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(liste au 1er novembre 2000)

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CRISIS AND CHANGE SEMINAR
January 20, 1995 (7th session)

THE RISE AND FALL OF IBM

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The following account has been prepared by Michel Berry
Translated by B&A Conseil

Abstract

After 40 years of unrivalled success, IBM is now in serious trouble. What has happened? Jean-Jacques Duby explains how the company's values and the cogs and wheels of its internal management system doomed IBM to failure, in the light of long developments in the technical, economic and commercial environment.

But why there should have been such a sudden shock remains a mystery. Perhaps IBM's mighty power had delayed its downfall, making this all the more brutal as a result, like the earthquake which follows the sudden encounter of two continental plates.

I - PRESENTATION BY JEAN-JACQUES DUBY

For three decades, from the 1950's to the 1980's, IBM made a net annual profit of 10-15% and enjoyed a growth rate of 10-15%. These results were particularly remarkable considering the problem of reconciling profits with a fast growth rate. During the 1980's, business declined with profits and growth of only 5-10%, although this would have satisfied many companies. Then came the fall. Since 1990 IBM has had negative growth and profits.

IBM's profits (NAT) and growth (CGR) from 1958-91

What happened? I would like to put forward some explanations in the light of my experience with IBM. We will therefore start with a look at the IBM system, the changes to IBM's environment and the company's reactions. We will then see how the IBM system, which had reached a state of ultimate perfection and was wonderfully adapted to a certain environment, became a millstone around the company's neck when the environment changed.

THE IBM SYSTEM
The integration principle

IBM was a completely integrated organisation, both horizontally and vertically.

There was complete horizontal integration, since IBM aimed to sell every product and service linked to data processing, from office equipment to the largest computers, through disks, ink and ribbons. IBM maintained the computers, trained the users and helped them to develop applications.

There was complete vertical integration, since IBM manufactured everything from the smallest parts to the largest machines. And more importantly, IBM's strategy was to sell directly to the end-users, a guiding principle which was demolished at the beginning of the 1980's with the birth of the personal computer. Furthermore, IBM did not sell parts to rival manufacturers, called OEMs (Other Equipment Manufacturers), who would have integrated them into their own machines. This strategy was also challenged at the end of the 1980's.

A sophisticated system of conflictual management

Let's now look at IBM's original management system. It was, of course, based on objectives, the two fixed at corporate level being profitability and growth. The way these objectives were defined at lower levels stemmed from a principal of conflictual management, which was based on a faith in market economy. This is the law of supply and demand, or the theory that buyers and sellers have opposing objectives in a market, but if forced to reach an agreement (i.e. to make a transaction), they will converge on a price which will optimise the exchange. IBM's principles therefore meant giving each function different, even contradictory, objectives and forcing them to come to an agreement. In this way, they hoped to obtain some convergence towards an optimum.

To give an example : the price of a machine was broken down into R&D, manufacturing costs, operating costs (marketing and other expenses) and, of course, the profit margin. The way in which the profit margin was allotted almost inevitably created conflict. The product divisions were assessed independently of operating costs. The marketing and sales divisions were appraised only on the ratio of marketing spending to turnover, and this also created conflict. The divisions which manufactured the products asked the operating divisions to somehow manage to sell "any" product, even if it meant a large expenditure, whilst the operating divisions in turn asked for increasingly high-performing and ever-cheaper products which would be easy to sell. However, people were forced to reach agreements by a method of conflictual management.

These conflicts were of varying degrees of importance: the least serious were 'concerns', followed by 'deadlocks', whereas the most serious of all were 'non-competition' which required arbitration from the top. The employees themselves made it known when there were disagreements. All was needed was one person to inform of a clash, stating the degree of conflict: concern, deadlock or non-competition. If he or she did not agree with the ensuing arbitration, an appeal could always be made at a higher level. However, this could risk the person's career if he or she wrongly identified a non-competition conflict, especially if it was his or her second offence of this kind. There were rules ensuring that when a concern persisted for more than 2 months, it would automatically be turned into a deadlock or non-competition deadlock. The conflicts were entered into a database and their progress was monitored. People knew that if a problem curve did not decline after 3 months, 'management attention' would be called for. In a sense this was a remarkable system.

Planning by function and by product

The conflictual management style was also used in the planning process, which I would describe as orthogonal, since plans were looked at from several different angles by each of the functions. With this multi-function planning, the objectives were analysed by the different functions. The R&D people would say, *"This product will definitely have these features"*, the production people would confirm, *"We can manufacture it at this price"*, the sales & marketing people would say, *"We can sell X amount of it next year"*, while the personnel training people would also give the go-ahead: *"You will have the right number of consultants to train the users"*. Each function looked at the planning estimates and had to reach agreements with the other functions. This did, of course, cause friction between the functions, but it was sorted out in the way described above. Planning was synchronised across the functions and was carried out on a yearly basis. There were 2 sorts of plans: a long-term strategy and a short-term operating plan.

Diachronic planning was carried out alongside synchronic planning. At the beginning of each product's development, planning was started and was continued throughout its life-cycle. Some of the diachronic plans were therefore out of step with the synchronic plans. This led to new audits, a closer look being taken if the sum of the products included in one of the plans did not match the other.

The management system was also rather sophisticated, albeit more classic. It was highly integrated. A database held all the information on each product, from the simplest microchip to the most powerful computer. The database also held the cost and performance estimates for each product before production began. When the product was actually manufactured, the estimates were then compared with the real figures, then the stocks, orders, prices and so on were noted. This system was used universally, so that it was possible at any time to know each product's stock levels worldwide, its price and how many breakdowns there had been. This was a remarkable system, but the desire for exhaustive information became problematic when the number of products increased and the markets lost their stability.

The vices and virtues of a complex system

The advantage of this system was that it dealt with numerous problems upstream, which eased matters later, since joint plans were made in good time. When the results differed from the forecasts, fingers could be pointed: *"You had anticipated making 50,000 but you have only made 49,000"*, or, *"You said that you would manufacture them at $15 apiece, but you have only managed to get down to $17"*. Things therefore had to be explained. There were measures common to all the projects, which meant that costs, revenues and profits could be calculated on the same basis. All the products were judged in the same light and had to be profitable in themselves. If a product was not profitable, it could not be justified by saying that it encouraged sales of other products. This was a tough system, but it worked very well, or at least it did so for a long time.

The disadvantage of the system was its complexity, as well as its strong bias towards the United States. On the one hand, the American market was for a long time more important than the rest of the world's markets put together. With the development of the global market, the American market has remained by far the most important national market, followed by Germany and Japan. On the other hand, without going into technical detail, the returns were entered into the books in such a way that the US returns were looked at first and external returns only impacted on profitability. In this way, a product that worked well in the US carried considerably more weight than one which worked well in other countries.

The conflictual management style lent itself to considerable politicking: *"Don't stand in my way on this product launch and I'll back you on your development project"*. This reminds me of a personal anecdote: I had my first major responsibilities at the Mohansic laboratory back in the mid-Seventies. Having just met all kinds of developers and planners, I was struck by the fact that none of them had seen a customer in 10 years. I thought about bringing in some field operators, but I dropped that idea when I realised that in order to achieve anything you need a sound knowledge of the extremely complex management system, as well as considerable experience in negotiating. You need to be able to find allies and to know that if Mr or Ms X announces a non-competition threat, there’s no need to worry because that’s what they always do. In short, the system created a power base which tended to act in a closed circle. Because of this, decisions could be taken in an environment which was far-removed from reality.

Personnel management : the unexpected outcome of good intentions

IBM's style of personnel management has often been studied with either admiration or revulsion. It was defined by strict norms and precise rites.

There were ethical rules concerning the competition. Corruption was strictly out. If a customer dealt with a competitor, all contact with him had to be cut off until the competitor's machine had been installed. However, at this point the salesmen were once again allowed to laud the merits of IBM machines. This measure has often been interpreted as a show of arrogance towards the competition or as retaliation against disloyal customers. This is an illustration of how good intentions can be taken the wrong way.

Another norm was respect for local specificities: IBM abided by each country's laws and its local units were run by local managers. The personnel of any country had the right to appeal by writing to the Chairman of the Board, not without risk, although the person was given recognition when the objections were founded. There were the same job descriptions, as well as the same pay schemes, or at least the same grading system, since the levels naturally varied between different countries. The rules for promotion were also standardised, based on rewarding merit. The instruction handbooks were identical. Everyone spoke American English or something near enough. Training was a priority. This has sometimes been interpreted as showing concern for progress and sometimes as brainwashing. It was in fact a bit of both.

These principles led to a formidable homogeneity, to the extent that one could talk about IBM's monolithism, which could be observed up to the most spectacular turnarounds. This was how at IBM a technical solution which had not initially been well thought of could suddenly be considered the best. As in certain political parties, people could say in unison the exact opposite of what they had said the day before. This was sometimes a very effective mechanism.

The downside of the system that I exposed at IBM was that it reduced the variety of personalities and was not very tolerant of people who didn’t fit the standard profile. Indeed, although the strength of a group at a given time is its average, its long-term strength derives from its variance, which allows a population to evolve and adapt to unexpected situations. A weak variance leads to poor adaptability, and this is one of the problems IBM has had to face.

A self-sustaining technical strategy

The technical strategy was based on some fundamental conceptions which were suited to certain technology for a time, before becoming out of step with it.

The first principle was centralised control. IBM had for a very long time favoured the main-frame computer which centralised everything, even the communications networks.

The second principle was hardware compatibility, as opposed to the more up-to-date idea of software compatibility. This strategy involved increasingly complex sets of machine instructions, since as the machines became more advanced, instructions had to be added to the originals in order for all the machines to remain compatible. The first IBM 360s came with 130-140 instructions, but the number must now be up to 250.

The third principle was the 'open' part number set (P/N set), by which there were no limits on the number of parts used. The machine developers were not restricted by having to use any standard parts, and could manufacture their own. This strategy was suitable for a while: as soon as there was upgrading to be carried out, there were no standardisation obstacles in the way. But this strategy was no longer suitable when it became possible to build microcomputers capable of doing everything from a single microchip.

The last principle was a strategy of proprietary systems. The systems designed by IBM did not comply with external standards. This allowed the company to make technical progress whilst protecting its investments and customer base. The lack of hardware compatibility was a way of tying-in customers.

CHANGES TO THE ENVIRONMENT AND IBM'S REACTIONS

The IBM system had enormous strength in a given state of technology and a given market. Problems occurred when these changed. These changes were revealed by some quiet warnings and developments over time.

By quiet warnings I mean changes which, without posing any immediate threats, led people to think that the strategies they were following were no longer suitable. This concerned the birth of compatible systems in the 1960's, experiments in decentralised telecommunications in the 1970's and the introduction of RISC architecture, also in the 1970's.

In addition, some slower changes took place over time: namely, the diminishing importance of the American market, the decreasing market share of central computing and the progress made by VLSI integration.

The birth of compatible computers

The first hint of trouble was the appearance of compatible computers, which is old news now, the first compatible being IBM's 360, which was launched in 1964. This computer was very successful and the competition caught onto it, manufacturing compatible peripherals by the end of the decade, memory at the start of the 1970's and central units in the mid-1970's. The competitors had a considerable cost advantage since they could save on R&D, which had been largely carried out by IBM. Similarly, their marketing was made easier: all they had to do was wait for IBM to convince a customer and then go and offer him the same thing for 20-30% less.

IBM tried to react by launching a major project called the 'Future System' (FS) in the early 1970's. The idea was to get so far ahead that the competition would never be able to keep up, and to have such a high level of integration that it would be impossible for competitors to follow a compatible niche strategy. However, the project failed because the objectives were too ambitious

for the available technology. Many of the ideas that were developed were nevertheless adapted for later generations. Once IBM had acknowledged this failure, it launched its 'box strategy', which called for competitiveness with all the different types of compatible sub-systems. But this proved to be difficult because of IBM's cost structure and its R&D spending, and the strategy only resulted in a partial narrowing of the price gap between IBM and its rivals.

However, in the short-term this confirmed IBM as the industry leader, with other companies following its technical and architectural solutions. It might have been necessary for IBM to give up some market shares, but this did not stop them from prospering since growth rates were astronomical. In the long run, this gave a head-start to competitors, who were able to make cash-flows in certain niches and finance their own R&D. These companies sometimes ended up developing superior technology and becoming fierce rivals. The Japanese started out this way.

This first quiet warning was taken seriously: 2,500 people were mobilised for the FS project. Those in charge had the right to choose people from any IBM units. I was working in Paris when I was picked out of the blue to be sent to New York. Proof of the faith people had in IBM is that I never heard of anyone refusing to move, nor regretting it. However, other quiet warnings were taken less seriously.

A strange idea in Hawaii revolutionised future telecommunications

In the early 1970's, an obscure university in Hawaii carried out the Aloha experiment in telecommunications. At the time it was not taken seriously because it was not concerned with the efficient use of busy communications channels. At the time, communications channels were very expensive. The approach taken by IBM and other computer manufacturers towards telecommunications was to optimise their use. This meant that before a message was sent, a check was made to ensure that the line was not already being used, a warning was given that a message was about to be sent, its arrival was verified and then a signal established that the network was free again. This allowed savings to be made on the telephone bill and more to be spent on computing, which was good for IBM.

However, the Hawaiian university researchers experimented with a different strategy: using a communication channel for 10% of the time, without checking before a message was sent. Messages collided in 1% of cases (a tenth of the 10%), but this was noticed and the message sent out again. A transmission was always successful after one or more tries. There was no centralised control since each transmitter-receiver controlled the order of transmissions. This strategy seemed inconsistent at first, but led to the introduction of the Arpanet network. This later became Internet, and was commercially successful with Ethernet. The technical and commercial impact of the Hawaii experiment was only felt at a later stage, but there was a quiet warning that the technical strategy of centralisation was not necessarily the only viable strategy.

A clever idea for chasing the competition which would later revolutionise the market

Computer architecture had become increasingly complex. Furthermore, the company had become more deeply involved in its FS, with incredibly complex schemes. However, some of the IBM people said that in 99% of cases only 30 out of 200 instructions were used. They therefore thought that it would be better to design a high-performance architecture with only a few dozen instructions and to introduce the other instructions as sub-programmes. This was the RISC architecture. 'Project 801' was therefore proposed, a much simpler and faster machine. This was a very good project but it came at a bad time: for historical reasons, IBM had many different architectures and was trying to reduce its very costly catalogue. The reaction to the proposal was, *"The last thing we need now is a new machine architecture!"*. Moreover, the only market IBM was looking at then was scientific applications, a reduced market compared to management applications and one in which IBM was not the best positioned.

This idea was adopted by the competitors Appollo, Sun and Hewlett-Packard. IBM later

retaliated with the RISC 6000 which now has a respectable market share. But since the architecture was very simple, it helped the development of an open portable disk-operating system, an idea which was realised by AT&T with its Unix system. The idea was to have a system which was so simple that it could be applied to several types of architecture. This is related to the simplicity of the machines' architecture: the operating system effectively provides the link between the programs and the architecture. For an architecture of 200 instructions, there are as many links to enable the operating system to boot up. But with simple instructions, it is easier to transport the same system to several machines. This was a decisive factor in the success of Unix and certain open systems which weakened the position of the proprietary systems IBM had counted on. This threat was not noticed at the time.

Product proliferation

Let's now take a look at some of the long-term developments. The first is the loss of the US market's dominance. At the beginning of the 1980's it represented double the rest of the world market, but by the end of the decade it had shrunk smaller than total of the rest. IBM at first tried to adapt its system by allocating special funds to worldwide developments, since this had never previously been a top priority. It was then necessary to correct the American bias in the accounting system. Local specificities were increasingly taken into account and the number of products multiplied. There were therefore more products to manage, more conflicts to handle and more facts to enter into the information system.

The second long-term development has been the negative growth of central computing in favour of peripherals. This has led to a growing diversification of products, including control units and terminals adapted to specific environments (factories, offices, etc.). Yet the management system treated all the products in the same way. But the most suitable financial ratio to use depend on the product: whether it is a modem, the central unit of a main-frame computer, a disk unit or a microcomputer. Moreover, this product diversification, together with geographical diversification, led to a strangling of the management system, whereby people spent their time trying to reach agreements, or more often than not, disagreeing.

IBM's first reaction was to create freer units called 'Independent Business Units' (IBUs). It was decided that these IBUs should deal with certain products outside the management system: modems, PCs and military products. However, IBM quickly realised that this was causing a problem of product incompatibility. The customers did not understand why they could not link up various IBM products, and their confusion would mount when they saw a succession of 3 different salesmen arrive, all wearing the same IBM hat.

We therefore said that IBM should return to a simplified version of the old system for all its products. A start was made by throwing out the strategic plan, which was certainly not the best of ideas. By the end of the 1980's we had restrained the non-competition powers, or people's ability to create conflict. It was then that problems occurred downstream, since they had not been looked at upstream with the conflict method. The situation did not become any less complex but instead got more and more confused. Finally, IBM gave up on its conflictual-style management and introduced management by ownership, where one person was put in charge of each product and was told to act as he or she liked to achieve their own goals. Some thrived under this system, but the law of the jungle took over from the formalism and good principles that had previously held together social relations in the organisation.

The progress made by VLSI integration

Some extraordinary advances were made by 'Very Large System Integration'. First of all, one transistor was put onto a microchip, then several, and now the number stands at 3 million for a large Intel and even more for memory chips. In this way a complete computer can be built from one or several chips. This has had many important consequences.

The first consequence was the birth of the personal computer. In fact, IBM has had the technical means to build PCs since the mid-Seventies. However, the company could not use their well-paid salesmen to sell this type of computer: it was necessary to go through distributors. This went against the company's principle of direct contact with the customer, and IBM gave up the idea as a result. However, the success of Steve Job and Apple at the end of the Seventies made IBM turn around its management plan. In the space of one year, a task force was set up in record time to produce the IBM PC. However, in their haste, they forgot some of the strategic rules: not only did IBM agree to sales & marketing through third-party channels, but the proprietary system was also abandoned, since the company decided to open the standards and allow anyone to link up software, cards and units to their PCs. These changes were effective in the short-term: unlike Apple, who did not let their machines connect to other brands, IBM PCs were quickly able to have the software, cards and gadgets which made them successful. But in the long-term, IBM has lost its technical, industrial and commercial control over the machine. The leaders are now Microsoft, who produce software, and Intel, who make processors.

Finally, complicated microchips can do everything but they cost a great deal to develop. This challenges the P/N open set: it is no longer financially viable to develop new microchips each time, so standard chips are programmed instead. Since the beginning of the 1990's, the development of P/Ns has been restricted. Families of microprocessors have been developed: the Power microchip, the 370 and the IBM 486 (different to Intel's 486). These developments have often been the result of joint ventures, which is something IBM never engaged in before: the Power microchip was produced with Motorola. And since these microchips are expensive, they are no longer sold uniquely to the end-user but also to middlemen and even competitors (OEMs).

WHEN SHOULD THE SYSTEM HAVE BEEN REFORMED ?

This is how today not much remains of the principles and the system I have talked about. The system was ideally suited to the technical, industrial and commercial environment of the 1950's to the 1980's. But it was rigid, with rigid planning and some real skeletons that took a long time to clean out from IBM's cupboard. The system also reduced the variance and even the adequacy of the managers' personality profiles. Since it became increasingly difficult to handle, the managers were selected increasingly on their ability to manage the system and less on their capacity to understand the development of the external environment.

This system was therefore finally doomed to failure by the environmental changes, as we have clearly seen. However, it is difficult to understand why this catastrophe came so suddenly. Perhaps IBM's mighty power had delayed its fall, which then seemed all the more violent. My question is, why should the management system have been modified earlier? Perhaps the best strategy was to stick for as long as possible with a system which enabled a breathtaking growth and colossal profits, and to say, *"One day, we'll have to change, but we'll keep going for as long as it works, and then we'll see..."*

II - DEBATE

Nomads and settlers

Gerard Dréan (ex-IBM) : I would like to add a few thoughts, in the light of my experience with IBM and work which I have since done on the evolution of the computer market.

IBM had to cope with some brutal changes due to the fracturing of the industry. Up until 1975, it was a case of Snow White and the Seven Dwarves: 8 integrated companies satisfied all of their customers' needs. There are now 40-50,000 companies who compete and each have a share of the market. They are in sectors with very different game rules, operating cycles and cost structures.

This challenges IBM's principle of integration, as well as another very important dogma which was mentioned by Jean-Jacques Duby: life-employment. In fact, redundancies were

forbidden at IBM, according to a rule introduced by Watson during the Depression of 1929. The first thing Lou Gerstner did was to send a circular to all the employees, informing them that this rule was being dropped. In fact, what now counts in many sectors is mobility, continual reassessment and nomadism, whereas IBM was made for long-term, carefully thought-out decisions. One problem is knowing whether these 2 types of organisation and culture -short cycles and long cycles- can coexist in the same company.

The former president of IBM, John Akers, finally concluded that this was impossible and h e decided to split IBM into
independent parts. This had many advantages, notably in that it allowed each sub-group to

evolve at its own pace without having to take the others into account: the group in charge of printers no longer had to worry about the consequences of its decisions for the central units, and was therefore more agile.

I think Lou Gardner was wrong to go back on this decision to split IBM up into subsidiaries, although he did the right thing, unfortunately, in getting rid of dogmatic full-employment. He was influenced by major customers who preferred to deal with a single IBM and its old clan who had not got over John Aker's decision to split IBM up. When a new director takes charge of a company undergoing a crisis, he often listens to the dissidents first, those who were against the previous management. However, the people who were against Akers were probably the newest recruits.

C. Riveline : My comments will perhaps seem strange, but this account of the events reminds me of the fall of the Roman Empire, when a settled civilisation was defeated by nomads.

Rome was characterised by a formidable culture, and a written culture no less. Emperor Augustus said, *"The reason of the empire is the empire of reason"*, an expression that would not have been disowned by IBM. Rome had a remarkable ability to tolerate differences: all the gods were admitted into the Panthéon, and when people paid their taxes, tolerated the legions and abided by the law, any differences could be lived with.

But there was the *'limes'*, the great wall that stretched from Scotland to India. Outside there were the 'others', madmen and barbarians ; Their main characteristic was the fact that they were on the move: these were cavaliers, sailors, etc. Then the environment changed in their favour, so that the Germans were able to enter Rome. Later, the Arabs were also able to found an empire, but with far fewer common rules. 'Barbaric' is just the image that the IBM people must have had of Apple.

But something always remains of any edifice that survives for so long. The Germans entered Rome disguised as Romans, Attila spoke Latin and nearly married the sister of the Roman Emperor. Louis XIV and Napoléon continued to disguise themselves as Roman Emperors. Similarly, IBM has taught us how to use computers and this had has changed the face of the world.

The moral of this tale is, in Paul Valéry's words: *"civilisations are mortal"*. Why? Because, in order to function, they need principles of inertia, but in time such principles prevent them from adapting to evolutionary changes.

Crisis and change

A participant : *I don't subscribe to the conclusions of Mr. Duby or Mr. Riveline, which are that a system cannot be changed. Instead, one has to wait for a crisis that will spur people into action and finding new ways out in the general rush.*

On the contrary, changes should be thought out while everything is still running smoothly. What sticks in my mind from your presentation is that IBM's major mistake has been its lack of vigilance concerning the external environment.

J. J. Duby (J.-J. D.) : I did not deny that changes should be prepared for, but I was wondering about how and when this could have been done.

It cannot be said that IBM lacked vigilance, technically speaking. Changes were detected but they were ignored on purpose. This was perhaps out of pride, although none could be justified: when your strategy has worked for 20 years and reaped 15% net profits and 20% growth, are you

really going to go back to square one for an innovation that will take a tiny percentage of the market?

M. Berry : Was it possible even to change systems when there wasn't a serious crisis? IBM's system corresponded fairly well to the American ideal of democracy, in that the arbitrary had been reduced as far as possible -there was a good deal of quantitative data-, the rules were the same for everyone, people had the right to appeal for arbitration, and there was concern for a balance of powers, which Toqueville talked about on the subject of the American political system[1]. It must have been quite easy for many countries to adopt this attractive system based on openness, especially since it respected local values.

One can understand how the company culture resisted the challenges for a long time. I hypothesise that no employer has the power to make profound changes to such a firmly-entrenched system, except after a catastrophe.

J.-J. D. : I effectively believe that it would have been impossible to change IBM's system and its guiding principles without the impetus of a major crisis.

However, the company was not inert: it was able to make some considerable shifts, even when they went against people's convictions. This was the case for the switch to virtual memory, the launch of the microcomputer and separate billing for software and hardware, a decision which caused turmoil.

I talked about how IBM's system reduced the variety of personalities working for the company. It was, however, able to tolerate some deviants. In fact, I was one of them, and it didn't stop me from reaching some positions of high responsibility; however, I was aware of the fact that I would never be promoted to certain posts.

G. Drean : I was a member of the work group that launched the FS project, which was made up largely of deviants. At the beginning, someone came to do a wonderful strategic analysis for us. He said that if IBM did not do something, it would be doomed to a strategy of box-by-box competition. The company needed to compete on price with companies that were not carrying out much R&D. IBM therefore needed to reduce its marketing and planning activity, drop its management system and abandon the principle of life-employment. He predicted what has in fact happened, but only to refuse such a future and launch a daring strategy which in the end failed.

At the time, IBM had such a strong culture that it was out of the question to imagine an evolution like the one that has taken place: nobody would have listened even if someone powerful had announced the new measures that were later taken during the crisis. It took this major crisis for IBM to abandon the dogmas which had been the company's foundations since 1913.

B. Cassagnou : I was one of the rare few people to enter IBM after 15 years elsewhere. Having already worked in an international company, I quickly adapted to the management system. I was amazed by the ability of the organisation to change structures: the change was announced many times during October and came into effect on 1 January the following year. All the IBM members worldwide did the same thing at the same time. But I still found myself lost on an IBM planet, which was not very open to the outside world.

And now, in the last few years, people have lost their confidence in the way the company is run: IBM's problems were analysed thoroughly as usual and decisions were anticipated. People expected the reaction to be quick, but it was delayed for several years until the catastrophe struck.

C. Riveline : I have a habit of saying that all management problems can be broken down into 4 parts: substance, people, institutions and the sacred. A crisis can be caused by any one of the levels being out of step with the others: at IBM there was technical innovation (substance), Lou Gerstner was nominated, a president from an outside firm (people) and the company was decentralised (institutions). The culture did not evolve easily: the philosopher Heidegger said that a pair of glasses was the thing people have the most trouble seeing, since we see the world through them. In this way, changing cultures is like changing glasses.

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[1] For more details, please refer to the report of the 24/3/95 session.

I would therefore like to suggest a hypothesis for the 'Crisis and Change' seminar. The term 'transformation' evokes expectations, continuity and smoothness, whereas 'crisis' conjures up a rupture. My hypothesis is that the substance, people and institutional levels can evolve by transformation, but the cultural level can only evolve through crises.

C. Midler : This also fits what the Palo Alto school says about single loop learning, as opposed to double loop learning. In single loop learning, people adapt without changing their glasses, whereas in double loop learning you have to question your whole way of seeing things: this rarely happens without a crisis. The problem we've seen during several of the seminar sessions is that the cultural level is related to the management level and often changing glasses means sacrificing the current management. I witnessed this at Renault in 1983: Bernard Hanon, the managing director at that time, told the company that it was on the road to ruin, but people didn't really understand him. It was only after he had been shown the door and George Besse arrived that the changes started.

F. Charue : I am carrying out some research at Rhône-Poulenc, which has evolved from heavy to specialist chemicals. This development has some similarities with the evolution of the computer industry, in that the products are multiplying and it is no longer possible to operate with a centralised system. Would IBM have set up its business units if it hadn't believed in them ?

J.-J. D. : This organisational change has certainly met with resistance on both a human and a cultural level. But substance constraints also have to be taken into account. In the chemical industry, you don't have to worry about your products connecting to others. In the computer industry, when you manufacture a terminal and communications controller you have to make sure that they can communicate and that they are compatible with all the previous products. The business unit system was therefore more difficult to set up than in other industries.

These problems are now solved in a different way: the open systems and government norms allow all hardware to link up, not just IBM with other IBM machines. This is the problem: the company has lost one source of its control over the market.

What now?

A participant : *What is left of IBM?*

G. Drean : It is still by far the largest company in the computer industry, with a turnover of $64 billion. The company generally ranks first or second, sector by sector. But the organisation has been broken up and is now more flexible. In my opinion, it is doomed to stay that way. There will never again be anything resembling the company we knew, as J.J. Duby described it.

B. Cassagnou : I started working for IBM France in 1984, when there were 19,000 employees. I retired in 1990, when the number had only grown to 23,000, despite the extraordinary growth you have pointed out. Nowadays there are only 15,000 employees, and this comes as a real shock for a company which had previously made a rule of full-employment. But people are still attached to IBM: 95% of the employees accepted the proposal of Mr. Andreuzza, the president, to reduce basic salaries by 8% and to receive the 13th month only when results allow it.

G. Drean : One has to hope that the IBM people will rediscover their identity, no longer in terms of the mighty IBM, but in the niches they operate in. This is why legal structures seem a crucial issue to me.

A participant : *Isn't the current system seen as rather rough and ready and marked by the arbitrary ?*

G. Drean : I have always known two worlds at IBM. Its R&D was scarred by conflicts, since for every product put on the market there were 4 or 5 that had been studied and abandoned, and this caused conflict and hard feelings. There was therefore a tough atmosphere, which has since become tougher still.

On the other hand, the sales sector was harmonious: the salesmen offered products through catalogues and benefited from the prestige of IBM when they went to see customers. According to rumours I've heard, they were hard hit when IBM dropped its full-employment policy. Instead of feeling like disciples spreading the Church's word, they now feel a bit lost.

A participant : *IBM France has just taken the unique decision to give employees the chance to take early retirement at 52 and be paid 70% of their salaries up until the date of normal retirement. People can even work elsewhere since their early retirement is not financed by the state. This fits in with the full-employment culture, whereby employees are protected even when the company is obliged to let them go. Contrary to expectations, there have been many volunteers. This is undoubtedly a sign of employees' disillusion.*

J.-J. D. : Since I left IBM in 1991, I can't provide any first-hand details on these subjects. But I know that from now on it will be a much more capitalist jungle, whereas IBM managed to keep a balance before. The divisional managers have to sell their products, and so much the better if they go through the IBM channels; they are concerned if competitors' channels are used and if they don't make sales, their division is closed down. Finally, IBM's big drama is perhaps having become an ordinary company like the rest.