

KOJI KOBAYASHI

An Interview conducted by

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Interview: Koji Kobayashi
Interviewer: William Aspray
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Kobayashi: There is a long history. You know the origin of NEC, Nippon Electric Company?

Aspray: I've read about it, yes.

Kobayashi: Sixty-four years ago I finished my study in the Tokyo University. This was a long time ago. But at that time there was no concept for the computer. Only of communication. Communication had many different parts in the Japanese industry. When I entered NEC in 1929, immediately after my graduation from the university, it was a subsidiary of Western Electric Company of the United States. I was thinking of a brighter future for communications technology when I was at Tokyo Imperial University. I decided to enter NEC because I understood that this was a joint venture with Western Electric and Japanese capital, 54% by Western Electric and 46% by the Japanese. I decided that NEC would be the best place for me to be involved with business, given my background in communications.

Anyhow, since then, the world has changed, many times. At that time when I entered NEC, there was not much concept for new technology. Everything, all that mattered, we were to learn from the United States. I knew how great Western Electric was, and I was impressed by its famous name. But we were not very happy to be overwhelmed by the name "Western Electric." To be honest, we could not do anything about that other than study, to follow the Western Electric way of technology.

In my early days here at NEC I was very unhappy because the majority of my

work was just translating the drawings from Western Electric. But I wanted to do the research and development. That's why I joined. [Laughter] Then the Japanese social involvement shifted towards nationalism, and the government asked the company to develop Japanese military radio and acoustic systems. Japan was very aggressive in capturing other countries, such as Manchuria. But we had no technology; no new technology had been developed. We just learned from Western Electric. Western Electric was a big company in the United States, a great company. Western Electric had the majority share of NEC. Even the management was directed by Western Electric. NEC was almost like an American company. So I decided: We are Japanese. We wish to stand on our own feet, even though it may be very difficult. We should do that. Otherwise, Nippon Electric cannot survive in the future. That was also my decision in determining the direction of my career in NEC.

Aspray: When did your vision of C&C, control and communication converging, come to you? When in your career?

Kobayashi: I had no concept of the computer before the war or in the wartime. No engineer in Japan had such a concept. But we did have a concept of communications. We tried so much to develop a new technology for communications. Until the end of the war, we had little technology of our own. Japan had no original technology except for a few exceptions. As you know, we were completely defeated by the war and had nothing. We had made some mistakes. We tried to follow only the technology that was developed by the western countries. But I tended to think that if we confine ourselves to communications only, it's imperative to compete with Western Electric and Siemens from Europe. They had already established their own record of achievements in the area of communications around the world. Then

what is left for a Japanese company like NEC? At that time, IBM was not so great as it is today. IBM was just coming up. So I was thinking: why do we stick to communications only? We need to explore new markets, new technology. The computer was a very new technology at that time. Very few companies were trying to establish their market in the computer. Not much difference between Japan and the western countries. The situation was quite different from communications.

I thought we should enter into the computer business, but I did not know what the results of this would be. But, anyhow, the computer would give us a big opportunity in the marketplace. So, my thinking was, it's better for us to go into the computer business. Actually, we entered into computer research in 1954. Around that time computer technology was in its infancy, and NEC was early to market a best-selling product in Japan. In 1958 NEC completed NEAC-2201, an all-transistorized small-range computer.

Before the war, I visited AT&T, ITT, Siemens and STC of England. All these companies seemed to have no idea about the computer. After the war, again, I had chances to visit these companies. They still had no idea about the computer. Against these telecommunications superpowers how could we compete?

On another aspect, although we made a very good start in the computer business, IBM was too great for us to compete successfully with. Other Japanese makers were also coming into the computer business. As the number one telecommunications maker in Japan and also a major computer maker in Japan, NEC had to compete with big companies of the world in both technology areas.

Entering the 1970s NEC firmly designed the direction it was to follow. It's information. Telecommunication is for transmitting information, and the

computer is for processing information. NEC should specialize in information. Some overseas companies specialize in telecommunications, others in computers. No one covers both. Then, if NEC could cover both of these information-related technologies, it would be sure to obtain a comparative advantage over all these competitors. Why don't we have a communications computer? That was my ambition. [Chuckling]

This idea of mine was first published in a very rough form in my article in an engineering magazine in 1959 in Japan. But it was a long time before this idea was announced to the world.

Aspray: I see.

Kobayashi: That is the concept of C&C. Computers and communications would ultimately come like this [Dr. Kobayashi brings his hands together.] and integrate with each other. We developed quite a breakthrough, I think, a new market. This was the concept of C&C.

This was really the reason why NEC got into the computer business. A venture in this area, computer and communications, became very appealing. The real market, however, depended on the advancement of microelectronics. I brought the microelectronics business into NEC in the early part of 1960, and this finally led to the announcement of C&C in October 1977.

Aspray: In *The Rise of NEC*, you wrote that one of the differences between Japanese industry and American industry is that the American computer manufacturers came out of the business machine background, while it was the telecommunications background in Japan. How did you see the difference in the computer products in the two countries, based upon those differences in background?

Kobayashi: In the background, I studied much about IBM because IBM was the strongest company in the computer industry for a long time. At first I considered NEC's extensive relations with the foreign company ITT. ITT was the major stockholder--almost as though it owned NEC--for some time even after the war. (ITT kept its shareholding of more than 30 percent until as late as 1956.) So after the war, when I started thinking about how to build up NEC, I felt it necessary to talk with the president of ITT, Harold Geneen. He was great. I met with him here in Japan and in New York. He had no engineering background, but both the computer and communications industries require complete understanding of the technology. Geneen's only interest seemed to be to make money in such businesses. I wanted to confirm what Geneen was thinking about these business areas, so I decided to see Mr. Geneen in New York to discuss this matter. At that time I already had made a commitment to a computing business. The C&C concept was already in my mind at that time. But I wished to check about the computer with Mr. Geneen. He did not talk much about such technology. He was thinking more about the financial side of the ITT operations. I felt I had to sympathize with ITT because I believed the business strategy of Mr. Geneen might keep ITT behind the times. It did. As a company that was willing to spend big money for its computer operations, with the communications business as a background, at NEC we tried to enter into the computer business.

In the communications business, we made money. We earned money. We used these funds to support our computer business. I thought that without investing money for such a new area, we could not be competitive in the new market, that is, the computer business. I wondered whether this policy was correct or not. There was no other managerial decision than to announce that they were entering into the computer business in addition to our traditional

communications business. Although NEC entered the computer business spending big money, that did not mean that NEC was slipping out of the communications business. We continued to keep very energetic activity in communications. But we also invested big money for computers. So I need to say that this was not really a matter of choice of communications or computers. It was C&C. So I was always talking about C&C. We were not only for this C, we were not only for the other C. We were for C&C.

I believe we could enjoy a synergy effect between these two mainstay business areas of telecommunications and computers. I wonder if computer makers with an origin in business machines could do the same thing.

I have another comment. Generally speaking, telecommunications engineers take a serious view of reliability and stability of systems and equipment. A grand communications network does not function unless systems reliability is maintained. Perhaps you know NEC was the first company in Japan to introduce Western Electric's quality control practices into a manufacturing shop. Both NEC and Western Electric are communications manufacturing companies. At these companies reliability is common sense where good component parts, good manufacturing processes, and good control are requisite. This sense of reliability was brought into other products they make - computers.

Aspray: Were you ever concerned that AT&T would take on such an approach? After all, they had had a strong history in telecommunications, of course, and they had done some work in computing before that.

Kobayashi: I did not recognize that AT&T or its subsidiaries had such an idea. I tried to make contact with AT&T executives and with Western Electric executives, but

they did not have any idea of going into computers.

Aspray: I see.

Kobayashi: NEC and perhaps other Japanese computer companies always thought of computer communications. At any time, from any place, anyone can talk to each other; that was our objective for advancing communications technology. With the entry into computer technology, our objective expanded: at any time from any place, anyone can access any kind of information, process it for their own purposes, and effectively utilize it.

We had no idea about the computer before the war, and during the wartime we were too busy with communications technology. After the war Japan was put into a very difficult position by the defeat in the war. But as time went on, I began to feel something about the idea of C&C as we call it today. My feeling is that IBM was great but they were only for computers. I would call AT&T great, but they were only for communications. I thought, why doesn't NEC go into such a business as C&C? No other company was thinking of C&C. So that must be a pretty dangerous idea, to commit the money and principal of the company to C&C. There are no ideas of offering shares. The idea was to commit ourselves to such behavior. Otherwise, we would never come into any power in the market place. That was the incentive for NEC to build up their business after the war. It was rather easy because we were not confined to communications. We were already in communications, and we could enter computing. Therefore, we could enter into C&C.

I left the working out of the idea to the engineers and scientists. The main objective at NEC had been continued growth--not commitment to a specific technology as such. There was a feeling that the company could enter into some new markets, which are built around C&C. At the INTELCOM

Conference in Atlanta in 1977, I spoke extensively about C&C, expecting that some big corporations might decide to compete with us, or challenge our ideas, but they had no such idea.

After the INTELCOM Conference I also talked about C&C in Geneva and other places. I talked freely about the subject. The Geneva conference was attended by many technology experts and management executives from all over the world. I dared again to speak about C&C there. But nobody questioned me about my idea. I was convinced that NEC was put into a position where there was no competitor in the area of C&C. Anyhow, the announcement of this new concept was very successful. That's my feeling.
[Chuckling]

When NEC was limited to only the field of communications, it was difficult to make the company grow very rapidly. The computer is the newcomer in the field of C&C. In developing this C&C concept of the computer within the company, we developed many fresh ideas. If we had stuck too much with the communications, there would have been so many companies in the world competing with us. However, a learning process was required, all those under my employment and also my engineers asked me: "What is C&C?" I replied, "Oh, it is a new subject. I wish to learn about it from you. Please give your idea to me." Why did I insist upon C&C? It was because no other company seemed to enter the C&C business. Major Japanese electronics companies had no announcement for C&C. So C&C was monopolized by NEC. Fujitsu would not like to say "C&C." They used in newspapers: global computer and communications company. But mine is very simple: C&C. We were the only C&C company, with well-balanced stakes in computers and communications.

Aspray: As I read your book, it seemed to me that of all the Japanese leaders of

technological companies, you had a much more international perspective. You visited Europe and the United States. You listened closely. You took ideas when it was appropriate to do so. Do you think that the direction of NEC was different from that of other technical companies in Japan, by taking an international perspective?

Kobayashi: My feeling is that we shouldn't fight face-to-face against the world's giants. That is suicide. Instead, we have to look into the niche market, develop a completely new market between two giants, and create a new market in the world. For example, the satellite communications market had not existed before NEC developed it. In this way we can survive. Many other Japanese companies follow the giants. We have always tried to survive in the new market. The overseas market was one such new market. During the 1960s we stepped into international competition. Of course we have many competitors in Japan. But we're always looking to the worldwide system.

Aspray: That's a post-World War II philosophy because the business had been almost exclusively within Japan before the war.

Kobayashi: Right. Later I worked out a six-point overseas strategy. One of the six points says, "if the domestic market is bad, go international." This does not make sense. Overseas markets should be created intentionally.

Aspray: In order to pursue C&C, you had to build up a big research program within NEC, and before the war I don't think there was much of a research mechanism within the company. Yet after the war, a very effective one was built up. What was your strategy for building up a research operation within the company?

Kobayashi: At the end of the war we had a big research laboratory located in a Tokyo

suburb. Many scientists and engineers were there. I suggested to the company board that such researchers should be dispersed companywide. This suggestion was accepted by the management, and in May 1949 the research laboratory was disassembled. The situation later changed and in July 1953 a new research laboratory was reopened.

This new laboratory was intended for both basic and applied research. Under this new structure, NEC planned to develop its own breakthroughs as well as follow more advanced technology of the Western world. Earlier dispersion of research scientists into our engineering and manufacturing sectors promoted research-minded operations within the company.

Now, I'll pick one example of our research engineers, Dr. Uenohara. After he graduated from the university, he elected to stay in the university research group. But he was not satisfied with the atmosphere there in the Japanese university. He gave up his position there and went to the United States to work at Bell Labs. In this instance, there is no international border in the area of technology. Technology should be common property of the peoples of the world. No national borders. Years later, I tried to persuade him to come back to Japan. [Laughter] Many times. But he was very much satisfied there with his work at Bell Labs in electron devices. Fortunately I was finally successful in persuading him to come back to Japan. We needed him at NEC.

Every engineer and scientist wishes to have his own idea being developed. They need a special environment, e.g. some sort of laboratory in order to be satisfied. They don't much care about the results of such technology--to build up new technology from the work of scientists and researchers. I'm not a research man. I didn't intend to limit our technological activity by national borders. If any company asks us to give our technology, to turn it over to them in return for satisfactory compensation, that is acceptable to us. Technology is

a commodity. The world community should enjoy it.

Aspray: I see.

Kobayashi: The only problem is: how much is the price of such a commodity. [Chuckling] That is the only trouble. Twenty years ago there was no such generosity in treating technology. But now I think it is perhaps coming to be. New technology was developed at NEC before the war, but not in great quantity because the company was too small. We were thus not part of the research and development community. Even then, though, the engineering people had already organized some kind of research and development. So we still thank all the leaders of NEC for the tradition they had built up. This was a nice tradition for NEC. Today in Japan, recognizing NEC as a high-technology company, graduates from engineering universities choose NEC each year as the highest-rated company in which they want to find their jobs.

Aspray: I understand that you were looking to the international market, but you were nevertheless doing business as a Japanese company. In what ways was it an advantage, and in what ways was it a disadvantage, to be trying to do business in the world from Japan? What effect did government regulations, the education of your engineers, protective markets, or other things have?

Kobayashi: I think that there is some misunderstanding for you about this matter. We are not limiting our operations to Japan. We have many NEC companies in the United States, in England, in Germany, mainland China, everywhere. They need to work as a community citizen of that particular country. For instance, NEC-America should do its own marketing, its own development, its own research program, which is suited to or desired by the United States, not thinking of the situation in Japan. NEC headquarters in Japan should give

consideration to, for example, each country's national policy. Sometimes NEC companies of the world compete with each other, or even with parent NEC. I don't mind that. It's very difficult to limit their operations.

We have a big NEC company in Brazil. The reason is very simple. NEC started to support the communications industry in Brazil some twenty years ago. At first we had to transfer our technology and build up the operations there. But after it was going, we expected them to build up their own position in that country. Even if parent NEC company sometimes competes with NEC-Brazil, I don't mind. I leave it to be a very free situation. Sometimes some friction occurs. I leave it for them to solve. We must remember that NEC was born in the globalization process of Western Electric of the United States. Initially they supported us in multiple ways. Year by year NEC grew up to what it is today. Now NEC has grown up to be a world-class high-tech company. Likewise, our local companies might become large enough in their countries.

Aspray: I see. That's very unusual.

Kobayashi: In Australia, we have two or three companies. They are all operated by the Australians, not the people in Tokyo. They are seeking some market outside Australia. I think they have been contributing to the international payment position of that country.

Our basic philosophy for the international operations has been that the final product has to be manufactured at the nearest place to the marketplace. For that purpose NEC established many local companies. They are not for NEC's sake only, but primarily for the local communities. In the developing countries, NEC established these companies partly because of the cheap labor, but in most cases because of the strong demand from the local government,

implementing local production projects.

Aspray: There are certain technologies, e.g. semiconductor technologies, that are very expensive to develop. In order to be able to design those new semiconductor technologies, you put in a very large capital investment at the front end. So you have to have world markets rather than just national markets to be able to make a profit. In some sense you can't compete with one another in those kinds of businesses. It's just too expensive. What is the company's strategy in those areas?

Kobayashi: There are large amounts of investments for semiconductor operations at NEC, both abroad and in Japan. As you know, the semiconductor is a world commodity; size is small and functions are standardized to some extent. Plants and circuitry design centers dispersed worldwide make it possible to produce semiconductor devices at places near customers and in accordance with particular local needs. We have such plants in Asia, North and South America and Europe.

In the manufacturing process, semifinished products made at plant A could be transferred to plant B in another country for fabrication. This type of world manufacturing network started full-scale operation during the 1980s.

Aspray: Let me ask you one last question. These gentlemen¹ sitting in here with you have clearly risen in the company because of their talent. How did you identify talent and develop it within the company?

Kobayashi: [Chuckling] This is one big difference in the idea of employment between

¹Several other key employees of NEC were present at the interview and occasionally helped Mr. Kobayashi with expressing his answers in English. These individuals (all of whom are identified as "STAFF") included: Mr. Yasukuni Kotaka (Vice President, Corporate Staff for Engineering), Dr. Michiyuki Uenohara (Executive Advisor), and Mr. Kiyoshi Yamauchi (Chief Specialist, Corporate Communications).

Japan and the United States. Usually Japanese people work in a company their entire working lives. NEC is not forced to offer lifetime employment. Employees are free to leave NEC and find a new position in another organization. We therefore need to make the employee feel that NEC is his or her best choice. The company must make him or her think "only here, no other place. This is the best place to work." When employees feel dissatisfied with the company, they might leave; we cannot stop them. Therefore, if such comments are common among the employees, that means that the decisions or strategies of the top management are somehow not right. But most of our employees do not seem to want to change their company. I think this is because our human resource management system has been effective to some extent.

Presently, twice a year, in July and December, all the employees are considered for their job changes within NEC, and eligible persons are transferred to other jobs. Each employee's own desires are taken into account by the management in assigning a new job.

Aspray: Yes.

Kobayashi: I think for me NEC is my life. I'm satisfied. But my long years of service with NEC were not directly connected with income. Even though salaries are not what they are in the United States or Europe, I don't like to appear that I'm against NEC. That is just a feeling. I am afraid it would be difficult for non-Japanese to understand this sort of feeling. Many times this question was raised to me, especially in the United States. It's not a theory, it's a feeling. We need to let all employees understand NEC correctly.

Aspray: I notice you've written much more than most chairmen of major companies. Is

this your way of passing on your message to your employees?

Kobayashi: Yes, I'm thinking like that. [Chuckling] But I don't know whether our people like that. Once I set forth "Ten Pointers for Executives." The first point is, "make a picture of your thoughts. Maps and sketches will provide guidance for attaining your next objectives." Writing a book also serves the same purpose. It helps clarify my own strategies before the eyes of the NEC people, and also invites other people to evaluate my own management direction. It is very helpful to me.

Aspray: If you recognized a young person as having great potential talent, how would you develop that talent in the company? Would you move them around systematically to a set of different jobs? What would your strategy be for development?

Kobayashi: As a formal job rotation system, NEC has a regular personnel change program. If I remember correctly, this system was introduced at my suggestion. To further elaborate this system, a skills inventory system was inaugurated in April 1965. Under this system, each employee must submit once a year his or her special talent which may be useful to company operations as well as his or her desire as to whether he or she wants to stay with the present job or move to another function area. In addition, we at NEC have maintained a large amount of investments in human resource development programs. NEC employees of overseas local companies are also eligible for those programs. Our belief is that "our human assets are the most important assets of NEC."