry and to rack up an enviable string of annual profits, it had a downside. Without any serious competition, IBM personnel became complacent and turned away from solving the customers' problems to a focus on sales for sales sake. The organization turned inward, ignoring or misreading what was happening in the marketplace and how its customers felt about the company and its service. The original values championed by the Watsons fell by the wayside or were perverted.

This is the state of disarray that Gerstner found when he took the reins as CEO in 1993, as articulated in his book: *Who Says Elephants Can't Dance?*

In Lou Gerstner's time

Lou Gerstner took over as the CEO of IBM in 1993 and carried out a whirlwind review of the IT environment and IBM's position in it, as well as an examination of IBM's strategies, execution and culture⁶. Gerstner found that IBM's monopoly position in the industry had been seriously eroded by several changes in the IT marketplace.

The vast shift of the IT industry can be traced back to the advent of the Personal Computer. IBM entered the PC fray in 1981, contracting out the Central Processing chip design and manufacture to Intel, and the Operating system to Microsoft. This turned out to be a big mistake, as IBM had greatly underestimated the potential impact of the PC, and events that were to follow. Microsoft and Intel quickly used their positions as the makers of the PC CPU chip and the Operating system to seize control of the IT industry. Through clever strategies they built on this control to dominate the industry.

Led by Microsoft and Intel, the PC and work station manufacturers, Dell, Hewlett Packard, Compaq, Sun Micro and others, created the "Client/server" Model of computing, in which the important calculating and analysis would be carried out by PC's and Workstations, using data provided by the mainframe servers.

At about the same time, a new open operating system, UNIX, was gaining popularity. This system offered a workable alternative to the closed IBM system. It was an open "Plug and Play" world in which many companies could and did offer parts of an overall solution to a client's computing needs.

⁶ Gerstner; *Who Says Elephants can't dance?*

Both these developments were harmful to IBM. They altered the IT landscape and more importantly, the point of purchase of technology equipment and software, shifting it from the Chief Information Officers (“CIO’S”) of the big enterprises to department heads and individuals.

Gerstner saw that this was devastating to IBM’s business and IT leadership position. He also foresaw that the Client/ Server model would not be able to handle the vastly growing amounts of data being created by the popularity of the PC and other potential computer network access devices, and the potential analytical requirements to manage and extract helpful intelligence from all that data. So he set out to wean the industry off the Client/server Model and began to promote a “Networked Model” of computing.⁷ A major consequence of this model was that it put the computing purchasing power back in the hands of the Big Corporation CIO’s that IBM knew well.

Gerstner espoused “the Networked Model of computing” in which the computer networks would play a key role and in which arrays of mainframes would come back into prominence as the main devices for storing, controlling and analyzing the vastly growing amount of data being provided over the computer networks. Shortly after Gerstner developed this new vision of the IT world, along came the public Internet; and the vision of the Networked World of IT became a reality that went far beyond the original vision, reinforcing it in spades.

Gerstner also foresaw that the new IT world would be an open world with many companies providing the bits and pieces required to make it work. In this new world the CIO’s of the Big enterprises would have a pressing need to integrate all the pieces and to create complete technology solutions to their business problems. To enable them to achieve this they would need the help of systems integration specialists. No one was better positioned than IBM to fulfill that role.

Gerstner set about positioning IBM as the System Integrator of choice, with a range of supporting strategies. His success is reflected in the growth of the business and the performance of The IBM stock price over the next two decades.

Today (2010’s) Environment

In the IT world of the current decade, the ground has shifted again and continues to shift. In its annual reports, which are massive, IBM sets out its annual analysis of the world of computing, the IT world, and the strategies it is following to

⁷ Gerstner, p 123

capitalize on the IT opportunities presented by that world. We will take the IBM 2009 Annual Report as our starting point for this analysis.

By 2009, the Internet is well established as the ubiquitous, universal highway for communications of all kinds; data, pictures, video, and even voice communications. While the initial device for accessing this communications highway was the PC, by 2009, Research In Motion and then Apple had introduced the Smartphone, which quickly became the main device for accessing the Internet.

It is interesting to note that both Research-In Motion and IBM focussed on the use of the Smartphone to access business information to be found in the mainframes of businesses and other large enterprises, such as governments; and to be used in furthering the business needs of those entities. When Apple showed that the Smartphone could be very useful to individuals for their personal uses, this opened up markets that were much larger than those of the Big Businesses in which the computer had started. We will have much more to say about this mistake by IBM and RIM later.

In its 2009 Annual Report, IBM identifies three major changes on which to base its renewed vision and strategies.

1. “Changes in the world: The lowering of trade barriers, the rise of the developing world and the emergence of the World Wide Web were unleashing the flow of work on a global scale. We believed they would lead to new business models and a new form of the corporation itself - ...the globally integrated enterprise.”
2. “Changes in Technology: ...Computational capability was being put into things no one would recognize as computers: phones, cameras, cars, appliances, roadways, power lines, clothes – and even natural systems such as agriculture and rivers. All of this was being connected through the Internet. And we now had the computing power ...to turn mountains of data into insight the economic, societal, and physical systems of the world were becoming instrumented, interconnected and intelligent. Our planet was becoming smarter.”
3. “Changes in Client Demand: ... **enterprises and institutions** ... now sought to innovate – not just in their products and services, but also their business processes, management systems, policies and core business models” to take advantage of the productivity, speed and reduced costs offered by the IT suppliers.

It is interesting to note that the focus of this IBM analysis of the changing world in 2009 is on the impact of the changes on Big Businesses (“the globally integrated enterprise”). This of course is the traditional focus of IBM from the Thomas Watson days that was also picked up by Lou Gerstner in the 1990’s. As we have noted it is a limiting focus that effectively excludes IBM from the impact of the technology developments in the retail or individual consumer markets; specifically, the rapid growth of the Internet as the universal information highway and the introduction of smartphones and tablet computers as the dominant access devices in the retail market.

The use of the Internet by individuals and groups exploded after 1995 as first e-mail was the dominant use, and then in a few years, e-commerce, information search and social media took off. And then of course, in the 2000’s, the Smartphone was introduced to allow digital communications among billions of users. This is the market in which the greatest action and growth opportunities in IT are occurring, and where the leaders of today’s Information Technology industry are to be found; Companies such as Apple, Google, Amazon.com and the social media giants such as Facebook and Instagram.

Vision and Strategy

The IBM Vision

In our analysis, we find that IBM’s corporate vision is essentially unchanged through the three periods that we have looked at. It can be summed up as: The leading provider of Solutions to the Big Problems of Big Business using innovative (computer/communications) technology.

Thomas Watson senior put it this way: IBM “focussed on providing large-scale, custom-built tabulating solutions for businesses, leaving the market for small office products to others.”

Lou Gerstner saw IBM’s role as the “System Integrator” of choice for the CIO’s of large enterprises.

Today, the IBM role is very much as Lou Gerstner envisaged it: the key provider of Global integrating software and services, in an open world with many suppliers, to

enable the Big Business CIO's to create their massive information systems connecting a myriad of their own and their customers access devices, to manage those systems and to analyze and utilize the information gleaned by advance analytic systems and feeding the information needed by the businesses' executives to run their businesses.

The IBM Strategies

The IBM strategies to achieve this vision however have changed.

In the Thomas Watsons' time

Thomas Watson Senior instilled a strong set of values to enable IBM to attain its vision of being the leading provider of computing systems for big enterprises. These included; a focus on customer service, an evangelical fervor for instilling company pride and loyalty in every worker, and a professional workforce that would instill trust in IBM by its customers. These values in turn were based on his personal philosophies;" hard work, decent working conditions, fairness, honesty, respect, impeccable customer service, jobs for life".⁸

A major strategy was to be the leading innovator in computer technology. The success of this strategy is illustrated by the excerpts we have included above from the IBM Archives showing the long history of IBM's innovations.

Perhaps the most important of IBM's innovations was the launch of the Systems/360 family of computers, software and compatible peripherals in 1964. As Lou Gerstner has recorded, in his autobiographical book on his experience as the CEO of IBM, this family was a large leap forward in computing power, speed and much lower costs, based on the application of the transistor technology to create the integrated circuit, or semi-conductor chip.

To accomplish the leap forward, IBM had to embark on a series of expansions to its business.

1. It had to start a semi-conductor business, since none existed at that time.
2. It had to spend heavily on R&D to build the various requirements of the System/360. "During this era, IBM ... invented the memory chip, the relational database, computer languages such as FORTRAN, and made huge advances in material science, chip lithography, and magnetic recording".⁹

⁸ Gerstner: Who says elephants can't dance?,p 114

⁹ Gerstner: p 116

3. It built operating systems, database management systems, transaction processing systems, and software tools and programming languages.
4. The sales force had to acquire the knowledge of customers' businesses and to determine how the new computers could help them solve the problems in making their businesses better.
5. And IBM had to build a product maintenance and service capability.¹⁰

All of these steps required a large investment in funds and resources over an extended period of time. It was a "bet the company" move and it paid off in spades by providing IBM with the profitable leadership of the computer industry for over two decades.

In Lou Gerstner's time

However, by the time Lou Gerstner took over in 1993, this success had waned. IBM was in serious difficulty and a new set of strategies was required to put it back on the path of business success.

Gerstner divides these into two groups in his book; Strategies needed immediately to turn the company around, and Strategies for a new growth curve. We have summarized both of these in our precis of Gerstner's book (see appendix A attached.). But for our present purpose, we will focus on the longer term growth strategies that he introduced.

Ten months after joining IBM and with the rescue plan well under way and succeeding, Gerstner took time to sit back and consider the longer term.

His priorities were: to invest in new sources of growth, build a strong cash position and do a more rigorous assessment of IBM's competitive position. His view was that to be successful IBM "would have to regain its former position of leadership in the computer industry and in the broader world of business."

Gerstner's own reservations about this ambitious goal:

¹⁰ Gerstner: p 116.

1. The track record of attempted turnarounds in the IT industry was not good. There had been many failures: Wang, Data General, Unisys, DEC. (See the list in Wikipedia)
2. More importantly, the Computer industry was shifting away from IBM's strengths: power was moving away from centralized computing systems and traditional IT, to distributed computing in which buyers were consumers, small businesses, and department heads rather than big companies' CIO's. These consumers were buying different things where reliability, dependability, and security seemed less important than applications that were useful to the individual.
3. Successful sales structures had changed from a direct sales force, as in IBM's model, to retailers and toll-free-numbers, (and, just around the corner, to the internet sales vehicles).
4. Customer value was moving away from mainframes to software and services.
5. There were very strong competitors, such as Microsoft, Oracle, Apple and Sun.
6. What had been accomplished in the initial wave of restructuring to save IBM in the short term, reorganizing around industries, consolidating marketing, moving to performance based, stock based, compensation, had been relatively easy. What was required to achieve the new Vision for "a new world and reinventing an encrusted culture" was a vastly more difficult challenge.

In spite of these reservations, Gerstner decided "we would take our best shot at making the long climb back to industry leadership".

The Gerstner long term strategies

IBM as the System Integrator of choice for Big Businesses

The long term Vision of Gerstner's IBM grew partly out of IBM's long history as the provider of solutions to Big Problems of Big Business, using new technology, and partly out of his momentous early decision to keep the Company together.

The first strategy was to keep the company together, going against the vast plans that were being made to split it up. Initially the decision to keep the company together was based on Gerstner's belief that IBM's size and breath gave it a distinctive competitive advantage in the IT industry. His assessment was that the

industry was going to a "Networked Model", in the 1990's (and before the arrival of the Internet, that made the new networked model work) and one in which open systems and standards prevailed. There would be many companies supplying bits of the IT package. CIO's would have a desperate need for someone to perform the System Integration function to deliver a complete working solution to the customer's business problems. IBM, he saw, was perfectly positioned to fulfill this role. Thus it became Gerstner's Vision for the new IBM. To this end, it was essential to keep the company whole.

The main strategic changes for the long term following from that vision, as discussed by Gerstner, were:

1. Services –the key to integration
2. Software – building the already biggest software business
3. Opening the company store
4. Unstacking the stack and focussing the business
5. The emergence of "e-business".

Services-the key to Integration

Gerstner envisioned Services as playing a much bigger role for IBM. He saw Services as the key to the System Integrator role he envisaged for IBM in a networked world.

Gerstner was fortunate to find a man to lead this change in Dennie Welsh, then head of IBM's Integrated Systems Services Corporation. Welsh's vision of the expanded services operation went beyond one that "just did IBM product maintenance and strung together computer code for customers." Welsh "envisioned a company that would literally take over and act on behalf of customers in all aspects of Information Technology – from building systems to defining architectures to actually managing the computer and running them for the customers."¹¹

This strategy was a perfect fit with Gerstner's Service based strategy.

¹¹ Gerstner

The services envisaged would meet new customer needs- principally the CIO's need for integrating services – services that were open systems services that would take over all aspects of IT for customers: building systems, defining architecture, managing the systems.

But implementing it would shake IBM to its roots! The open systems required and the need to sell products made by competitors would run exactly contrary to the existing IBM “modus operandi”. This would be true for the sales force, and the support systems. It would require remaking the very structure of IBM and change the entire focus of the business on a closed system. It would clearly be counter culture and hence would meet large scale resistance within IBM.

In addition, the economies of a service- based business were different from a product-based business. Service contracts could last 6 to 12 years and lose money in the first year. It would require substantial changes to sales compensation and financial management.

Gerstner decided to introduce the changes gradually. Initially, he worked hard to develop a sense of mutual dependence between sales and service units, and to do this on a global scale. With Welsh, he introduced outsourcing and network services, a gigantic task that was spread out over several years. In 1996, he broke out the new service unit separately under the name: IBM Global Services. By 2001, it was a \$30 billion business employing half of IBM's workforce.

This move was another big bet. Could IBM do this and earn a profit? It was a financial bet because of the front loading of expenses; and an economies of scale bet (this is just what the Integrated Manufacturing model of the 1980's and 1990's set out to make happen (as described briefly in My book: A Short history of the Personal Computer)), a bet on whether IBM could operate a service business with the economies of scale to be profitable.

Sam Palmisano became the head of this service business, and later succeeded Gerstner as IBM's CEO.

Building the Software Business- already the world's biggest

If Gerstner was right in predicting a shift from a PC dominated Client/server model for IT to a networked “Distributed computing model”, he had to identify

the new sweet spot in IT customers' spending, and hence the best opportunity for IBM to focus upon.

He saw that the new model would require new networking hardware to deliver high speeds and high bandwidth, large increases in data storage capacity, and a range of services to design and implement solutions to customer problems in the new environment. But he reasoned that the "linchpin" in the new era would be software, software based on open systems which would connect the hardware of many different suppliers. Just at the right time, the public Internet arrived, in the mid 1990's, with its open standards that allowed anyone complying with those standards to use the new communication highway.

IBM's software business was the largest in the world. But it was buried inside IBM and was part of a closed system.

To hit the sweet spot, Gerstner divided the networked software into 3 groups: Operating systems, Middleware and Applications software. He recognized there were big players dominating both the Operating systems and Applications software and so he targeted Middleware: database management, systems management, and transaction management; to which IBM would add security and reliability.

So, IBM launched a massive effort to rewrite all critical software to be networked enabled and run on Sun, HP, Microsoft, and other hardware and software.

In 1995/6 IBM bought Lotus Development Corporation, to fill a hole and to plant a flag in Collaborative software, rather than standalone computing. IBM wanted particularly Lotus Notes that permitted collaborative software among individuals using large numbers of computers. The success of this move is reflected in the fact that Lotus Notes "Seats" grew from 2 million in 1995 to 90 million in 2001.

In 1997, IBM bought, Tivoli Systems, for distributed systems management. The revenues from this business grew from \$50 million to \$1 billion in 2002.

The Software Group in 2001 had revenues of \$13 billion, profits of \$3 billion and was Number 1 or 2 in every middleware segment of the networked world.

Opening the Company Store

To “Design, Build and Deliver Integrated technology solutions” in the new networked world, IBM had to make another bet the company move. It had to “Open the Company store” by selling its technology components as parts of the new systems required by the open networked world, and by providing services for non-IBM equipment, and networking software to link them all together.

Gerstner saw 4 advantages to this move for IBM:

1. It could capitalize on IBM’s vast R&D, an underutilized asset!
2. It would disperse IBM technology more widely, enabling greater influence over the definition of future Protocols and Standards.
3. Selling some R&D would generate a new income stream.
4. In a post PC world, there would be higher demand for components to power the new digital devices created for network access.

In the immediate past, IBM R&D was creating new products but was not bringing its own R&D discoveries to market. For example, the Relational Database, Network Hardware, Network Software, and UNIX processors were all invented by IBM but exploited by Oracle, Sun, Seagate, EMC, and Cisco. The plan was to change this so that IBM better capitalized on its own R&D.

To accomplish this goal, the first step was licensing some IBM technology to third parties.

The second step was selling components to other companies. Initially this was limited to DRAM memory chips to take advantage of the fast growing market for this product. This was a feast or famine business that turned down in 1998 and was sold in 1999 but gave IBM an entry point into the components business, and, in particular the business of selling computer chips.

Driven by the proliferation of internet devices, exploding data and transaction volumes and the continuous build out of communications structure, the demand for chips that powered big processors and the demand for specialized chips for the many access devices and appliances would explode. In between, there would be a growing demand for chips for networking and communications gear.

In the next 4 years, IBM’s Technology Group became number 1 in custom-designed chips. As a result, IBM was positioned to benefit from the internet driven growth in communications, outside IBM’s traditional market, the computer industry. Gerstner notes that the resulting Technology Group in 2001 was still a

work in progress, the third of IBM's growth strategies in 1990's; to better exploit IBM's treasure trove of R&D.

Focusing the IBM portfolio by unstacking the stack

Gerstner wanted to focus IBM's growth efforts on market segments that made strategic and economic sense; segments where the opportunity was large and where IBM's strengths would come in to play.

In the 1960's, with the system/360, IBM's strategy was to make every layer in the stack from hardware, to operating systems and middleware, to applications software and services.

By 1990, the industry model had change in 2 key ways:

1. Smaller companies were providing pieces of the stack at competitive prices and customers welcomed the competition.
2. Two more stacks emerged; one based on open UNIX platforms, one based on the closed WINTEL platform.

Both of these changes seriously eroded IBM's leading 30% market position (down to 20% and falling)

A new strategy was needed, a focussed strategy. In the new and more complex open world of networked computing, IBM could no longer be everything to everybody. It had to enter the other two stacks on a selective basis.

Preliminary steps were to exit the Applications Software business and to walk away from the OS/2 vs. Windows slugfest.

Application software had been an expensive loser for IBM. That arena was dominated by specialists, and by trying to be in it IBM was irritating the specialists, such as PeopleSoft, SAP and J D Edwards, who could be sources of sales of IBM's hardware and services.

As noted, IBM decided to focus on middleware. In doing so it filled gaps in its own arsenal, by partnering with applications software specialists, such as Siebel Systems, specializing in customer relationship management, and 180 similar partnerships. This move dramatically improved the economics of IBM'S business and was a fit with its vision of being the System Integrator of choice. IBM could" now focus on a different stack: the customer's business processes and how it could bring world class technology – both IBM's and that provided by other leading companies – to improve those processes". Echoes of IBM's original Vision:

to be the provider of new technology solutions to the Big problems of Big Business.

By 2001, this move had proved to be a major success, increasing revenues by \$ Billions.

The Emergence of “E-Business”

“e-business” was the term IBM used to encompass all the activity that would be generated by the Internet. It was first unveiled at a Wall Street briefing in 1996. It became the centrepiece of IBM’s marketing program and provided a framework for IBM’s position as the premier System Integrator in the now Internet world. It was intended to convey the new world of the Internet covering “every important kind of relationship and interaction among businesses and people”, and undoubtedly it did so. But as we will see a little later, it missed the full significance of the Internet’s transformation of communications and limited IBM’s presence in the Internet world.

IBM and Sears formed Atlantis, merging their private data networks. Ultimately this became part of IBM Global Network, and then in 1999 it was sold to AT&T, since it wouldn’t be able to compete with the capital required to build out digital networks. Then along came the internet, obviating the need for IBM to own a network.

Backing IBM’s vision as The Systems Integrator of choice in the Big Business world, in an Internet enabled world, was its concept of “The Cloud”. The Cloud was envisaged by IBM at that time (1993) as a network service serving connected devices such as PC’s, Cell phones, and other access devices on the one hand, and businesses, institutions, and governments on the other. IBM’s vision was to dominate the Cloud. (Today of course, the Cloud is envisaged as a service to access software and services for devices of all types provided by all types of business and facilitated by the Cloud providers, who provide internet users with a collection of storage, software as a service, and other facilities, such as outsourcing of the entire IT function.)

In the 1990’s, the cloud was seen by IBM as causing two major shifts:

1. In computing, where it would shift the focus from the PC's to larger enterprise systems.

2. In the interaction between businesses and institutions, on the one hand, and consumers, on the other. – “the biggest wave of business transformation since the arrival of digital data processing in the 1960's”.

And IBM, under Gerstner had positioned itself to take advantage of these two shifts.

It had already committed itself to open standards, including the Internet Standards.

It was focussed on providing the Middleware that would be the integrating glue of network applications.

It saw Web hosting, as a significant new services capability, and was developing the capability in consulting and implementation services to help its customers provide that service.

And it focussed some of its R&D efforts on designing the specialized chips that would be in high demand for all the new access devices.

In 1996, Lotus and IBM announce Domino Web server, an adaptation of Notes to work in the Internet world.

It created an “industrial strength commerce server”, called “Websphere”.

All of this activity was placed in a new group, the Internet Group”, with responsibility for “evangelizing (IBM's) network strategy across all of IBM's business units”.¹²

Gerstner's Reflections on Strategy

When Gerstner took over the CEO job at IBM and reviewed the Internal and External environment of the company during his first three months in office, he found a company that had lost touch with reality. It was a company that had been highly successful, in large part due to the development of the System/360 family of computers, in the 1960's. But the System /360 family was a closed system. This had allowed IBM to operate in a virtual monopoly position. But by the late 1980's,

¹² Gerstner

it had become “Fatally outmoded” and not responsive to the changes in the Computer market place, the changes in technology, the changes sought by customers, the changes introduced by competitors.

In response, Gerstner set a new vision for the company and initiated many changes to its business, as noted above. In his reflections on strategy, he sums up the changes as falling in three categories.

The first is technology. The biggest change in this category was to move from the closed System/360 model to an open system model in which IBM would comply with open industry standards, sell products produced by other companies and develop complete systems that might employ these products. This was entirely consistent with his vision of IBM as the system integrator of choice for big business.

The second category was economic. In this area, Gerstner had launched serious cost reduction programs, company – wide. He rationalized whole sections of the business, particularly the support functions, IT, marketing, finance, human resources, etc.

The third category of change was the culture, “the mindset and instincts of hundreds of thousands of people”. This was “the hardest part of IBM’s transformation”. Gerstner devotes a whole section of his book to this subject. We will deal with culture under the heading Execution and Culture below.

Today’s Strategies

We find that the basic growth strategies put in place by Gerstner are still playing out today, although the specifics have changed. We will use the 2009 Annual Report statement of strategies as our starting point for analyzing the IBM strategies of today (2014/15).

In the 2009 Annual Report, there is included the following three-point summary:

“We transformed IBM’s mix of products, services, skills and technologies – exiting commoditized businesses like PC’s and hard disk drives, and making 108 strategic acquisitions over the course of the decade. (Shades of Gerstner’s “Re-engineering of our business”) We amassed substantial industry expertise (another of Gerstner’s initiatives), and also re – invented the way we deploy it, shifting skills

and decision making closer to the marketplace and the client. We invested significantly more in our teams and capabilities in emerging markets around the world, and we accelerated the global integration of IBM's operations."

"We transformed our vast services delivery capability, applying automation, standardization and advanced engineering and management principles.... We also rebalanced our internal R&D. Today, IBM's (R&D) portfolio is built around networked, modularized and embedded technologies, such as service-oriented architecture, business intelligence and analytics. ... more than 70% (of new patents) were for software and services."¹³

The new strategies in 2010 would include a focus on four growth opportunities:

Growth markets: IBM has increased its global footprint to 170 countries. The growth markets group is focussed on high growth opportunities in the emerging economies, where revenue growth has been faster than in the established markets.¹⁴

Analytics: IBM has noted the explosion of data both from the large numbers (hundreds of millions) of users of social media, and the emerging Internet of Things. Sophisticated mathematical models ("Analytics") can turn this immense flow of data into insights. Increasingly, this is being done in real time. "IBM has built the industry's premier analytics practice ... with leading edge software capabilities... to deliver integrated analytics solutions based on the needs of specific industries."¹⁵

Cloud and next generation Data centre: The cloud is "a network of virtual software services that don't require big-business IT shops to own their own computers and programs."¹⁶ It provides businesses with "far more choice and flexibility ... and allows new services such as Modeling systemic risk or creating integrated health records". It also delivers significant cost reductions since the provision of the Cloud hardware, software, services and maintenance are done by the companies that specialize in doing so. Reliability and security become more important attributes in this new integrated environment with data from many diverse sources. IBM is focussed on the provision of Cloud Services that have

¹³ IBM annual report for 2009

¹⁴ IBM annual report for 2009

¹⁵ IBM annual report for 2009

¹⁶ Fortune Data Sheet, October 27, by Adam Lashinsky

these strengths for its clients and has had many years in building its Cloud offerings.

And summing up these specific strategies is IBM's buzz word "the Smarter Planet": which it sees as the application of digital analytics to increase awareness and intelligence to improve productivity, efficiency and response times in all aspects of business and in the wider world of the customers of businesses.

In 2010 IBM was focussed on helping its clients use these new digital, internet based, structure and analysis capabilities in 9 high growth industries: healthcare, oil and gas, energy and utilities, transportation, telecommunications, retail, banking, government, and electronics.

For example, in a study of 439 cities, smarter transportation systems, including ramp metering, signal coordination and incident management reduced travel delays on average by more than 700,000 hours annually.

Eight hospitals and 470 primary care clinics in Spain used smarter health care systems to improve clinical results and operational efficiency by up to 10%.

And banks around the world are achieving new levels of risk control, efficiency and customer service with these new services.

Banorte Grupo Financiero Banorte, S.A.B. de C.V., doing business as Banorte and as Ixe, is a Mexican banking and financial services holding company with headquarters in Monterrey and Mexico City, Mexico. It is one of the four largest commercial banks of Mexico. Working with IBM, Banorte analyzes the data of millions of customers to better anticipate their needs. This enables the bank to deliver more personalized service.

In the 2012 annual Report, the key strategies are set out as:

- A. Managing Big Data from a continually growing multitude of sources;
- B. Applying Advanced Analytics to mine the data and to build relevant business insights from it;
- C. Remake the enterprise IT for the era of the Cloud; and
- D. The rebuilding of business networks to incorporate the latest developments in mobile and social media.

To accommodate these strategies, IBM is “pioneering a new computing model – Smarter Computing” with three core attributes:

- a. The world’s deepest portfolio of analytic solutions and software, including the acquisition of 33 companies since 2005, to build targeted solutions helping clients “turning large amounts of real-time unstructured data into high- value knowledge available instantly.”
- b. The development of a software defined environment, of which Cloud is just the first component. This allows flexible tuning of networks, storage and servers, such as IBM’s System z mainframes and Power Systems data storage.
- c. The stress on an open and collaborative IT world.

In the 2013 Annual report, the IBM strategies are summed up as “one of innovation, transformation and a constant evolution to higher value.”

More specifically, they are stated as:

- A. Big Data - “Transform industries and professions with Data” (collecting and storing “Big Data as the world’s new natural resource...fueled by the proliferation of mobile devices, the rise of social media and the infusion of technology into all things and processes”).
- B. The Cloud - “Remake Enterprise IT for the era of the Cloud”, transforming their IT and business processes into digital services, to reinvent their core business processes and to drive innovation.” In 2013, IBM Cloud services supported 24 of the top 25 Fortune 500 companies.¹⁷
- C. Engagement - “Enable “systems of engagement” for Enterprises and lead by example”, to connect enterprises with their employees, customers and the “Internet of Things”.
- D. Advanced Analytics - Continue to broaden the reach of the “Smarter Planet”, IBM’s strategy to lead in a technology-enabled world that is “more instrumented, interconnected and intelligent than ever using advanced analytics for business and physical systems, cloud computing, mobile, social business and business process management.”

In the 2014 Annual report, IBM notes “Information Technology is one of the most dynamic, fast changing and fiercely competitive industries in the world, characterized by relentless cycles of innovation and commoditization.”

¹⁷ IBM< Annual Report 2013

IBM is stated to be pursuing a model of high-value innovation, rather than commodity technology.

More specifically in 2014, IBM invested \$1 billion to accelerate the commercialization of IBM Watson cognitive computing capability;

IBM invested \$1.2 billion to expand SoftLayer cloud computing centres;

IBM invested \$1 billion to create IBM Bluemix, (its) cloud computing platform-as-a –service for software developers;

IBM further scaled the global IBM Cloud business through partnerships with SAP and Tencent, the large Chinese computing company;

IBM offered powerful cognitive computing and visual intuitive analytics through IBM Watson Analytics;

IBM formed a landmark partnership with Apple to bring mobility to the enterprise; and

IBM formed a strategic alliance with Twitter (Facebook) to bring an entirely new category of Big Data to business.¹⁸

The fundamental strategies today

Based on the above extracts from the IBM Annual Reports from 2009 to 2014, we conclude that today, in 2016, IBM's key strategic focus areas to drive growth in its Big Business target market are:

Big Data,

Advanced Analytics,

Mobility (Engagement),

Cloud Services,

Social,

Security and reliability,

And The Internet of Things.

¹⁸ IBM annual report for 2014

In these, we see a general continuation of the key strategies introduced by Gerstner:

The Focus on Software and Services,

The Opening of the Stack,

The emphasis on Middleware (However, IBM now has to offer Application Software, both its own and that of a multitude of others to meet the business needs of a wide range of customers-now in 18 focus industries, worldwide.)

And the Development of “e-commerce” capabilities.

Big Data

Big Data, the term has slightly different meanings for different purposes. For our purposes, it means the masses of digital information or data coming into big businesses over the internet from multiple types of connected devices. These devices were primarily PC's in the 1990's, but now include smartphones, tablets, web servers, and sensors connecting the “Internet of Things”. The amounts of data streaming into big businesses increases daily. Much of this data is unstructured and expressed in natural language. Massive systems of large networked mainframes are needed to deal with this mass of information. More importantly from IBM's point of view are the array of software and services needed to collect this data, store it in a secure and reliable environment and in a manner that can be accessed for analysis.

Advanced Analytics

Advanced Analytics refers to the software and services designed to extract useful meaning from the Big Data. Big Data is described by IBM as the new natural resource.

Using mathematical tools, Advanced Analytics can extract information from the Big Data that can be used to help manage businesses from the internal processes to relationships with suppliers, partners, customers and intermediaries. The new information can be used to improve reaction and process times, to reduce costs,

to deliver relevant information to the parties that can use the information, and in advanced systems to deliver predictive and prescriptive advice.

IBM has coined the term “Cognitive computing” to refer to such advance systems. One of its major offerings is the “WATSON” family of analytics software. Originally famous as a computer gaming software with the ability to beat human champions at “Jeopardy”, the analytical and predictive capabilities of the Watson family of software are being applied by IBM to provide advice and solution to business problems extracted from the Big Data being collected by Big Businesses. More recently, in 2015, Watson Analytics is being applied to a wider and wider variety of unstructured data analytics problems experienced by smaller enterprises.

Mobility (Engagement)

Engagement is the term used in the IBM 2014 Annual Report to refer to the computer systems required to permit access, particularly Mobile Access, to the enterprise Cloud data and services by the many millions, if not billions of Internet access devices used by customers, employees and other stakeholders in the enterprise. It consists of both hardware: bridges, routers, modems, relay stations and the software needed to manage all these devices and the connections to them and through them to the enterprise’s network of mainframes.

The Cloud and next generation Data centres

Cloud computing allows users to store and share software, data and other resources on the equipment of the Cloud Provider and accessed by the users over the internet. The advantages to users is that it puts the management of the resources (hardware, software, and services) in the hands of the experts who are responsible for maintenance and updating of the resources. This permits lowering of costs from economies of scale and allows for scaling up as more resources are needed.

The cloud has also been described as “a network of virtual software services that don’t require big-business IT shops to own their own computers and programs.” It provides businesses with “far more choice and flexibility ... and allows new services such as modeling systemic risk or creating integrated health records.”

Reliability and security become more important attributes in this new integrated environment with data from many diverse sources.

IBM is focussed on the provision of Cloud Services that have these strengths for its clients. It has had many years in building its Cloud offerings.

IBM's cloud services grew out of its mainframe hardware and virtualization technologies that allowed memory sharing in a network of mainframes by connected users as early as the 1960's and 1970's.

In 1993, Gerstner and others at IBM used the term "The Cloud" to refer to its concept of "The Cloud" as a network service serving connected devices such as PC's, Cell phones, and other access devices on the one hand, and businesses, institutions, and governments on the other. IBM's vision at that time was to dominate the Cloud.

The term cloud has been used to refer to platforms for distributed computing. In Wired's April 1994 feature "Bill and Andy's Excellent Adventure II" on the Apple spin-off General Magic, Andy Herzfeld comments on General Magic's distributed programming language Telescript that: [18]

"The beauty of Telescript ... is that now, instead of just having a device to program, we now have the entire Cloud out there, where a single program can go and travel to many different sources of information and create sort of a virtual service."

References to "cloud computing" in its modern sense appeared as early as 1996, with the earliest known mention in a Compaq internal document.

The popularization of the term can be traced to 2006 when Amazon.com introduced the Elastic Compute Cloud.

The main enabling technology for cloud computing is virtualization. Virtualization software separates a physical computing device into one or more "virtual" devices, each of which can be easily used and managed to perform computing tasks. With operating system-level virtualization essentially creating a scalable system of multiple independent computing devices, idle computing resources can be allocated and used more efficiently.

In 2007 IBM announced plans to build “Clouds” for its enterprise clients and to provide a full range of services to help its clients use the “Cloud. In 2011, IBM stated that 80% of Fortune 500 Companies used the IBM Cloud services.

Today (2015/6) IBM offers enterprise clients under its SmartCloud suite Cloud “IaaS”, “PaaS and SaaS services.

“IaaS” Cloud Infrastructure as a service-

In the most basic cloud-service model - and according to the IETF (Internet Engineering Task Force) - providers of IaaS offer computers – physical or (more often) virtual machines – and other resources. IaaS refers to online services that abstract the user from the detail of infrastructure like physical computing resources, location, data partitioning, scaling, security, backup etc.

To deploy their applications, cloud users install operating-system images and their application software on the cloud infrastructure. In this model, the cloud user patches and maintains the operating systems and the application software.

“PaaS” Cloud Platform as a service-

PaaS vendors offers a development environment to application developers. The provider typically develops toolkits and standards for development and channels for distribution and payment. In the PaaS models, cloud providers deliver a computing platform, typically including the operating system, programming-language, execution environment, database, and web server. With some PaaS offers like Microsoft Azure and Google App Engine, the underlying computer and storage resources scale automatically to match application demand so that the cloud user does not have to allocate resources manually.

“SaaS” Cloud software as a service-

In the software as a service (SaaS) model, users gain access to application software and databases. Cloud providers also manage the infrastructure and platforms that run the applications. SaaS is sometimes referred to as "on-demand software" and is usually priced on a pay-per-use basis or using a subscription fee.

In the SaaS model, cloud providers install and operate application software in the cloud and cloud users access the software from cloud clients. Cloud users do not manage the cloud infrastructure and platform where the application runs. This eliminates the need to install and run the application on the cloud user's own computers, which simplifies maintenance and support.

The IBM Cloud services include Private Clouds, Public Clouds and Hybrid Clouds. A Private Cloud is a Cloud service that is available to a single client and can only be accessed by the employees of that client. A Public Cloud is a cloud run for a single client but one that can be accessed by other parties such as its customers, partners or suppliers. The Hybrid Cloud is a cloud service that has elements of both private cloud and public cloud, that is some parts of the Cloud can be accessed only by employees of the cloud client and others can be accessed by the public.

In its 2013 annual report, IBM comments on its Cloud strategy goal as follows: - “Remake Enterprise IT for the era of the Cloud”, transforming their IT and business processes into digital services, to reinvent their core business processes and to drive innovation.” In 2013, IBM Cloud services supported 24 of the top 25 Fortune 500 companies.

Security

Security has been a longstanding problem for computer networks. It is a running game as enterprises attempt to keep one step ahead of the many hackers, fraud artists and other dangerous invaders who attempt to access the enterprise’s data for mischievous and nefarious purposes.

IBM has been in this game for a long time; today it is a key strategy for IBM, to ensure the integrity and safety of its Clouds. IBM claims to be “the global leader in enterprise security, grounded not only in technology and (its) 3700 patents, but in (its) experience – based understanding of the changing nature of the challenge.’ (IBM’s) security business, with unequalled data and analytics capability, grew by 19% in 2014”.¹⁹

The Internet of Things:

The concept of an Internet of Things has been around for some years. British entrepreneur Kevin Ashton first used the term in 1999 to refer to a global network of radio frequency transmitters embedded in a variety of Things. Today, in 2016, it refers to an internet-connected network of physical devices of all types

¹⁹ IBM Annual Report for 2014

equipped with embedded sensors and capable of transmitting the sensed information wirelessly to the Internet and from there to a variety of computers, smartphones and the like to be stored, analyzed and used to control the physical devices remotely.

The potential is immense. Already it is estimated by Gartner that there are over 3.8 billion internet-connected “things” at the end of 2015. It is estimated by ABI Research that over 30 billion “things” will be wirelessly connected to the Internet and feeding it with all sorts of sensed information. Cisco’s Chairman, John Chambers has forecast that within 5 years there will be 50 billion connected “Things” in a market worth U.S.\$ 19 trillion.

In a Toronto Globe and Mail, Report on Business Magazine article, Alec Scott has described the current and potential applications of the Internet of Things. He notes that “these intelligent machines are already altering spheres as diverse as health care, manufacturing, city planning, transportation and power generation, agriculture and household management”. And further, that the devices themselves are “causing macro shifts in how we live and work.”

In his Report on Business article, Alec Scott details a long list of Internet of Things application in play today; in such fields as, Home heat and light controls, Traffic light controls, Manufacturing automation and defect prevention, Robotic cars such as the Tesla, Planes and trains safety, health and fitness assistance, management of power grids and farming.

Scott also notes that there are a number of obstacles still to be solved; involving issues such as standardization of (computer) languages, security, privacy, preventing hackers from taking subversive control of Things, as well as legal issues about who owns the information, and regulatory issues.

IBM has announced a \$3 billion program of R&D focussed on the Internet of Things. One would expect a lot of this would be aimed at developing the infrastructure for the Internet of Things. But already IBM is partnering with many companies targeting specific areas of The Internet of Things. Recent IBM announcements include:

1. IBM and Semtech Corp., a leading supplier of analog and mixed-signal semiconductors, announced a significant advancement in wireless technology, combining IBM software and Semtech hardware to create a system capable of transmitting data up to a distance of 15 km (9 miles), depending on the environment, with significantly improved ease-of-use.

2. IBM and AT&T announced a new global alliance agreement to develop solutions that help support the “Internet of Things.” The companies will combine their analytic platforms, cloud, and security technologies with privacy in mind to gain more insights on data collected from machines in a variety of industries.
3. AT&T, Cisco, GE, IBM and Intel formed the Industrial Internet Consortium to improve Integration of the Physical and Digital Worlds. These Technology leaders will establish industry standards for operation of the Internet of Things by identifying requirements for open interoperability standards and defining common architectures to connect smart devices, machines, people, processes and data being wirelessly transmitted from “Things”.
4. IBM, STMicroelectronics and Shaspa announced a collaboration to tap cloud and mobile computing for manufacturers and service providers to provide innovative ways for consumers to manage and interact with their homes’ functions and entertainment systems using multiple user interfaces such as voice recognition and physical gestures for a smarter home.
5. IBM and Vodafone announced a collaboration to combine mobile communications and cloud computing for the remote management of ‘smart home’ appliances.
6. IBM and The Weather Company through WSI, its global B2B division announced a ground-breaking global strategic alliance to integrate real-time weather insights into business to improve operational performance and decision-making. As part of the alliance, The Weather Company, including WSI will shift its massive weather data services platform to the IBM Cloud and integrate its data with IBM analytics and cloud services.
7. TransWiseway, a Chinese company, teamed with IBM to design an Internet of Vehicles (IoV) platform to connect millions of trucks as well as tens of millions of devices and sensors from vehicles. Using IBM Internet of Things technologies, the trucks and vehicles are connected to the Internet as well as with each other on this single IoV platform. Built in the cloud, the IoV platform applies analytics to data from mobile devices and sensor data, instantly turning them into valuable information that drivers and authorities can access via the Web or through a mobile app to improve decision making.
8. IBM Deep Thunder is a high-resolution weather forecasting system that provides customized weather forecasts for business operations.

Applications include business areas impacted by weather include insurance, supply chain, agriculture, airlines, and renewable energy

9. IBM announced a new transportation management solution to help minimize congestion and improve traffic flow for the New Jersey Turnpike Authority. This first of its kind transportation management solution will help minimize congestion and improve traffic flow for the Garden State.
10. IBM and Eurotech announced that they are contributing software to accelerate and support the development of a new generation of smarter wireless and mobile devices. The technology, which could become the basis for a new standard of mobile connectivity and interoperability, will be contributed to the Eclipse Foundation open source community.

In a recent report examining technology adoption trends by cities, Forrester Research, Inc., cited IBM for its full set of smart city solution components, making IBM one of only two vendors that is truly a smart city service provider.

Clearly IBM is very actively focused on developing the Internet of Things and has been for some time. But there are big and tough competitors pursuing the same opportunity. These include Cisco, the giant computer networking systems leader, Siemens and other long-time manufacturers of control systems, such as Honeywell International. Still if the forecasters are right this is a huge opportunity and clear leaders have yet to emerge.

Summary

The Big Data and Analytics business grew to \$17 billion in 2014. IBM's Cloud business grew to \$7 billion in 2014. And in the third quarter of 2015, IBM stated its Cloud business revenue was \$9.4 Billion for its last 12 months.

In 2014, the 5 strategic imperatives of IBM: Cloud, Analytics, Mobile, Social and Security represented \$25 billion, or 27% of IBM's revenue for the year – a growth rate of 16% year over year.

"IBM works with 90% of the world's top banks, 9 of the top 10 oil and gas companies, 40 of the top 50 retailers and 92 of the top 100 healthcare organizations. IBM systems manage banking, reservations, transportation, retail, trading and healthcare systems. (IBM's) mainframes alone process 75% of the world's business data."

While Management of Big Data today requires the computing storage and management capabilities of networks of large mainframes, the higher value offerings lie in the software and services to collect this data, to analyze it and to produce useful intelligence from the analysis.

In 2014 IBM derived only \$10 billion of its total revenue of \$93 billion, or 11%, from its Systems and Technology (Hardware). A far cry from the position in the 1980's, as IBM continues to spin off the low margin segments of its business. It is also interesting to note that this shift in the composition of IBM's revenue parallels a similar shift in the decline of manufacturing as a portion of GNP (Gross National Product) of both Canada and the United States. In the U.S., it was down to 12% in 2014.

On the other hand, IBM's revenue from Global Technology Services (Services), Global Business services (Services) and Software were \$81 billion, or 87% of total revenue, in 2014.

While undoubtedly much of IBM's Software is the sale of Middleware, it is evident that IBM has had to expand its software offerings to include not only infrastructure products but also Applications software. IBM now has to offer Application Software, both its own and that of a multitude of others, to meet the business needs of a wide range of customers-now in 18 focus industries, worldwide.

The offering of Cloud services, the development of systems to connect and gather data from the many types of internet connecting devices, and the development of advanced analytic services, such as Watson Analytics, are all a continuation of Gerstner's "E- Commerce" strategy as markets, technology and customers' needs continue their continuously evolving nature.

Commented [PF1]:

As we can see from these excerpts from recent IBM annual reports and our summary of IBM's strategic focus areas, the IBM Vision continues to be: The provider of choice of new technology solutions to the Big Problems of Big Business.

In general, we have no quarrel with the strategies being followed by IBM today to achieve its vision of using innovative technology to solve the Big problems of Big Business. However, we have two main types of concern:

(1) The focus areas and strategies are facing tough competition. This competition comes from both from large, well-established competitors such as Apple, Google, Amazon, Facebook, Oracle, Cisco and others and new start-ups focused on particular areas of the “Stack” such as Cloud services for particular industries, and security.

(2) The Vision is limited to serving large enterprises and so misses the retail or individual consumer market wherein lie the greatest growth opportunities springing from the Internet and the services designed to exploit it.

We will provide more specific comments on these two shortcomings of IBM’s Vision and Strategies in our Observations and Comments section below.

Our task, as we see it, will be to determine whether the Vision and Strategies that Gerstner put in place in the 1990’s are still relevant in today’s rapidly changing IT world and whether the execution of these strategies reflects the ongoing commitment to Quality and Customer Satisfaction, set out in Gerstner’s statement of key Principles to govern IBM’s culture.

Execution and Culture

“Culture does trump strategy, every day” Mark Bertolini, CEO, Aetna at the Fortune Global Forum November 2015

If a business has a good and clear Vision and has developed the Strategies to allow it to achieve that vision, the key determinant of its success will be Execution, its ability to execute its strategies. In turn, the key determinant of its ability to execute its strategies will be its Culture.

Corporate Culture, as Gerstner put it in his book, is about “the collective capacity of the people to create value”. It determines “how people actually go about their work, how they interact with one another, what motivates them.”

“Most companies say their cultures are about the same things – outstanding customer service, excellence, teamwork, shareholder value, responsible corporate behaviour, and integrity.²⁰” As Gerstner notes, “these kinds of values don’t necessarily translate into the same kind of behaviour in all companies”.

²⁰ gerstner

²¹They may form the value system that underlies a corporate culture, but they don't determine it. This requires something more. And that something more that determines the culture of a business, in turn, determines the ability of the business to Execute.

So, we will look at IBM's culture in the Watson period, in Gerstner's time and today (2010's) to determine how IBM's ability to execute its strategies has varied over time.

In the Thomas Watsons' time

Thomas Watson senior determined the initial and long standing culture of IBM by his leadership and by his example.

Watson Senior was a self-made man who espoused the personal attributes of hard work, respect for the individual, integrity, a focus on customer service, excellence in all aspects of the business, teamwork and professionalism. "hard work, decent working conditions, fairness, honesty, respect, impeccable customer service, jobs for life", as Gerstner summed it up²². By his leadership he instilled these attributes throughout the organization. And they defined IBM, as much as the Computer products it produced. This culture ensured that IBM could be trusted to deliver on its strategies and be the leading provider of innovative solutions to the Big problems of Big business for many decades.

In Lou Gerstner's time

By the time Lou Gerstner took over in 1993, the Watson values and ethos had dissolved. The focus on the needs, the business needs, of the Customer had disappeared, to be replaced by a drive for sales at all costs with little or no regard for the real requirements of the customer's business. The focus on respect for the individual had been replaced by a belief in employee entitlement, entitlement to lifetime employment, entitlement to industry leading fringe benefits. Sheltered by years of monopoly positioning, profitability and lack of significant competition in its mainframe business, IBM had turned inward. It had become hamstrung by a rigid bureaucracy of structure, rules and practices that placed a value on process rather than principle, and reflected little regard for the external realities of a

²¹ Gerstner

²² Gerstner book, page 114.

rapidly changing marketplace. These and other failings, including a failure to react well to changes in the IT Industry and the competition for IBM products and services, led to failures to execute the IBM strategies of the time.

Gerstner set about changing this situation, among other things changing the IBM culture.

Gerstner's first step was to eradicate the stifling bureaucratic processes that permeated IBM from top to bottom, **and replace them with a set of 8 general principles that he** felt needed to be the basis for IBM's new culture. These were sent to each IBM employee. They are so good and so universal that we repeat them here. They were:

1. **The marketplace is the driving force behind everything we do.**
2. **At our core, we are a technology company with an overriding commitment to quality.**
3. **Our primary measures of success are customer satisfaction and shareholder value.**
4. **We operate as an entrepreneurial organization with a minimum of bureaucracy and a never-ending focus on productivity.**
5. **We never lose sight of our strategic vision.**
6. **We think and act with a sense of urgency.**
7. **Outstanding, dedicated people make it all happen, particularly when they work as a team.**
8. **We are sensitive to the needs of all employees and to the communities in which we operate.**

To spread the word and make these principles pervasive throughout IBM, Gerstner undertook several measures.

Waking up the leadership team

Gerstner embarked on a major restructuring of the leadership at IBM. The first move was **to disband the Management Committee**, the top tier in IBM's management structure. To replace it, he formed a Corporate Executive

Committee with 11 members with a focus solely on policy issues that cut across multiple units (integration).

Gerstner built a new board, reduced in size, adding new people with different perspectives (all leaders of big clients).

He opened up new communication channels with employees for messages from and to the CEO. (He used IBM internal messaging system for Dear Colleague letters.) He announced and carried out plans to visit as many operations and offices as possible “to talk together about how we can strengthen our company.”

The responses from the employees to these steps was very positive!

Creating a truly Global Enterprise

Gerstner wanted to remake IBM into a truly global enterprise, one that could serve big global companies seamlessly. This was designed to support the company’s fundamental strategy, building around IBM’s “distinctive competence- its ability to integrate all the parts for our customers.”

The first step was to integrate IBM, remaking the organization, redoing the brand image, and resetting the compensation structure.

A. Remaking the organization

IBM was the most complex business in the world, because: (1) of its sheer size; (2) it was far reaching; it had to be prepared to serve every institution, every industry, every government, around the world: and (3) the rate and pace of change in technology, with product cycles reduced to 10 months, new discoveries overwhelmed planning and economic assumptions regularly. Also complicating things was the size and composition of the employee base, composed of 300,000 professionals.

IBM had evolved into (1) powerful geographic units and (2) powerful product divisions, dealing with the technologies. Missing was a customer view - product divisions had little concern over customer needs or priorities. Gerstner experienced this first hand at American Express. American Express needed common systems around the world and consistent support worldwide. It wasn’t getting it!

Gerstner’s early priorities were to shift the power bases, simplify and unify staff bases and systems.

To do this, Gerstner broke the customer base in 1995 into 11 industries and **1 for small to medium sized businesses**. It took 3 years to be accepted; involving a massive shift of resources, systems and processes.

B. Reviving the brand

Gerstner saw that the company needed to re-establish a customer/market orientation **led by a strong marketing organization**.

To recast the IBM image, he wanted an integrated marketing effort to articulate why customers would want to do business with an integrated IBM. He reduced the number of **Ad agencies used by the company to a single global agency**, which developed a coherent branding message: that IBM was global, “was staying together, as a world class integrator”, **and was able to move quickly, take risks, and be more accessible and easier to deal with**.

Another marketing step was to coin the term “e-business”. “e-business” was the term IBM used to encompass all the activity that would be generated by the Internet. It was first unveiled at a Wall Street briefing in 1996. It became the centrepiece of IBM’s marketing program and provided a framework for IBM’s position as the premier System Integrator in the now Internet world. It was intended to convey the new world of the Internet covering “every important kind of relationship and interaction among businesses and people”, and undoubtedly it did so. But as we will see a little later, it missed the full significance of the Internet’s transformation of communications and limited IBM’s presence in the Internet world.

C. Changing the compensation system

Compensation policy was reset to align with the strategic Vision of being the leading global computer/communications system integrator.

The old policy was one in which compensation at all levels was primarily salary, with little differentiation in the system; a heavy emphasis on benefits, including pensions, medical coverage, education, and a commitment to lifelong employment.

The new policy embraced pay for performance, differentiation, variable rewards, and benchmarking compensation to the broader marketplace.

Stock options became a much bigger piece of compensation, offered to many more employees (from 1300 in 1992 to 72,500 in 2001). They became a much

larger element of executives' pay. The executives were required to put some of their own money into IBM stock if they were to receive stock options, **to align their interests with those of other shareholders.**

"All executives would have some portion of **their annual bonus determined by IBM's overall performance.**" To reinforce the message that "we need to work together as a team --- to make integration the centerpiece of our new strategy."

Measuring the success of the Gerstner leadership

Was Gerstner successful? By his own two key measures, customer satisfaction and shareholder value, the answer is very successful.

We will take revenue growth as a proxy for customer satisfaction, (a measure not entirely free of inaccuracies). Total revenue grew from \$62.7 billion in 1993 to \$88.4 billion in 2001 and went on to hit a peak around \$107 billion in 2011.

The IBM stock price went from \$12.72 in 1993 to \$120.96 in 2001, a growth of almost 10 times in 8 years. The IBM stock price would hit an all-time high of about \$207 in 2012, or almost twenty times its value in 1993.

Shareholders and employees, most of whom were also shareholders, must have been pleased.

The Culture today

Today, in 2015, there are strong indications that everything is not quite right at IBM. Revenue growth has stopped and is shrinking, the share price peaked in 2012 and has fallen by over 30 % since to about \$137 in November, 2015. This may be attributable in part to the levelling off of the world economy, in part to IBM's continued focus on the business of Big business that cuts it off from the consumer IT market, and in part to the strong and increasing competition in IBM's focus markets and strategies. Could there be more to it? Could there be renewed problems with the culture at IBM? These are the questions we would like to address now.

It is difficult to get a handle on the culture of an organization without doing an objective survey of its staff at all levels. However, in the case of IBM, there are some other sources that may provide clues to the current culture.

Robert Cringely, a Silicon Valley journalist for over 30 years, has in 2014 published a book: *The Decline and Fall of IBM*. It deals extensively with the culture today at IBM. It is severely critical as the title of his book implies.

Cringely's book seems to be a one-sided tale of **unhappiness among the employees at IBM**. It **recites** the cutbacks in staff resulting from the sale by IBM of a number of its old business units, the PC business, the Server business and a number of others. It ignores the many acquisitions that IBM has made over the last few years, continuing the strategies introduced by Gerstner in the 1990's. It cites the **transfer of many jobs that followed from the outsourcing** of work to India, but ignores the growth in IBM focus markets of Cloud, Analytics, Security and Mobile Connectivity. Nevertheless, Cringely supports his analysis with a number of pieces of correspondence from IBM employees and former employees that detail some of the hard luck stories suffered by them and their concerns about how IBM is being managed. If half of what Cringely hints at is the case, IBM has some serious problems with its culture today that need to be addressed.

On the other side of the culture debate is the following good news story by Steve Rosenbush in the Wall Street Journal. In a 2015 article, Rosenbush reports that IBM hired Jeff Smith as its new CIO in mid-2014. Smith had served as CEO of Suncorp Business Services, an Australian company, where he had led a technology transformation at the parent financial company, Suncorp Group, working with IBM. The transformation produced gains in quality, cycle time and cost structure.

As CIO at IBM, Smith leads a 20,000- person global IT team that creates tools and services for the entire IBM workforce. He has launched a transformation of his team with "The mission to have innovation and the speed of small companies".

The IBM IT team had been divided into two groups, following a traditional model: the "development" group and the "run" group. Smith replaced the old structure with 25 "Domains", each self-directed, with its own leader. The domains include, for example a group that develops software for the "Cloud" services, to a group in charge of the availability of the software tools that IBM employees need to access.

"The key piece is how to break big problems down and yet use the wealth of people IBM has around the world" says Smith. The domains use IBM's Agile and Dev Ops methodologies to break projects down into small units, enabling rapid development. Smith seeks to build company-wide collaboration on the small projects to get the best people on each one. One method he uses is to rotate

people through different jobs every 5 weeks. The Domains bring employees around the globe together by using always-open video links on platforms such as Skype.

Smith sees his role as helping to define the problems to be addressed and to establish leadership and systems of accountability. The small teams are left to manage their own work. No one gets credit until the project is completed.

An even more encouraging note on IBM's culture is provided in the November 16, 2015 issue of the New York Times. Jim Kerstetter has reported a movement within IBM to adopt "Design thinking". It is being led by Phil Gilbert who is in charge of "design" at IBM. He, and his staff of about 1000, are trying to get everyone at IBM, from marketers, engineers, R&D personnel and others to use the "Design thinking" methodology. This approach starts by identifying what customers need and using that information as the basis for what products and services should be developed and delivered to meet those needs, rather than the other way around. While that seems like a fairly basic idea, and has been used by other businesses, it is refreshing to hear that IBM is putting resources into the approach. It is reminiscent of Thomas Watson's "focus on customer service, and of Lou Gerstner's efforts to "Redefine IBM and its priorities starting with the customer", "to drive all that we did from the customer back"²³. Given the criticisms spelled out by Robert Cringely in his book written in 2014, it is encouraging to see these moves to correct some of the problems he articulated.

If these approaches are typical of the new IBM, we see it as creating a workplace where employees would be happy to be: a good sign! At the same time, Smith's hope, based on his experience at Suncorp Group, is that his approach will speed up IBM's software development times and allow it to compete with both the "Tech-giants" and the "Host of start-ups working in common fields such as Artificial Intelligence".

Cringely's book and the letters from disgruntled IBM employees and former employees and the downturn in IBM's revenue and share price suggest that IBM still has serious morale problems and needs to do more to address these. We have a suggestion in our final section of this book.

²³ Gerstner: Who Says Elephants can't dance?

Comments and Observations

We will start by addressing the two main concerns raised earlier: the focus on Big problems of Big companies and the level of competition in IBM's key fields of endeavour.

The Narrow Focus

In our discussion of IBM's Vision and Strategies today, we noted two concerns.

The first was IBM's continued focus on being the provider of innovative solutions to the Big problems of Big corporations. This was the focus developed by Thomas Watson Senior and it has remained the focus through the years in which Lou Gerstner was the CEO, in the 1990's. It continues to be the focus today, in the 2010's.

The concern with this focus is that it leaves IBM out of the consumer IT market. This is where the predominant action is in IT today. This shift away from big business started with the popularity of the Personal Computer beginning in the 1970's. It was followed by the development of the Internet in the 1990's that created the universal digital communications highway. This was followed in turn by the arrival of the SmartPhone in the 2000's.

These three developments caused a number of shifts in the IT industry. In the first place, it caused the predominant use of the personal computer to become communications rather than calculations or typing.

In the second place, the development of universal and free standards for using the Internet meant that it was practical for individuals and groups around the globe to use this new digital communications tool at a relatively low cost. And so the usage mushroomed quickly.

Third, the arrival of the smartphone and variations thereon meant that individuals could use this new communication tool anywhere they happened to be and any time they had something to communicate. This new communications medium was used first for E-mails, then for e-commerce, then for social media of varying types: words, pictures, videos, and graphics. Variations include instant messaging, video chats and even telephone conversations.

To get some idea of how massive these shifts in the use of computing equipment are, consider that in 2015, sales of smartphones of various types are expected to pass one billion units; in contrast the peak year of sales of personal computers, 2012, had total sales of about 322 million units.

Leadership of the IT industry has passed from the big companies serving big business such as IBM to the Companies leading the supply of equipment, software and services to individuals and groups. For evidence of this shift consider the Market Caps (Stock market value of the companies' share capital) of a few of these companies, in November 2015:

IBM	\$128 billion
Hewlett Packard	\$24 billion
Intel	\$151 billion
Microsoft	\$422 billion
Amazon	\$301 billion
Google	\$493 billion
Apple	\$626 billion
Facebook	\$294 billion

Based on this measure of value, the new leaders of the IT industry are the companies focussed on the retail or consumer market rather than the Big Business market. If IBM wants to regain leadership of the IT industry, it is going to have to broaden its focus to include one or more of the new mega growth areas. That's not to say that the present focus on the IT needs of big companies can't be a sizable and profitable market, but it is not where most of the IT action is today. We will have some suggestions on how IBM could initiate such a shift in focus if it so chose.

The Competition

Our second concern with the current IBM Vision and Strategies is the fact there is much competition in the areas IBM is focussing its strategies on. This competition is coming both from large and well established competitors and from new start-ups and entrepreneurial businesses.

Advanced Analytics Competition:

Adam Lashinsky reported in a 2015 Fortune Data Sheet that “Intel is Buying Saffron AI, a start up in Cary North Carolina that makes a cognitive computing platform that is reminiscent of IBM’s Watson Technology.”

“Saffron’s software takes in a variety of data on a topic... then parses similarities and relationships to “learn” about that topic. Saffron has purportedly created software that mimics human reasoning and memory that it applies to problems for clients.... A system that helps take in a lot of data and generates insights.”

Intel has three goals in connection with this acquisition. First to play catch-up in putting its chips in the growing and varied connecting devices that feed the big data collectors. Second is selling more of its general purpose chips for the server data centres. Third is to build and sell advanced chips to accommodate the advanced analytics required to produce useful information from all that data.

Lashinsky also reported that a company called Workday, ten years old with annual revenue anticipated to be \$1.5 billion, was offering applications software that run human resources and financial departments; two areas targeted by Oracle and a number of others for advanced analytics.

In this connection, Intel is also spending \$16.7 billion to buy Altera. Altera makes a programmable chip that may be useful for “artificial Intelligence”.

Competition in the mobile market

In the Globe and Mail of October 23, 2015, the Associated Press reports that Google is making significant strides in the mobile device market. Google announced third quarter earnings of about \$4 billion, up 45 %, on quarterly revenue of \$18.7 billion. Google is in the midst of separating out its “skunk works’ projects investigating new businesses as diverse as self-driving cars, internet connected thermostats, and cures for diseases and other health problems, and a multitude of other ventures in search of “The Next Big Thing”. These ventures will be put in separate companies that along with Google are becoming subsidiaries of newly public company “Alphabet”.

Competition in the Cloud

Competition to offer Cloud services is intense. In its article on IBM Cloud Computing, Wikipedia lists 18 competitors. The major ones are Amazon Web Services, Google’s cloud services, and Microsoft Azure.

It is difficult to get a good comparison of cloud revenues since companies have different reporting periods. Perhaps the most useful comparison is that published in the Wall Street Journal by the Market Realist in 2015, showing the following revenues for Cloud enterprise vendors.

In this presentation, IBM leads the way with Revenue of \$ 8.7 Billion.

Amazon Web Services is second with revenues of \$7.35 billion, but is growing faster than IBM in this area. Amazon Web Services constitute a full suite aimed at enabling small and medium sized businesses to set up their own Cloud offerings to their customers. For the moment at least Amazon is not competing directly against IBM in the Cloud, where IBM is aimed at Big Enterprises.

Third is Salesforce with revenue of \$6.5 billion. Salesforce is an interesting case, because it was started with a narrow focus, on Customer Relationship Management (“CRM”). Based on its success to date, this met a popular need.

Salesforce was started in 1999 by four people who left their jobs at Oracle to start up Salesforce as an SaaS Cloud business focussed on providing CRM applications via the Internet, or “Cloud”. When the company went public in 2004, Larry Ellison, founder and long-time CEO of Oracle, invested in the new company.

In its 2014 Annual Report, Salesforce states that it sells to businesses of all sizes and in many industries globally, on a subscription basis. The Salesforce mission is “to help our customers transform themselves into “Customer Companies” by empowering them to connect with their customers, partners, employees and products in entirely new ways. Our objective is to deliver solutions to help companies transform the way they sell, service, market and innovate.”

“ Key elements of our strategy include:

- strengthening our market-leading solutions;
- extending distribution into high-growth markets;
- Expanding relationships with our customer base;
- Pursuing new customers;
- Reducing our attrition rates;
- Building our business in top markets globally; and

-Encouraging the development of third party applications on our cloud platforms.”

Clearly Salesforce is a serious competitor whose ambitions go far beyond CRM.

Fourth is Microsoft with revenues of \$5.09 billion in this survey. Microsoft is aiming at enterprises generally. It is coming on strong in this area with its Azure cloud offering built into Windows 10, as well as its web browser. In 2011 Microsoft apparently committed 90% of its \$9.6 Billion R&D budget to Cloud services. It appears that Microsoft is aiming most directly at Amazon Web Services since a lot of its efforts are aimed at replicating and improving upon the suite of services offered by Amazon. This doesn't mean that it won't also try to catch the attention of Big enterprise CIO's. So it is a force to be reckoned with in the Cloud.

Fifth is Oracle with revenue of \$3.2 Billion. Others with significant revenue include SAP and Google.

The competition in the cloud is not just from the Big boys. The demand for Cloud services is growing so rapidly it is attracting the attention of a number of young entrepreneurial companies.

Adam Lachinsky reports on one of these in the January 26, 2016 issue of his Fortune Data Sheet. The company is Box, a cloud software company. It is over ten years old and went public just in 2015, raising a net of \$187.2 million. (It had also raised \$150 million from the issue of redeemable convertible preferred shares in 2014.)

Box is focussed on businesses. It provides Cloud storage and file sharing facilities, as well as sophisticated encryption services, management of complex workflows and regulatory compliance assistance. It lists IBM, EMC and Microsoft as primary competitors.

GE is a major client using the Box Cloud software with 150,000 employees as users.

The following quote comes from the Box website:

“In today's mobile-first, cloud-first world, providing our employees with secure access to content at any time using any device is critical to creating a more productive, connected workforce. Moving to a cloud technology like Box allows us to centralize all of our content and provides more efficiency, speed and simplicity for our employees.”

Box is currently introducing its Cloud software to businesses to enable them to offer Box services to their customers – a bet the company made and the reason it went public to raise sufficient funds to give it a decent chance to pull this off.

All of the Cloud leaders are making acquisitions and entering into partnerships to improve their cloud services. One commentator, Oracle CEO Mark Hurd, speaking at the 2015 annual Oracle software conference in San Francisco., stated that he expected 80% of all data to be in the Cloud in a decade, compared with 25% today. So the Cloud is a highly competitive arena but the total market for Cloud services is expected to continue to expand rapidly for the foreseeable future. All companies in the game should experience growing revenues, but leadership seems to be up for grabs.

In a recent (2015) Globe and Mail issue, Reuters reported that Microsoft Corp. beat expectations with its first quarter revenue results, “boosted by burgeoning demand for its Cloud products”. “Revenue from Microsoft’s Intelligent Cloud business, which includes server products such as Windows Server and cloud-based platforms such as Azure, rose 8% to \$5.9 billion.”

And also in the same issue of the Globe and Mail, the Associated Press reported Amazon had a surprise third quarter profit (“17 cents per share”), “driven by a boost in revenue ... (from) strong growth in its cloud computing offerings (“Amazon Web Services”).” Amazon Web Services sales jumped 78% to \$2.09 billion in the quarter, out of a total revenue number of \$24.85 billion. At over \$8 billion a year run rate on its Cloud services, Amazon is closing in on IBM’s sales leadership in volume of Cloud business. While Amazon Web services is aimed at small to medium size businesses, perhaps there is a danger that it will scale its services up and attack the big business market where IBM plays.

Competition in Big Data

In the Globe and Mail, Jaqueline Nelson reported: The Canada Pension Plan Investment Board, managing one of Canada’s largest pension funds, is taking a

stake in a technology company that specializes in harnessing collections of unwieldy corporate data for businesses around the world. The investment was part of a \$5.3 billion transaction to take Informatics Corp private. Redwood, California based Informatica is a multifaceted data company trying to build sales momentum for its software products that collect, access and protect data for 5500 enterprises. Informatica topped \$1 billion in sales for the first time in 2014. It is targeting Cloud services and security, both of which it projects to grow significantly.

In the Globe and Mail, James Mirtle reported on the ninth annual MIT Sloan conference on sports analytics. The conference has become “a mecca to those both sporty and statistically inclined.” The key to its growth is said to be the fact that data “analytics helps you make better decisions, which helps you win”. Athletes today view analytics “as just another way to gain an edge.” For example, Mirtle reports that Shane Battier used advanced statistics to shut down L.A.Lakers star Kobe Bryant, by discovering his weaknesses according to the numbers.

This is but a small sample of articles announcing activity among competitors in IBM’s target markets. It is an indication that the competition in these markets, both from large, long-established corporations and from entrepreneurial start-ups and smaller corporations is intense and growing.

Financial Considerations

Recent timeline of some key financial statistics

Year	Revenue (\$ billions)	net income (\$ billions)	free cash flow (\$ billions)	Share purchases & Dividends (\$ billions)	Stock price \$
2004	96.5	8.4	8.7		84.74
2006	91	9.4	9.0		
2008	104	8.86	14.3		11.96
2010	99.9	11.67	16.3		134.14
2012	104	15.25	18.2		207.45
2014	92.80	16.53	12.4		189.97
2015					137.00

We can see from this table that revenue growth has stalled at IBM and is actually falling in 2014/16.

IBM has maintained profitability by its program of selling off losing or poor performing units and focussing on high margin opportunities. Profitability is partially attributable to income tax reductions, probably through international tax planning, and may also be partially attributable to the off-shoring, principally to India, of some services.

IBM has also maintained a high level of cash flowing to shareholders by dividends and share buybacks. This is in lieu of the funds being reinvested in growing the business.

However, as Tom White has pointed out in an article titled: IBM's Lost Decade in 7 Charts, published on Yahoo Finance in January 2015, the profitability and the amount of cash going to shareholders is unlikely to be sustainable.

IBM's cash/ debt position is out of line with its key competitors. Consider that Apple has currently over \$200 billion in cash and marketable securities.

Investors are not being fooled by the financial engineering tricks. IBM's share price and market cap have turned south from a peak of about \$207.45 in 2012 to a drop to about \$137 in November of 2015. It seems clear that things are not right at IBM today.

The keynote article in the March/April issue of Discussion and Analysis, the bimonthly publication of the CPA's of Ontario, was headed: The Strategy Strait Jacket. The article asks: "What happens when a company is bound by a financial strategy that will ultimately do it harm? And how can it break free? The primary example was IBM and its Roadmap 2015, a five-year financial strategy that included a target Earnings per share of \$20 by 2015. The article notes that this strategy led IBM to aggressively cut operating costs while sacrificing revenue growth in order to increase dividends and share repurchases. And it won't meet its target!

To get out of the financial Strait jacket, IBM CEO Virginia Rometty, appointed in 2012, part way through the 5-year period covered by Roadmap 2015, announced in October, 2014, that IBM was abandoning the Roadmap 2015 plan. CFO Martin Schroeter, who took on the role in January 2014, stated that "IBM is unlikely to put another absolute earnings per share (five year) target in place any time soon."

His new financial goals will be “to achieve modest single digit revenue growth alongside high, single digit operating EPS growth in the longer term”.

The article notes that to the end of 2014 IBM had experienced 10 straight quarters of declining revenues and had the status of being the worst performing stock in the Dow Jones 30 Index in 2014.

Conclusions and recommendations

We are starting the conclusion section with a SWOT analysis (Strengths, Weaknesses, Opportunities and Threats). A SWOT analysis is the traditional starting point for the preparation of a business plan, or strategic plan. The idea is that this analysis helps to identify the focus of the Strategic Plan.

So here goes our SWOT analysis for IBM today, 2015.

Strengths

IBM has a large installed base of Customers in the Big Business Category. As set out in the 2014 Annual Report IBM mainframes process 75% of the world’s business data. It continues to improve its mainframe offerings. In 2014 it introduced the z13 a new line built for the mobile era. IBM claims the world’s leading banks, oil and gas companies, retailers, healthcare organizations and more rely on IBM to run their IT systems. This provides it with a large number of important contacts in the IT world and a base from which to sell its software and services.

The IBM Brand is still one of the world’s best known and valuable. In its 2015 ranking of the Top 10 global Brands, Interbrand ranked IBM as number 5, behind Apple, Google, Microsoft and Coca-Cola, and ahead of Toyota, Samsung, GE, McDonalds and Amazon.

IBM has one of the largest R&D operations of any business entity, investing more than \$ 6.3 billion in R&D in 2014. In 2014, IBM was the recipient of 7,534 new patents by the U.S. Patent and Trademark Office. This marked the 22nd year it has

been awarded the most patents of any company. In 2011/2012, Fast Company ranked IBM as 18th among the Top Innovative Companies in the world.

In 2014, IBM was named a worldwide leader in the IDC Market Scape in Worldwide Mobile application development and testing consulting services. IBM was recognized as a “Leader” by IDC because of its performance across business service capabilities, employee management, customer satisfaction, overall project management categories, and for the scale of its user experience and creative design skills. Customers were noted as having a “high regard” for the IBM technical expertise in mobile, global scale and flexibility in working with customers’ application development methods.²⁴ These are all areas in which Lou Gerstner pushed the company to improve on, in the 1990’s.

Warren Buffett through Berkshire Hathaway has been accumulating IBM stock in the last few years. Buffett looks at factors such as whether the company is conservatively financed, particularly debt to earnings ratios, strong management in part as indicated by the company return on capital and how it uses the company’s earnings. John Reese writing in the Globe and Mail finds IBM has done well in these categories in the last few years.²⁵

IBM has a clear Vision for its business: Solving the Big problems of Big Business using innovative technologies. It is the clear leader in this (niche) market.

IBM has a well-honed set of Strategies designed to enable it to achieve its business Vision. These Strategies have been modified over time as the IT environment has changed. Today they are focussed on “Cloud, Big Data, Cognitive Computing, Engaging mobile devices, and Security”. IBM has competitive advantages established over time in most of these focus areas.

IBM has a number of initiatives designed to continually improve its culture, to motivate its employees, to make IBM a good place to work.

IBM has dealt with adversity in the past. In the 1990’s, Lou Gerstner led a successful turnaround of the company when many commentators were predicting its demise.

Weaknesses

IBM’s revenue has been levelling or dropping in recent years.

²⁴ IDC MarketScape: Worldwide Mobile Application Development and Testing Services 2014, December 2014

²⁵ John Reese in November 2014 Globe and mail

IBM's share price has turned south over the last 3 or 4 years, dropping from an all-time high of about \$207 in 2012 to a low in 2015 around \$135.

IBM is distributing an unsustainable level of its cash flow to shareholders in recent years.

The IBM Board of Directors is dominated by senior executives of large client enterprises and has no representatives from the current technology growth sectors.

The IBM Vision targets a mature part of today's IT market and misses out on the consumer segment where the dominant action is now playing and the new market leaders are to be found.

The IBM strategies appear to leave little or no room for expansion of the Vision into areas that might produce the Next Big Thing and give IBM the potential to develop a new leadership position and reenergize its revenue growth.

IBM's primary management coordinate, or organizational structure seems to be Functional rather than the Industry specialties that Gerstner introduced. While IBM has increased its target industries from 11 to 18, it is not clear how much emphasis it is giving to the Industry specialties in its organization and power structure.

There have been serious questions raised about the company's culture based on the numbers of employees that have been cut or left the company in recent years. Concerns have also been raised about the way it has handled Outsourcing of functions to other countries such as India.

In spite of recent employment cutbacks, IBM still seems to have too many employees, at over 430,000, for its current revenue levels.

It is not clear that IBM is fully capitalizing on its world leading R&D program. This has been a chronic problem at IBM. We have noted that the IBM R&D labs developed many new technologies that were exploited by other companies. Gerstner noted that this was a problem in his era of the 1990's and initiated several steps to enable IBM to take better advantage of its R&D program. It still seems to be a problem today, in 2014/16. For example, the IBM technology Group (hardware) has not lived up to Gerstner's expectations with respect to the demand for specialized chips for the plethora of new Internet access devices. Although the IBM R&D program has several developments in the chip area, the

leadership seems to be elsewhere, with companies such as Intel, Broadcom and Qualcomm.

Opportunities

Helping Big Businesses adapt and take advantage of the rapid changes in technology.

Building technology innovations that solve business problems, such as showing the way to reliable, secure and creative uses of Cloud Computing.

Expanding geographically, particularly in the leading emerging economies.

Creating new software to manage the increasingly diverse and dispersed range of computing devices being used by individuals, whether, customers, employees, suppliers, or business partners; and connecting them to the large networked databases and systems of Big Business.

Establishing more functional partnerships with leaders in the fastest growing segments of the IT marketplace.

Looking for The Next Big Thing.

Threats, or Challenges

The challenge of competition in all facets of IBM's business, from both large, well established competitors and young start-ups focussed on particular problems.

The Challenge of managing a huge conglomerate with large functional divisions, customers in over 170 countries and in diverse industries.

Keeping on top of technologies that matter. Attempting to achieve a leadership position in the Next Big Thing.

Maintaining a highly motivated workforce, with the right experience, the right training and the right resources - a "passionate" workforce in Gerstner's terms.

Recommendations to right the ship

We have some specific suggestions on things that could be done to strengthen and expand on IBM's current position and to ensure its survival.

Structure

Board composition

At present and throughout its history, the IBM Board has been composed of leaders of its big company clients, with a few academics.

Since the arrival of the Internet, the IT industry has shifted from a focus on storage and calculations to a focus on communications. This shift has caused the mainframe market to stagnate and to transfer the high growth prospects to the consumer market. The leaders of today's IT industry, as we have seen, are the companies focussed primarily on the consumer market; companies such as Apple, Google, Amazon and Facebook.

We applaud the partnership between IBM and Apple. It should be complimentary for both companies' businesses.

We recommend that IBM should have representatives of the high growth areas of the IT Industry that are leading the innovation in products and services in those areas on its Board. This will help ensure the Board is plugged into the thinking of the leading innovators and inform its decisions as it explores ways in which IBM can participate in the high growth IT opportunities. A good candidate or two might be found in the Silicon Valley Venture capital community, say Mark Andreessen or one of his partners. This would give the company a window on new technology developments that it could pursue, as well as giving it a useful eye on competitive developments.

Management Structure

Larry Greiner, a Harvard Business School Professor wrote a seminal work on The Stages of Growth of business enterprises. His original article, published in 1972, was updated and republished in the 1985 Harvard Business Review, under the title: Evolution and Revolution as Organizations Grow.

In the article, Professor Greiner identifies five discreet stages that growing enterprises pass through on their growth paths. Each stage is characterized by unique management characteristics that he titles: Management Styles. The characteristics include: leadership focus and style, organizational structure, control system, and management reward emphasis.

For example, the reward emphasis shifts, through the five stages, from ownership in the Entrepreneurial start-up stage, to salary and merit increases in

the Direction stage, to individual bonuses at the Delegation stage, to profit-sharing and stock options at the Coordination stage, to team bonuses at the Collaboration stage.

The irony of the growth analysis is the very management characteristics that enable the organization to succeed at one stage are the characteristics that trip it up ahead of the next stage. Wholesale changes in the management style are required to succeed at the next stage. Greiner refers to these steps as “Evolution” during the productive growth stages, and “Revolution” during the transition to the next stage, reflecting the fact that revolutionary changes in Management Style are required to move the organization successfully into the next “Evolutionary” stage.

For example, consider the transition from the successful start-up of an organization, a phase characterized by “Creativity” of products and services and markets, to the second phase characterized by the need for “Direction” of a growing staff. To make this transition successfully, the top management style should shift from “Individualistic and entrepreneurial” to a “Directive” style in which control of the operations to make them efficient becomes a more important focus. Typically, this shift requires quite different skills in the top management. A good example of this shift is to be found in Google where the founders Larry Page and Sergey Brin brought in Eric Schmidt to manage the company.

The question raised by this analysis is where IBM fits in. Greiner himself provides a clue. He notes that Lou Gerstner was brought into IBM (in 1993) at a time when it was faced with a “Revolution” between being a Stage Four company with formal lines between strong line staff and product groups, and making the transition to a Stage Five company where the key management characteristic was “Collaboration”. IBM before Lou Gerstner and General Electric before Jack Welch both suffered badly at the end of the fourth phase of coordination, when sophisticated management systems evolved into rigid bureaucracies.”²⁶

Today, in 2015, IBM seems to be in a revolutionary stage following the Stage Five Collaboration stage, established by Lou Gerstner, to transition to Stage Six. Greiner doesn’t define this stage but has some suggestions on what it might look like.

²⁶ Greiner: Evolution and Revolution as Organizations Grow; Harvard Business Review, 1985,05

Initially he felt that the Management Crisis ending the Fifth Stage, Collaboration, would be psychological in nature; the result of employees growing “emotionally and physically exhausted from the intensity of teamwork and the heavy pressure for innovative solutions”. This crisis could be solved, he suggests, by new structures and programs that allow employees to take a break and “reflect and revitalize themselves”. On reflection, Greiner himself states that perhaps the Fifth Stage Crisis is the fact that the organization can no longer produce its own solutions, “such as new products, for stimulating growth and must look outside”.

Greiner goes on to speculate that “A sixth phase may be evolving in which growth depends on the design of extra-organizational solutions, such as creating a holding company or a network organization composed of alliances and cross-ownership.” He notes that GE may have developed something of this sort. A better modern day example may be what Google has done in creating the Alphabet holding company to hold its varied adventures in innovation in separate companies.

This line of thought leads naturally into our next suggestion for IBM.

Exploring for the Next Big Thing in the IT marketplace

If IBM is to renew its growth, it seems clear, as Greiner has suggested that it is going to have to look outside itself. It has a perfectly good business in the Big Business IT market; but this is a mature business apparently with little prospects for growth. And competition is intense. We note that Hewlett Packard, a competitor is experiencing the same problems as IBM with revenue growth. HP, “the tech pioneer...reported a fall in revenue for the fifth straight quarter (in November 2015)... Hewlett Packard’s revenue fell 9.5% to \$25.71 billion in its fourth quarter, ended Oct. 31, 2015”.²⁷

IBM already has a significant project under way to expand on its existing initiatives in the development of “The Internet of Things”. IBM has announced that it will spend \$ 1 billion a year in each of the next three years on innovations in the Internet of Things. We applaud this initiative and feel it is a natural for IBM.

²⁷ Reuters as reported in the Globe and Mail of November 25, 2015

After all, most things are made by Big companies, so IBM should have good contacts with the present leaders in this evolving marketplace.

Another initiative that would fit this prescription would be to follow Google's approach in the search for the Next Big Thing. This would involve setting up cross-discipline teams of people to pursue new products or services in specific target areas, such as driverless cars, or improvements in healthcare administration, or many other opportunities presented by the rapidly changing technologies of today.

The key to making these initiatives effective is to allow each team to operate on its own under very loose control. Accountability would be achieved by monitoring the innovations produced. The idea would be to create in each team an independent entrepreneurial environment like the one spelled out by Greiner for a Stage One business in the Creative/ start-up stage. These would be high risk ventures, so they would have to operate on a long leash. In Google's case, the decision has been made to put them in separate companies, under the Alphabet holding company umbrella and see what they can develop.

IBM must focus innovation on new products and services. There is a question about how focussed IBM's massive research and development efforts are on new product and services development. This is the ultimate test of how innovative the company is. Certainly IBM has a long history of product innovation. However, reports on the subject of how innovative the IBM R&D group is, seem to focus on how many new patents it obtains each year (IBM has been the leading corporation in this regard for 22 straight years). It is unclear how it stacks up today in terms of new products. It would be helpful to know how IBM does on this test of Innovation.

Another approach to measuring how innovative IBM is today, is presented at Corporateinnovationonline.com. This site shows a 25-point survey that is used to measure the degree of innovation in the culture of a corporation. Users who complete the survey are given a report comparing their results with the full database of completed surveys, or the portion in their industry. The company results can also be compared to the best-of-breed innovators. 3M has a long history of being one of the best. The survey is best completed by a number of employees at different levels in the corporation who complete it twice: once to indicate what they believe is the situation now and once to indicate what they believe it should be. These two sets can be aggregated and compared to give a

summary score of gaps that can be addressed to improve the innovative culture in the corporation.

The IBM Research and development program

IBM has a long history of an industry leading R&D program. Each year for the past 22 or so it has topped the list of companies earning new U.S. patents, often by a large margin. IBM has continued to spend over \$6 billion each year on R&D. The mystery is what type of R&D it is spending on.

From the myriad of press releases from IBM each year, we can deduce the following:

It is winning a leading number of U.S. patents.

It is also producing a remarkable string of new products or improvements, both hardware and software, each year.

The surprising thing is that it continues to achieve new developments in basic computer hardware building blocks. This is continuing in spite of the fact that hardware is a rapidly diminishing part of the company's overall revenue, about 12% in 2014, and the hardware division barely earns an operating profit. In recognition of the latter fact that hardware is a low margin business, IBM has been jettisoning bits and pieces of its hardware business for years. So what was once the core of its business is all but gone as the company continues to shift to software, the highest margin part of its business, and services, continuing the change in strategy directed by Lou Gerstner starting in 1993.

The burning question is how all that money being spent on R&D is being allocated, and is the allocation consistent with its strategic plan? There is a suggestion from the little information we have on this question that the two may be somewhat out of sync. If this is the case, it needs to be corrected.

Finance

IBM should shift the financial focus of success away from the stock price to measures of business success that are related to the operating objectives of the company, measurements of customer satisfaction, employee satisfaction, alliance partners' satisfaction, and shareholder satisfaction (other than the short term stock price).

The stock price reflects many different factors, such as government regulations and changes in laws, foreign currency fluctuations, stock market sentiment, global financial crises, etc. as such it is not a good measure of shareholder value, at least not in the short run. As Benjamin Graham, the renowned early investment theorist and practitioner, put it: In the short run, the stock market is a voting machine, in the long run, it is a weighing machine.

Market prices are also susceptible to being misled by financial engineering moves.

In the long run the stock price can be a useful indicator of business success or failure because, in theory in an efficient market, the stock price is determined by the interaction of many buyers and sellers acting independently; hence the price, in the long run, is determined objectively.

The better idea for measuring business success in the short run is to focus on measures of client satisfaction, and employee and partner satisfaction. Only in the long run is the stock price a useful indicator of shareholder satisfaction.

Another financial strait jacket

IBM is still suffering from the pressure of another financial strait jacket: this is the pressure to maintain a huge annual payout to shareholders in the form of dividends and share buy backs. As mentioned above a number of commentators have observed that total payouts to shareholders annually are exceeding the free cash flow from operations. This is clearly not sustainable. Presumably, it is being done in the hope that future earnings will increase to allow the payouts to continue. But, so far, this has failed to happen at IBM.

IBM is not alone among American companies. As has recently been pointed out by Aswath Damodaran, the noted expert on Valuation, U.S. companies (In the S&P1500 Composite Pure Value Index) collectively are currently paying out more (1.36%) to shareholders, as dividends and share buybacks than they are earning. Perhaps there is safety in numbers! But failing a dramatic improvement in earnings and free cash flow, how else to deal with this problem, other than by cutting back on the distributions to shareholders- short term pain for long term (hopefully) gain. (Damodaran also suggests this course in his calculations of expected return on capital.)

Cutting back on distributions to shareholders would seem to be the only course open to IBM to get out of the financial strait jacket that is putting immense

pressure on the whole company. Such a step should open the way to a significant improvement in employee morale. And give it some time to let it develop the growth areas of its existing business and explore new opportunities outside this business.

Fending off the competition

We have indicated that IBM faces intense competition, even in its primary Big business market. Its installed base and important contacts therein give it an important competitive advantage. To maintain its position, let alone grow, it will have to continue bringing new products and services to market; whether they be the product of its own R&D programs or acquired by acquisition or by a venture capital operation.

Rightsizing again

IBM is reported to have over 430,000 employees today. This is close to an all-time high. It cannot support this level of employment with its current revenue levels. It would appear to be in need of another rightsizing move to reduce its employment levels significantly. Obviously, such a move has to be done very carefully. It must ensure that key employees are retained and continue to be highly motivated. This will require a carefully thought out and extensive consultation program.

Conclusion

Based on our analysis of the history and present situation of IBM, we conclude that IBM can survive. This conclusion is based on the finding that IBM continues to hold a leadership position as the principal provider of IT equipment, software and services to the Big Businesses around the world and that it has major initiatives under way to strengthen that position.

These initiatives include:

Its five strategic initiatives: Cloud, Big Data, cognitive computing, engagement of internet access devices, such as smartphones, and reliability and security, all designed to build on its position as the primary IT provider for Big Business;

Its R&D programs;

Its acquisition and divestiture programs;

Its strategic alliance programmes, particularly its partnership with Apple;

A variety of initiatives to continually improve the culture at IBM. These include its introduction of “design thinking” methodology to drive product development and services based on a start with identifying the customers’ needs (A continuation of Lou Gerstner’s commitment to have the customer drive everything at IBM): to create an ongoing culture of Innovation and passionate service, where people will be happy to work. Maintaining a positive culture is an ongoing issue; IBM should be sure to support the initiatives of people like Jeff Smith that are introducing new approaches to their business that will strengthen the company’s culture.

Despite these positive factors, IBM has a lot of heavy lifting to do to maintain its leadership position in the Big business IT market, let alone grow its business. While its five strategic initiatives are producing significant growth in revenue, they accounted for only 27% of its business in 2014. And, as we have seen, the competition is fierce. Already, Amazon.com may have overtaken IBM as the leading provider of Cloud services. IBM will have to continue aggressively buying up or partnering with some of the many entrepreneurial companies bringing new products and services to IBM’s five strategic target areas, in order to keep on the leading edge in those key markets.

Beyond its traditional Big business market, IBM will have to develop a leading position in one or more other markets, if it is to have a chance to regain leadership of the IT industry as Gerstner hoped.

IBM Things to watch for

Here is a list of things to watch for that would be positive indicators that IBM will survive.

Changes in the composition of the Board of Directors

Changes in the Management Structure

Establishment of an Entrepreneurial Division

Continued introduction of measures to improve employee morale and operating culture

Working its way out of the financial strait jacket

Revenue growth in strategic focus areas

Maintenance of high operating profit margins in the main Big corporation business.

Major progress in search for The Next Big Thing.

Changes in the composition of the Board of directors

We have suggested that the present composition of the IBM board is highly skewed to leaders of Big Corporations. We have suggested that IBM should add representatives from Silicon Valley. In particular, we have suggested that IBM add to its Board of Directors one or more leading members of the Silicon Valley Venture Capital community.

Changes in the Management Structure

We have suggested several changes in the management structure that we feel would benefit IBM.

We suspect the existing management hierarchy has reverted to the highly bureaucratic structure found by Lou Gerstner in the 1990's. This view is based on the way the financial statements, are drawn up suggesting the primary division of the company is by function – hardware, software, services, financial – just as Gerstner found it. This structure is outdated, if not archaic, and not helpful to IBM's prosperity.

A better management structure would be to divide the company organization along "industry lines". This is what Gerstner did in 1993-5. It has the advantage of making clear that management authority and decision-making is driven by the customer, in the various industry divisions, with all the benefits that that entails. In our entrepreneurial practice at Ernst & Young we developed four rules for success in entrepreneurial businesses. The first was: The customer is the most important decision-maker in the business. This of course echoes the priorities of Thomas Watson senior when he led IBM and also the focus of Lou Gerstner when he took over as CEO in 1993. A revision of the IBM management structure along these lines would be an important indicator of future success at IBM.

Changing the financials to follow this approach would also provide a better indication of how IBM is doing, at least in its present target markets.

Establishment of an Entrepreneurial Division

We recommend that IBM establish a separate Entrepreneurial Division, with a Venture Capital arm, an M&A arm and an R&D arm, working together to discover new IT opportunities outside IBM's traditional line of business.

Continued introduction of measures to improve employee morale and operating culture

We applaud IBM's efforts to improve its culture. In particular, the two initiatives cited above: Jeff Smith, the new (2014) CIO at IBM has launched a transformation of his IT team with "The mission to have innovation and the speed of small companies". Another innovative team is led by Phil Gilbert who is in charge of "design" at IBM. He, and his staff of about 1000, are trying to get everyone at IBM, from marketers, engineers, R&D personnel and others to use the "Design thinking" methodology. This approach is focussed, like Total Quality Management, on determining customers' needs and using that information to drive the development of new products and services. This is reminiscent of Thomas Watson's focus on the customer and Lou Gerstner's efforts to have customer needs drive everything the company does.

This is all good news. But it has a weakness as pointed out by Clayton Christensen in his book; *The Innovators Dilemma*. This approach will typically focus on existing customers, the Big Businesses in IBM's case, and may result in the company missing out on technologies that will "disrupt" its business. It also may lead to missing out on changes in the marketplace and competition. Both these problems have been suffered by IBM.

IBM needs to continue to encourage the efforts of Jeff Smith and Phil Gilbert. It also needs to introduce similar efforts to innovative management of other parts of its business. We will look at announcements of such efforts as a positive sign.

Beyond this it appears that IBM needs to reinstate Thomas Watson's focus on respect for its employees. Any moves in this direction would be very positive for IBM.

As discussed above, we suspect that IBM has put undue pressure on all its employees, from the top down to the front lines of the business. This is the result

of the financial strait jacket that it has put itself in. Working its way out of this strait jacket will do wonders to the culture at IBM, as we address in the next section.

Working its way out of the financial strait jackets

As discussed earlier, other commentators had observed that IBM had put itself in a financial strait jacket by committing itself to a five-year plan that set out a specific target for operating earnings per share. The new CEO and new CFO have removed this strait jacket by dropping the specific target for EPS and adopting a more general goal, while trying to shift the focus of the company on improving areas, such as customer satisfaction and employee morale, key indicators of the success of the business operations.

IBM should also remove a second strait jacket. This is the strait jacket created by distributions to shareholders that are not sustainable. It is putting tremendous pressure on management and all employees. IBM has to cut back on its distributions to shareholders, in particular on the amount of money it is spending each year on share buy-backs.

Revenue growth in strategic focus areas

IBM has five main strategic initiatives in its core business: From the 2014 annual Report, these are summarized as:

Big Data: Managing Big Data collection and storage from a continually growing multitude of sources;

Cognitive computing: Applying the power of IBM's Watson Analytics to solve an increasing number of business problems;

Cloud based computing; Allowing businesses to outsource the hardware and software of their IT departments;

Engagement: The rebuilding of business networks to incorporate the latest developments in mobile and social media.

Security and reliability: maintaining a leading position in the provision of secure and reliable data collection, storage and access.

To these we would add a sixth strategic initiative; Growing the business in the Emerging Economies, as mentioned in the 2010 Annual Report.

IBM is experiencing significant growth in all these areas. But because they presently represent only 30% of its revenue, they are not growing fast enough to offset the declines in its traditional business lines. We would look to increasing revenue growth in these strategic areas as a positive sign that IBM is righting the ship. This will have to carry the business until the searches for the Next Big Thing start to show success.

Maintenance of high operating profit margins in the main Big corporation business

IBM has been successful over the last few years in maintaining high operating margins – around 50%. This has allowed it to generate consistent profits even in a period of falling revenue. This has been achieved by continuing to follow the plan laid out by Lou Gerstner of selling off the low margin segments of its business, such as significant parts of the hardware business and some services and investing in higher margin business such as Middleware and Systems Integration services. The latter has been done partly by internal growth and partly by strategic acquisitions and partnerships. It is key to a turnaround of IBM that it continues to produce a high operating margin, even in the face of the stiff competition, which we have cited, in its strategic initiatives. This high margin business coupled with increasing revenue growth in these important areas will be indicators that IBM is doing a good job in outdoing the competition.

Major progress in search for The Next Big Thing.

If IBM is to regain the IT leadership position it long held under the Thomas Watsons, it will have to establish a leadership position in some aspect of the consumer market. The only way we see this happening is if IBM becomes a leader in introducing The Next Big Thing in the IT marketplace. There are a myriad of opportunities here.

The Internet of Things may be it. IBM has already committed \$3 billion in R&D over three years to this area. And it should have an edge because of its connections with Big Business; after all, most “Things” are made by Big Businesses. But it also has to build connections to the devices consumers use to access the Internet of Things. This is where its strengthening partnership with APPLE could stand it in good stead, since APPLE is the leader in the smartphone business.

There is still a long way to go in developing the Internet of Things, but there is lots of competition. IBM will have to work hard and smart to succeed as a leader in this area.

It should also be pursuing a multitude of other opportunities in the search for the Next Big Thing. This is why we have suggested it should set up an independent Entrepreneurial Division that includes a Venture Capital Arm, a part of its own R&D unit (including the part working on the Internet of Things) and a part of its Mergers and Acquisitions group looking for new acquisitions and partnerships in new areas. Success in these endeavours will be a very strong indicator that IBM will survive.

Final Remarks

We have concluded that the answer to our opening question: Can IBM Survive? is Yes it can. Whether it does or not will depend on how well it protects its leadership position in the Big business IT market, against fierce competition.

Beyond that IBM needs to continue to pursue growth opportunities both in the Big Business market and in the larger market of the consumer. It needs to ensure a vigorous program of new product and service innovation with three legs: Its own R&D programs, a venture capital type pursuit of the Next Big Thing, and a program of key partnerships and acquisitions, as suggested by Larry Greiner for “Stage Six Growth Companies”.
