Oral History of Tokuo Kubo

Interviewed by:
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Stanley Myers: Today is December 10, 2014. And we're here today with Kubo-san, the former president and founder of Tokyo Electron.

Tokuo Kubo: Yes.

Myers: Kubo-san was born in Ōita Prefecture. He began his career with Nissho--.

Kubo: Yes.

Myers: Nissho Company Limited-- it's a trading company-- in 1956.

Kubo: Mm-hm.

Myers: He established Tokyo Electron in 1963 and became director of the board in the following year. He became president of Tokyo Electron in 1974 until 1980 when he became chairman of the company. He became an advisor in 1984, then was back to chairman in 1986. Kubo-san was very active to form joint ventures with the global partners. He served as president of Tokyo Electron-Varian from 1982 through 1985, and board director of Varian Associates from 1992 to 1994. Kubo-san was-- served on the board of directors of SEAJ. That's the semiconductor equipment association of Japan from 1986 through 1994. He also served as vice chairman of SEAJ in 1989. I'm going to read here anyway, because there're some very interesting things.

Kubo: Yes.

Myers: Kubo-san and his family moved to Korea where they stayed until he was twelve years old. His father worked for a construction company and was involved in building dams for rice fields and rice paddies. After World War II his family moved back to Ōita, carrying only a single daypack, his family left all of their belongings in Korea. He studied in Ōita from elementary school through high school. He entered into Ōita University in 1952 and majored in economics. He recalls those days-- the early days as very hungry days for his family and probably here in Japan, too. After he graduated from the Ōita University he entered Nissho Company. He moved to their office in New York in 1958 where he learned about the semiconductor industry. And for the first time in his life he knew what that industry did. One of the companies he worked with was a famous company in semiconductor, Kulicke & Soffa. After he returned to Japan he resigned from Nissho and established a venture company, which was the birthplace of Tokyo Electron. He recalls the difficulties of getting funds for a start-up company in those times. If you wanted to borrow money, at that time many banks requested collateral, such as your home, your house, or your property. It was very, very difficult to get money, which made it difficult to start up a company. Kubo-san remembers tough times at that time and that the only thing you could think of was money, money and more money. Kubo-san recalls that no venture capital funding existed at that time. The only opportunity was with Tokyo Broadcasting System (TBS), a broadcasting company, which had a joint venture project with Toshiba. However, the sales and the product didn't perform as expected. The joint venture was then not successful. He proposed TBS that he would sell the products of TBS/Toshiba joint manufacturer. TBS agreed to invest into Tokyo Electron.

Kubo: Yes.

Myers: And it was a very different time than now. I would have to say, very impressively, that after Tokyo Electron went-- became a public company Kubo-san said that he would not have such an issue with TEL and since then they have not had such issues with the money. My personal opinion is he was one of the true entrepreneurs and start-up companies that started up what we now know as Silicon Valley.

Kubo: Yes.

Myers: With that Kubo-san, I will ask you a few questions and--

Kubo: Yes.

Myers: --you can either elaborate on some of the things I've said or correct me maybe--

Kubo: Yes.

Myers: --if I had the wrong thing. So in the early years-- we're interested in your background, where you were born and what you did, where did you grow up and what did you do at that time?

Kubo: Uh.. I was born in a city called Masan in southern tip of Korea. And my father-- I understand he has been initially working as a civil engineer for the government. Japanese has been in charge of governing total Korea at that time. My father later left the government and started reclamation jobs in southern part of Japan as a private venture to make the seashore change into the rice paddy, that type of project with all hired human powers.

Myers: Oh, really?

Kubo: Employed many Koreans. I had a chance to visit that place 30 years later and found that there was a very big, nice, rice field existing right now. And Korean people where very thankful, the village people. Yes, but when Japan lost the war we could not bring any assets out of Korea. So we came empty-handed into Kyushu and I spent six years in middle school and high school there and also I went to Ōita for the college, called Ōita University. Living expense was very much limited at that time. Everybody in Japan was very poor and having a hard time to survive.

Myers: Sure.

Kubo: My father told me to make it minimum cost to go to the university. And I went to the Ōita University and I had to go home every time the agriculture work needed helping hands. And all the time I had to work to make money by teaching the young students at that time besides a small scholarship. It was very difficult to get a job at that time after graduation of university and I was going to big banks to get examination, but I felt that the small- middle-sized trading company was more attractive. So I entered the company called Nissho Company, a trading company, which had headquarters in Osaka at that time.

Myers: Right.

Kubo: There are many-- most of the headquarters of the big trading companies of Japan were in Osaka at that time. Tokyo was kind of a branch and Osaka was the center of commercial business at that time. Usually Japanese company give you an assignment and then it does not change for the rest of your life. Like, finance department, transportation, and usually you become the specialist in transportation or, for example, petroleum or steel. If your company assign you in a steel mill and then you spend all your business life in steel, thus they bring up employees to make the life time experts. Nothing like this in United States.

Myers: Right.

Kubo: Initial assignment for me was internal control department. But I found it was not interesting business so I applied to be moved to Tokyo to join a nuclear station business at that time and then from there I have been assigned to Canada.

Kubo: Canadian office at Ottawa. I was twenty-four years old, very young, and went to Ottawa, Canada. My assignment is to go to Ottawa and establish connection with a company called Consolidated Dennison to get natural uranium ore for the nuclear reactor in the future. But when I went to New York, New York office was too busy and they asked me to stay and forget about Canada.

Myers: <laughs>

Kubo: So then I stayed in New York and my job was to sell Japanese-made vacuum tubes. They were produced in Japan by a company called Kobe Kogyo, manufacturer of vacuum tubes. I tried to visit many companies like Motorola, Zenith, Admiral, GE, and RCA-- many TV factories to sell Japanese vacuum tubes. But I have experienced lots of failure from bad quality and many people told me the Japanese vacuum tube is junk(!) although the price was very attractive. At that time three hundred sixty yen was a dollar. But Japanese government policy was to push the export in order to gain some foreign currency for Japan. Japan was constantly losing money in foreign trade at that time.

Myers: Right.

Kubo: People came from Japan were mostly top management people getting permission and U.S. dollars from the government to come to visit the United States at that time. I was very young and so – I was running around with those people as an interpreter to visit many places. Then later younger people from big Japanese electrical companies started to come to learn about the electronics of the United States. I mostly took those younger people, maybe section managers in Japan, from Hitachi, Mitsubishi, NEC, many companies-- and I used to take them to Allentown of Western Electric-- Allentown factory for transistors.

Myers: Yes.

Kubo: And also at the same time I used to commute to RCA Somerville factory and Bell Telephone, Murray Hill, and it's been very enlightening for me to know that this is going to be the future major components replacing vacuum tubes. Everybody was calling it solid state electronics. And unlike vacuum tubes, they would not break.

<laughter>

Kubo: So I thought the Japanese solid state business would grow up very fast later on.

Myers: Right.

Kubo: I think one of the big reason of Japanese success was all young people, very young people in thirties were assigned to go into that and study very hard. Because all the senior management people know nothing about the transistors. They only learned vacuum tubes in universities. So I saw young power has been building up in Japan at that time and during that period of time we had a discussion about future of solid state and I thought that integrated circuits are going to be the future technology. And we have learned that Fred Kulicke has a very small company then-- was supplying the bonding equipment for the Western Electric Allentown factory from a very small wooden house in the Callow Hill Street in the Philadelphia suburb, but-- has been growing fast. I met Mr. Fred Kulicke and Albert Soffa at that time and we have proposed to become the distributer of their products in Japan. And they went to Western Electric for approval. Western Electric said, "It's okay for you to export to Japan." Kulicke was a small company, but wanted to make it larger company in the future. So we initially started to sell their products in Japan, and the Japanese companies starting to buy the equipment to try to make their own transistors. At that time, in 1958 or 1959 Texas Instruments(TI), similar period of time they have announced the future ICs and they have shown some samples at the IRE Exposition. And later TI announced famous basic patents. It's called Kilby patent for ICs. And Fairchild has a planar patent, equally basis.

Myers: Right.

Kubo: It's very important. And the Western Electric also had diffusion patent. Three of most important patents in making the ICs. And at that time Fairchild started 1956. It's a relatively smaller company, but very aggressive, very ambitious at that time, and I thought that there must be many companies like Kulicke & Soffa and it should be a fast, rapidly growing business. After coming back to Japan I wanted very much to quit the company and to start my own after inspired by many ventures in United States, in Boston area. With, Mr. Stan Olsen. Do you know Stan Olsen of DEC?

Myers: Yes. I don't know him. I know the name.

Kubo: Oh. I met him who was very aggressive, big talker, and was operating in a small old wooden factory in Boston suburb which has grown big later on though.

Myers: Right.

Kubo: And many venture companies in Boston area at that time. I have been very much impressed by this U.S. electronics ventures then.

Myers: So this was really your first exposure to the electronic innovation.

Kubo: Yes.

Myers: --semiconductor industry.

Kubo: Yes. Also computers.

Myers: And it's just beginning to develop.

Kubo: Yes.

Myers: So who are the important influencers in your life? You mentioned a couple already in your choice to move ahead in the semiconductor industry.

Kubo: Semiconductor industry, I thought it is a very good future potential and I have asked my associates in Nissho employee younger than me, Tom Kodaka and Tom Kamo, two of them, to join me quitting the company and start our own. We had no future guarantee of survival, but they decided to join-- they both studied electrical engineering in universities and I have been working to obtain assistance of TBS for financing to our venture-- I have been very close to TBS people. TBS is Tokyo Broadcasting System at that time. And I-- they had a very close relationship with CBS-- you know, Columbia Broadcasting System in New York and people had been going back and forth between them and exchanging some idea and some engineering to make commercial TVs or programs between them. So I had a chance to talk to senior TBS people and TBS wanted to-- they wanted to have new business for their engineers besides broadcasting because they have almost finished for the color TV broadcast engineering at that time.

Myers: Right.

Kubo: I went to TBS and made a proposal that TBS should own forty percent of my company, my own company, and twenty percent ourselves, and forty percent from U.S. investor called Mr. Seymour Ziff. Mr. Seymour Ziff was a person in New York I met and he told me that he was willing to invest money if I am going on my own in the future in Japan. He told me that he was an investor-- I think he made some fortune in stock trading or stock business in New York.

Myers: Yes. And what was that business?

Kubo: The reason I said U.S. forty percent and TBS forty percent and twenty percent myself was the reason that we did not want to have TBS take over control, because big companies might change our own company policy in the future. So we tried to make giant TBS to own only smaller part. Fortunately TBS top management agreed to invest into Tokyo Electron (TEL) placing Mr. Endo, one of TBS director as TEL's first president and also we would be selling their products, industrial television of TBS/Toshiba joint company --

Myers: Right.

Kubo: --to other countries. But later we have found that this is very difficult to sell their products, because their product was not price-competitive at that time.

Myers: Right.

Kubo: So TBS agreed and we have started TEL and Mr. Ziff came from United States and TBS was very kind people-- they became very friendly and during their friendship I became very close to the top management of the TBS. And later on, after the first oil crises of 1973, American investors decided to sell TEL shares and TBS bought it. TEL has been growing and we needed money. We had to increase the capital and we have found that we do not have money to invest and our twenty percent capital has been diminishing very fast. And my retirement money from Nissho was seventy thousand yen at that time. The Japanese company when you quit young, they give you only small portion of the retirement money.

Kubo: We wanted to have a venture, but we didn't have money. So that was the most difficult part of the venture.

Myers: Were you a trading company then?

Kubo: At that time, yes, trading company.

Myers: Yes.

Kubo: Because we have no money to have factories.

Myers: Right.

Kubo: Even the garage: We have no garage like HP.

<laughter>

Kubo: But it's a trading company, but final purpose was to have manufacturing capability to be able to satisfy customers' needs.

Myers: So you were driven from a trading company--

Kubo: Yes.

Myers: --into a manufacturing company. What were the sequence-- why did you pick what you did? That's--

Kubo: Initially, we have asked the TBS to finance our company and the TBS, biggest commercial TV station in Japan, had a very strong labor union. And labor union management told TBS top management that there is no reason for broadcasting company to have a subsidiary in electronic trading business. We had to look for public money later on. That was one path we had to clear.

Myers: Yeah, yeah.

Kubo: Very, very difficult. And TBS has a Toshiba joint venture, a small factory, in making some ITV (industrial TV) vidicon camera. But the ITV was not competitive. Therefore, we have decided to export automotive radios. Automotive radios to U.S. market. And there was a person called Mr. Harold Mendes in Cleveland. His brother was the president of a big automotive antenna company in Cleveland. And they

have decided to get into the under-dash radios of automobile, later car stereos, export of consumer products and they supported TEL operations for initial 8 years. At the same time our company was buying from United States transistor test equipment and also transistor-making equipment. But the demand was small and everybody in Japan-- big companies, like Fujitsu or Toshiba or Hitachi, whatever they are, the division of solid-state electronics was called money-eating division inside then.

<laughter>

Kubo: Yes. They also had very hard time in those big companies.

Myers: Sure.

Kubo: Yes. But we have been asking all the time to buy the equipment, equipment to make transistors, because this is going to be our future main business and we have a very good equipment from United States. And trying to push-- and import is very profitable, but export business was not so profitable. But we have to make profit every year, you know, to sustain the patronage from TBS top management.

Myers: Right.

Kubo: Otherwise, if we lose money in our venture, I think TBS management will be very severely criticized by their labor union.

Myers: Yes.

Kubo: --TEL, as small company-- has nothing to do with broadcasting. TBS has about ten companies-- ten subsidiaries- all in broadcasting business, but not us. So it's been hard time to borrow money from their finance department. They always criticized me for going to the top management and asking for money allowance.

<laughter>

Kubo: Yes, but somehow we kept showing all the time some small amount of profit and paid some small dividend every year to TBS, so that their investment to TEL can be justified.

Myers: Yes.

Kubo: And that was one reason that we have survived in living with the big organization. There was no venture capital at that time. Nothing. In this country, but now they have many. But at that time venture capital was not existent and also very, very difficult to get into Tokyo Stock Market, second division. Very severe inspection by SEC. It was done at that time. So it took eighteen years for us to get into Tokyo Stock Market, second division.

Myers: You went public in what?

Kubo: in 1980, after eighteen years from the foundation of the company. By that year, TEL wrote off consumer products export business and focused only on the semiconductor production equipment and chip devices distribution.

Myers: Okay.

Kubo: Yes.

Myers: And when you went public. Were you already a manufacturer at that time?

Kubo: Yes, TEL/Themco, joint venture (diffusion furnace manufacturer), TEL Engineering Company, MEC Engineering Company, etc. By that time, we closed all consumer products factories. We became Fairchild's distributor of test instruments in 1965. The company became the importer and distributer of Fairchild Semiconductor chips-- and we went to Dr. Bob Noyce, President of Fairchild.

Myers: Oh, yes.

Kubo: --and also other staff. Fairchild was a very aggressive people, understood the young people's ambition and agreed to give us a chance to serve their products. I was very much influenced by the free and dynamic culture of young Fairchild Semiconductor division at that time, and from then worked very hard to transplant such culture into my company, TEL.

Myers: Yes.

Kubo: The initial product we have sold was an automatic tester called 4000M. Almost all transistor manufacturers in Japan bought this product. It was because of very fast with disk memory, with one hundred parameters in one second. It's a very fast, advanced test gear for Fairchild designed by themselves for their own use.

Kubo: One-by-one we have accumulated U.S. smaller companies of making transistor-making equipment such as Electroglass, KLA, Cobilt, Lam, etc. Actually, we have started a small manufacturing joint venture so that we can avoid domestic customers become discontent of inferior field service support. When we have decided to form a venture with Varian the yen was two hundred forty yen a dollar. This company was dissolved fifteen years later when yen was a hundred twenty yen a dollar. So it has much to do with the exchange rate.

Myers: Currency exchange.

Kubo: Yes.

Myers: What were the major reasons for Japan's success?

Kubo: Mm-hm.

Myers: 'Cause you can remember the early nineties: It was the Japanese miracle, not just in the U.S.-- all over the world it was considered that. And you may choose to not talk about it, but what over time has maybe caused that to-- the semiconductor part now I'm talking about, the--

Kubo: Yes. In my opinion, first Japanese manufacturers were big enough to have their inside users – they were conglomerate), secondly Government owned telephone company which was a big buyer as well as the technology leader, thirdly Government helped to promote domestic computer technology, fourth, chip manufacturers tried to focus on the biggest market which was memory, finally and most important of all, young and bright engineers were actively motivated without much interference from the old managers.

Myers: And then the question of what's the appropriate role for Japanese companies in semiconductor today, in today's business. And then I'll be looking for your advice to the young guy-- you were young; you were twenty-four years old, you went to New York; you got these ideas--

Kubo: Yes.

Myers: --you're creative; you're inventive and built this huge company, really. It's a huge company whether it goes with Applied or not. But so I'd like to get on tape at the end of this interview. What's your advice to a young person coming out of school, whether it's economics or business administration or chemical engineering or electrical? Just any mature wisdom, advice that you would give and we capture that on tape for the museum.

Kubo: While I was working as a vacuum tube salesman in New York, I met many engineers and scientists of the electronic field and I thought that the transistors and ICs would grow into a huge business eventually. It was proven to be right foresight. I feel young men should also sense what will happen in the future, and should aggressively challenge towards that target.

Kubo: Yes. I think I was driven by the curiosity all the time. I believe young people had better be curious for anything interesting.

Myers: So let's start with what were the big things that grew your company, who are your major customers that helped you grow? And then move into where you kind of build it from that into the-- what's your advice to the young guys, the young people?

Kubo: Okay. TEL started in 1963 with TBS investment of $15,000 in a small room inside TBS. In 1965, our encounter with Fairchild became a greatest jumping board for its future because firstly I have learned electronics business require flexible young brain in order to follow daily advancement of technology, secondly we need young spirits to be able to respond to fast changing market. I got this conviction while visiting young companies in the Silicon Valley. 50 years passed, but TEL still has this culture, I believe.

Myers: Oh. So what were the major things that helped Tokyo Electron then go from a trading company to a manufacturing company? What made it grow like it did?

Kubo: When we started small, I was interested in going into manufacturing. But we started as a trading company because money, people, products were so limited. We have been adding U.S. companies who want to sell into Japanese market. In order to be successful in distributing in Japan trading company is not enough. The company selling the U.S. product in this country must be able to maintain the product. "Maintain" means you should be able to repair equipment if necessary or adjustment. They are expensive and very delicate equipment, most of them. And also chemical process-oriented. Very difficult. So we need technical knowledge, much more than trading companies. The profit is also more than just distribution or selling. Almost the same time, our company became Fairchild device distributer in this country. That was a beginning of the RTL, DTL-type ICs. Hitachi and Fujitsu have been big users of such devices at that time. NEC was Fairchild's licensee of the planar patent, which is a basic patent to make ICs.

Myers: Right.

Kubo: And Hitachi and Fujitsu or other big Japanese companies making computers did not want to buy from NEC, their competitor. So Fairchild asked NEC to share the distribution rights to TEL. We were lucky. And then we became into the distribution business. At that time our relationship with Fairchild became real close. And we had a chance to visit many times with Fairchild headquarters in Silicon Valley. And I met Dr. Noyce. And I had been very much impressed by his open management style.

Myers: Yes.

Kubo: He was talking to his engineers all the time with a big smile. And he's feet on a desk, talking with people working under him. He's very friendly and frank, and very intimate personality.

Myers: Yes, yes.

Kubo: And I thought that was an ideal style of company manager. And Dr. Gordon Moore was working at the same time with the same attitude to everyone, excellent managers, both of them.

Myers: Right.

Kubo: I understand at that time Fairchild stock was selling about 180. And one time I have seen that Fairchild was selling the ICs in Japan, it's about $50 apiece. And the Fairchild sales people in Tokyo sent a telegram to United States factory to make it cheaper. They were humorous because their cost then was cheaper than 50 cents. That was the good old days.

<laughter>

Kubo: --a very, very profitable business. It's actually everyone in Japan was trying to catch up. <laughs> That was a tremendous opportunity at that time. Fairchild devices and Fairchild instruments both. And we wanted to manage our company like Fairchild at that time. But 1968, Noyce and Moore left to form Intel. Our company became the first Intel device distributor in this country. And Intel was the first people to have made microcomputers, 1971.

Myers: Mm-hm.

Kubo: Yes. Also DRAMs. Very, very impressive moment for the U.S. device industry.

Myers: Well, you know, in Japan--

Kubo: Yes.

Myers: --in my mind, as I recall it, the real significant growth was after 1980.

Kubo: Yes.

Myers: And towards the early '90s.

Kubo: Yes.

Myers: What were the reasons for that success? Besides Deming. <laughs>

Kubo: My personal opinion is that unlike traditional electric business, electronics management fell down to the aggressive young engineers because old management could not understand this new technology. Another big factor was Nippon Telegram and Telephone Corporation (NTT) has been the promoter of advanced technology. They have been buying lots of communication gear as well.

Myers: Mm-hm.

Kubo: But the semiconductor people was losing money. It was a kind of future investment. So they are very much future technical advancement oriented, and everybody was working hard.

Myers: Patient money.

Kubo: Yeah. Fortunately they have been one of the divisions of a big profitable company. And that was one of the reasons that they could grow fast despite the loss. And they had also computer divisions in the companies. That was a built-in customer inside. Like, for example, companies such as Toshiba, Matsushita, Sony, Sanyo, had device divisions. They have the order from the consumer product people inside. A big quantity. And that was very fortunate.

Myers: So that kind of built the success--

Kubo: Yes.

Myers: --building towards until the early '90s.

Kubo: Yes. I think I wonder always, this is the difference between GE or RCA or Westinghouse. They gave up. But in Japan, the conglomerate has been assisting the semiconductor divisions to grow because they were not severe to their division P/L.

Myers: Mm-hm.

Kubo: But after 1973, after the first oil crisis, semiconductor became very, very important for saving application.

Myers: Right.

Kubo: Yes. And also in the automotive business, small cars has become very popular in the United States also. And the Japanese has been growing very fast in '70s. Thus 80s, I think that was a very important period for us also and for the total semiconductor industry. And everybody, Japanese have been told that this country should, can, survive only by importing materials from foreign countries and make products for exporting. That is the only way to survive. It's called "material fabrication industry" which is a Japanese way of living. That's what has been taught, all of us. And they thought the time came, for Japan to be really powerful, and to be able to make profitable contribution to the world.

Myers: Right.

Kubo: Yes. And Japan has no oil and basic natural resources, we must buy from outside.

Myers: Right.

Kubo: So it's an assembling business and export is going to be the main thing. And Japan semiconductor companies and semiconductor making equipment and also automotive companies, they all worked very hard.

Myers: Right.

Kubo: And I think that formed the basis of its growth at that period. Japan chip production was over 50 percent of the world in 1990.

Myers: Well, that had great momentum moving into the early '90s.

Kubo: Yes.

Myers: Now, what's affected that momentum into the future?

Kubo: I think, I brought this today. Some of the past records paper.

Myers: I thought you were retired. You're still working pretty hard, <laughs> it looks like to me.

Kubo: This is a Japanese paper, but it shows past cycles.

Myers: Mm-hm.

Kubo: From 1971 to '89.

Myers: Right.

Kubo: So those 20 years of downtown period, Japanese semiconductor really suffered from severe silicon cycles.

Myers: Yep.

Kubo: With growth of foreign competitors, and shrinking domestic market with high yen rate, it became difficult to control boom and bust cycles. And this is something that the Japanese industry decided to minimize DRAM business, I think.

Myers: Well, take the cycles or moderate the cycles.

Kubo: Yes. Usually, when the business is down, the companies must, invest big money for the future expansion. But the wave becomes too big to sustain.

Myers: Yeah.

Kubo: Each year.

Myers: But when you look at the semiconductor business now--

Kubo: Yes.

Myers: --what's the role for Japanese companies now?

Kubo: Oh, I think Japanese companies must become specialized for specific applications. Nothing like Samsung, Intel, and TSMC who are capable of big investment, and big production for the big sales. And those big operations require, top-down decisions. Very hard for Japanese corporate cultures.

Myers: Right.

Kubo: Japanese companies are still not top-down. Consensus management remains as historical tradition and it is too hard for the top people who do not own a company.

Myers: Right.

Kubo: Yes. Japan is the homogeneous society.

Myers: Mm-hm. But thinking about that, I guess--

Kubo: Yes.

Myers: --I'd like to get some of your wisdom of you're looking at the semiconductor industry today globally.

Kubo: Yes.

Myers: And you look at what's going on in Japan, and all of this, you know, the whole industry's built on people. People like you as a young entrepreneur, many other. They built the platform. So the real question is, to a guy like you, what do you have to recommend to the young people coming into the industry? Why should they come into it and what should they focus on in the training?

Kubo: Oh, I still think that the IC industry, IC chips are required for most of the inventions in the future. In any, you know, to design anything. It's basically very important to have a basic technology to be able to make a circuit, control circuit. And Japan has a very smaller company now, like Renesas or ROHM, Toshiba. Toshiba is very big, but the rest are smaller companies.

Myers: Mm-hm.

Kubo: But that existence is still very important. And young people also should study very hard to be able to promote the advancement of the technology. Still the big challenge is waiting for us, like three-dimension circuits, MRAM, 450mm diameter wafers, etc for even chip production technology. Main material silicon is approaching its physical limit, requiring new concept for a nano-technology, while computers spreading into deep and wide applications including analog humanware Great challenge is there!

Myers: Right.

Kubo: Very difficult. But I think semiconductor, making the instruments like us, like AMT or any other type of companies. I think United States and Japan and Holland have a major share of the world market.

Myers: Right.

Kubo: This equipment, of semiconductor making needs good engineering knowledge. It could not only be automation or computer software, but other very precise mechanism control and also gas system and also vacuum systems. The integration of various high technologies. Not so easy for any other countries to be able to enter.

Myers: Right.

Kubo: --have.

Myers: Well, what was your first--

Kubo: Yeah.

Myers: --exposure to computers?

Kubo: From Fairchild. Fairchild had a MPU. The first MPU is called the 4004. They came to us and suggested to design a calculator. So we tried very hard to make calculators for export. When our company started in 1963, 1964 I went to a business show and I had seen the first time electronic calculator made by Sharp. The price tag was $15,000, at that time.

Myers: Mm-hm.

Kubo: 540,000 yen at the time, for apiece. And then Fairchild came. And this is a chip that you can make a very cheap calculator. We decided to have calculator factory in Kuala Lumpur, Malaysia, at very early stage for TEL and we then didn't have big money. But we went there to make the calculator over there. And that was a complete fiasco at the time, our operations could not be efficient because TEL had too little resources to support.

Myers: When was that?

Kubo: That was 1972. We have found, I went there, and have found that Motorola had a big semiconductor factory already there.

Myers: Right.

Kubo: Because United States chip makers wanted very much to get into volume production, then, to expand calculator business. May be going to a huge business in the future, they thought. But, Japan built a very good share of the calculator with fast sinking prices. But now it's about only three or four dollars, I think.

<laughter>

Myers: Right.

Kubo: <laughs> But that was one of our wasted challenges. Our biggest customer was the Royal typewriter U.S.A., OEM brand.

Myers: Right.

Kubo: And that was a boom and bust type of business.

Myers: Right.

Kubo: The same thing may eventually happen to the smartphone, I think. It is going to be very cheap in the future. Same as the watch did.

Myers: But it'll take equipment from companies like you to make that happen.

Kubo: Yes. But equipment is now costly, I think, you know, that the equipment they are working now for UV light exposure by ASML may cost same as airplane, it is said.

Myers: Right.

<laughter>

Kubo: Yeah. We don't know yet if the equipment is going to be made or not, but this is, I think this, is a very big challenging moment.

Myers: It's the foundation of the computer.

Kubo: Yes.

Myers: And a future computer.

Kubo: Yeah.

Myers: And that's why I was trying to get what's your advice to these children that are coming up? That it's not just to play with the computer, but how do you build that infrastructure into the computer?

Kubo: Yes. Computer must develop further to be real user friendly.

Kubo: I think Japanese manufacturing, semiconductor manufacturing equipment, Nikon and Canon, made the stepper.

Myers: Right.

Kubo: It's called the stepper. That was one of the big success in the past market. Until the ASML came in with bigger throughput. So about 1970' to 1980 has been the growing moment for the memory devices. But I think still smaller and a very heavy quantity of memory will be required in the future. Now people talking about the cloud, big data business. Still needs a tremendous amount of memory.

Myers: Yeah.

Kubo: So everybody is fighting to make the memory very cheap, cheaper. So future engineering challenge is still going to be very great.

Myers: Yeah. I guess as our friend Makimoto-san said, "Semiconductors is the locomotive driving this train we all talk about."

Kubo: Yeah.

Myers: And I hope it's not going too fast and we crash.

<laughter>

Kubo: Yes.

Myers: Anything else you'd like to tell the audience based on your experience?

Kubo: I think this is popular for Dr. Noyce, Intel founder. He was the great scientist and business manager at the same time. Friendly personality that all people in the company want to talk to him with

personal respect. I believe such a manager is the winning style for a high tech company because your technology can become obsolete tomorrow suddenly.

Myers: Oh, yeah, Bob.

Kubo: Yeah. Dr. Noyce predicted the smart telephone development in 1981, I guess. Was that 1981? Anyway it was a very early age.

Myers: I don't know.

Kubo: He talked in an interview, October 1981 at San Jose Mercury paper, about the future of microprocessors.

Myers: It would've been. It was '81.

Kubo: Yes.

Myers: October 19th, '81, 34 years ago.

Kubo: Yes. I think he, in that newspaper article, he mentioned about the smart telephone. And I think that kind of imagination is admirable.

Myers: And that was before the bricks were made that we've <laughs> used.

Kubo: <laughs>

Myers: So that was over 30 years before…

Kubo: Yes.

Myers: And I tell my grandkids about that and they don't believe it.

Kubo: Yeah.

Myers: But yeah.

Kubo: So I think--

Myers: That's an old article, yeah.

Kubo: I think that that he had a tremendous foresight to the future.

Myers: He was a great--

Kubo: Yes.

Myers: --can't say dreamer, but visionary, you know.

Kubo: Yes. This is Japanese made, written, article about how Japanese lost DRAM.

Myers: Oh, yeah.

Kubo: DRAM.

Myers: Yes.

Kubo: It was a big production in Japan, but Japanese was making this DRAM for the big computers. And big computers have a big appetite for the DRAM.

Myers: <laughs>

Kubo: So they designed and manufactured to perform for 25 years without problems, which was excessive engineering and costed high.

Myers: Right.

Kubo: Actually. It was not necessary, for the small personal computers. Samsung made the memory at cheaper cost and high throughput, beating Japan.

Myers: Do you see any great growth in the semiconductor industry, and I say semiconductor because Sapphire is a semiconductor, they're all different, but some of them are not in 3-5 elements.

Kubo: I understand a lot of effort is poured into different materials from silicon because silicon can not go below 10 nanometer pitch.

Myers: So do you see any future for what we've learned in the traditional semiconductor that can move out into other areas such as biomedical equipment, biomedical applications, anything?

Kubo: Yeah, I think so. Already many people in Japan also, they are working on the experiments to make, to use it, for this small, miniature, to make a capsule to drink, to check and cure the inside of the human body. And that type of application research is expanding.

Myers: Right.

Kubo: It's in the experimental process yet.

Myers: In my opinion--

Kubo: Yes.

Myers: --Japan should be very proud of what people like you who were doing things in the early '60s that are equivalent to what they're saying is a marvel today in Silicon Valley. Innovation, entrepreneurship, betting your own home rather than venture capital doing all. You guys took a big risk and you rewarded

the industry with great success. Lot of problems along the way, I understand that. Because I've kind of lived in almost the same time frame.

Kubo: Yes.

Myers: But you should be very proud of the accomplishments you've made.

Kubo: Yeah. But I am always watching Japanese companies. Now Japanese are changing to a global standard. Changing the inside of the companies. In the near future, large block of senior people will retire and both younger manager and women will play more active role in the decision process.

Myers: Yeah.

Kubo: Come out of school and get into the company together. And you work for the company for the life time. That has been a tradition of Japan for a long time.

Myers: Right.

Kubo: And that is the origin of complete loyalties to the company. But it's been successful only when the pyramid style population exits, but it will change as penalty of changing jobs will get less and less.

Myers: Yes.

Kubo: And government is talking about the white-collar exemption. That means that Panasonic, or Hitachi, all those people are talking about, they decided from next year, for the salary to be paid for accomplishment and ability of the senior employee, not by the seniority nor the time worked.

Myers: Right.

Kubo: And that is a reflection of the global style. And Japan is going to change to that. There will be more start-ups, more people will change the jobs, looking for more incentive for the work.

Myers: Right.

Kubo: They need a different type promotion, I mean, motivation. So how to motivate people is now becoming top management important task for Japanese. So I think now for several years, maybe 10 years, Japanese, to change the style of operation.

Myers: Yeah, it'll take time.

Kubo: Now it's becoming easier in Japan to change the job. But when we have started TEL when we're young, changing the job means to become a taxi driver if we do not succeed.

<laughter>

Kubo: It was almost impossible to get into the big companies then, unless you are new graduates.

Myers: Yeah.

Kubo: When we told Nissho to start a new company, many people told us not to. Not to go out, not to leave the companies. But I was very much spoiled by venture business spirit in United States. So I wanted to make our own company. I think Japanese people are conservative not willing to run into a risk.

Myers: That's impressive.

Kubo: Yeah. Japanese company, Japanese young people, would be more venture oriented, I think, in the future. Because now it's very easy to get into the stock market. For us, it took 18 years to get in. Until that time, we had to depend on the private money. It has been most stressful for me to raise private money.

Myers: Right.

Kubo: So we kept explaining what a transistor is and it can grow into a big business. But the bankers then did not understand totally.

Myers: Yeah.

Kubo: But now it's widely known in the public, it became easier for Japanese young people to follow their own desire.

Myers: So what's the most exciting thing, not just Japan and the globe, what's the most exciting technical thing that you see on the horizon?

Kubo: Oh, I think mostly electronics and biology has big potential-- I personally think that I need personal computers that I can control by audio only. Many people in Japan, many rich people and senior people, are still feeling really difficult to control personal computers, which have many strange keys.

Myers: Oh, yeah.

Kubo: Yeah, actually.

Myers: You know, many of them are like I was. I had really two major secretaries in the 50 years.

Kubo: Yes.

Myers: Both bilingual.

<laughter>

Myers: And took dictation.

Kubo: Yes, yes.

Myers: So I didn't have to do that. Now I'm having to do it. <laughs>

Kubo: I think I'm still waiting for the equipment.

Myers: Yeah.

Kubo: That I can control by audio. And I can make a phone call to my friends in their local language, which does interpretation automatically.

Myers: Right.

Kubo: Many people have been working, but still not complete yet.

Myers: Okay. Well, my question will be what do you think is the most exciting opportunities in the future?

Kubo: Mm-hm.

Myers: And what would be your message to the people looking at this oral history. Kubo-san, and, I mean, you got to think about it. In your days there weren't many innovators and young entrepreneurs. They weren't, like you said, venture capital wasn't available.

Kubo: Hm.

Myers: Wasn't even in existence. So where'd you go? To the bank. And they said, "Yeah. You give me your wife your son and your house--"

Kubo: Yes. Yes.

Myers: "--and I'll loan you money."

Kubo: Hm. Yeah.

Myers: "If you don't pay it back, I take all of it away from you."

<laughter>

Kubo: Yes. That's loan condition still existing in Japan though. If they go to the local bank to get some venture money, and they are willing to lend you because plenty of low cost money is available. But they want the money back with full interest if you don't succeed in three years.

Myers: Yeah. Right.

Kubo: Yeah.

Myers: Okay. So that's the fundamental question--

Kubo: Yes.

Myers: Just take your time, think about it, because your advice and direction to future applications and future requirements of people. What's your advice?

Kubo: I think Japanese industry is very, very good in engineering and very hard-working, diligent, honest, good people. But Japanese industrial companies should pay more attention to the end market, market requirement. I have read recently the book talking about Japanese watch companies. Watch companies like Seiko. They came out with a very good electronic watch with quartz and of highest accuracy. And Japanese engineering worked to make it more accurate. So be able to meet the standard of the Olympic games. But actually right now, when we go to the local market in foreign countries, we see many Swiss watches. They have 90 percent of the market.

<laughter>

Kubo: This is happening in our country. I think Japanese engineers should study some marketing. I think TEL has been very successful manufacturer among the companies because we have started as a trading company, sales company, and our people have a habit of having a broader eyesight for the marketplace. This is something that the Japanese should pay attention more. Seiko watch, Japanese watch, is very accurate. Tremendous accuracy and high price, high quality. But Swiss watch is not so high quality but very cheap price and design is very nice. And it's available at all the airports. Singapore or any airport, a tremendous amount of quantity. And people are buying. I understand from looking at this DRAM things in Japan, it says, I don't know if this is truth or not, but Japanese have been making the DRAM too good quality guarantee for 25 years performance. But personal computers did not need it. I want to advise Japanese engineers should be more market oriented, rather than technical achievement.

Myers: Right.

Kubo: I think the engineering people should be more sensitive about the market. How to make it more appealing to the users and how to make it at the lowest cost.

Myers: Driven by the market.

Kubo: Yes.

Myers: Well, you know, the other thing I was going to ask you.

Kubo: Yes.

Myers: Twenty-nine years old in the early '60s, you took a big risk.

Kubo: Mm-hm. Yes.

Myers: And I had 11 years of working for a Japanese company, and it was difficult for me to say, "Take the risk."

Kubo: Mm-hm. Yes.

Myers: But at the same time, the money was patient.

Kubo: Mm, hm.

Myers: So those are dichotomies because eventually the Japanese gave me the money to grow, took the risk, I took the risk of saying, "I'll get it back for you," but--

Kubo: I see.

Myers: And you did that.

Kubo: Yes, mm-hm.

Myers: And so maybe a little more risk-taking might? That's a question not advice.

Kubo: Yes. I think that became easier right now because of changed regulation, as I mentioned, going public is easier, much easier right now. Especially for the companies not in manufacturing business.

Myers: Right.

Kubo: It's very easy, maybe three or four years from the start, they can get public money if successful.

Myers: Right. Manufacturing is different, I agree.

Kubo: Right. And another factor is that we can change the job easier than before. Before it was almost impossible, but a small start-up fund can be available now. So with those two factors, Japanese can be more venture-oriented nowadays we hope. And also, Japanese culture is different because about 60 percent of the people are going to the universities, or colleges.

Myers: Mm-hm.

Kubo: They graduate and they come to the companies and employed. And they are all engineers. They think they're engineers. And there's no technicians. All engineers. And everybody come up with their own idea of improvement. We must be careful that can end up as excessive quality which do not sell well. The consensus style management does not change easily. Culture changes will take long time.

Myers: Mm-hm.

Kubo: Japanese must get a very fast consensus if they need a consensus. Looking at the most successful companies, I think that decision speed makes a difference.

Myers: Right.

Kubo: Great difference.

Myers: Well, Tokyo Electron, TEL, has been very good at picking people for positions.

Kubo: Yes.

Myers: I'm very impressed with Higashi-san, with Tsuneishi-san.

Kubo: Thank you.

Myers: Who you've picked. Dickerson is… These are impressive men, and young men.

Kubo: Mm. Do you know Mr. Ken Levy?

Myers: Oh, yes. Very, well… <laughs>

Kubo: I understand Dickerson was working for Ken Levy once.

Myers: Yes, he worked at KLA.

Kubo: When he was very young.

Myers: He worked at KLA, then went to the Varian and to AMT.

Kubo: Yes.

Myers: --yeah. I know that history. Actually, I did an interview with Ken Levy like I'm doing with you.

Kubo: I see. I think Ken is a very good manager. I have never talked with him about engineering but he has a very warm personality and he is very intelligent businessman.

Myers: Very super person.

Kubo: Yes.

Myers: Okay.

Kubo: Yes.

Myers: I think we've done it, but if you have any other thoughts we can talk about them later.

Kubo: Oh. I think all those young people must try to challenge for the venture in the future. Looking back old days, environment has improved so much. They can, I think, do whatever they wish to.

Myers: Right.

Kubo: To spend their life.

Myers: By the way, I told an old friend that I was going to have a session with you. A guy by the name of Ed Segal.

Kubo: Uh-huh.

Myers: And he said to say “hello”.

Kubo: Yeah. Ed is really nice guy.

Myers: He said, “Tell Tom ‘hello’.” <laughs>

Kubo: Yes.

Myers: And I said, “Who?” <laughs>

Kubo: Yes, I remember.

Myers: Okay.

Kubo: It’s been a long time. Yes.

Myers: Yeah.

Kubo: I… Yeah.

Myers: He’s a very good friend too.

Kubo: I see. Oh. I think Mr. Imamichi, chairman of TBS was main supporter to me for financing our company, when we were small. He used to tell me that electronics is a young man’s business. Only young man can succeed in it. And today it still is a young man’s business. Many possibilities of great innovation exist from now on. My advice to these young people is “If there is a will, there will be a way”.

Myers: Well, it’s still the locomotive driving the train, as Makimoto would say.

Kubo: I see. Uh-huh. I hope that the people, young people must get more ambitious.

Myers: Yeah.

Kubo: Uh-huh.

Myers: Okay. Well, thank you very much.

Kubo: Yes.

Myers: We’ll give you the rest of the day off. <laughs>

END OF INTERVIEW

