Taiwanese IT Pioneers: Matthew F. C. Miau

Interviewed by: Craig Addison

Recorded: February 10, 2011
Taiwan, R.O.C.

Sponsored by:
National Security Council, Taiwan, R.O.C.

CHM Reference number: X6264.2012

Craig Addison: This is Craig Addison for the Computer History Museum. Today is February the 10th, 2011, and I am doing the first oral history interview as a part of the joint project between the Computer History Museum, Taiwan National Science Council, the National Taiwan University, and Taiwan Public TV Service. And the guest today is Matthew Miau. Matthew, could you just, for the record, state your name in English and Chinese, and your position?

Matthew Miau: I am Matthew Miau, Chairman of the MiTAC-Synnex Group.

Craig Addison: Where were you born and where did you grow up?

Matthew Miau: It's a long time ago. I was born in China. I grew up and went to primary school in Taiwan, high school in Hong Kong and college days in the States, the U.S.

Craig Addison: What were your best and worst subjects in school?

Matthew Miau: My goodness, I think my math was pretty good, usually very high scores. And the worst is literature for Chinese or English.

Craig Addison: Do you remember your first exposure to computers and electronics?

Matthew Miau: I guess like everybody, probably we were all taking computer science courses. So... I think it was IBM 1620 using card punch machine, this is back in my college days. But those were not the really, you know, you just punched cards. You didn't get the personal feeling with the computer interaction. So I guess it was later days when, you know, when the mini computer came up, then I played with the PDPs 11 and 7 and 8s

Craig Addison: Did that interest you at all? Or were you just using the technology?

Matthew Miau: [I had] some frustrations and debugging the program, of course, like everyone else. But it's a lot of accomplishment, when you see your programs working. And it's enjoyable

Craig Addison: Did you have any role models in your younger days?

Matthew Miau: I went to school in Berkeley, and I only applied for one college, and it was UC Berkeley, and the reason for that was because there were Nobel Prize winners. They all came out from Taiwan, and they were awarded a Nobel Prize. So those were, when I was a kid, I just kind of respected those [people]. But actually, when I got to work, I must say working with Intel, several people, including Dr. Noyce Dr. Moore, and Dr. Grove. Of course, Grove was one I was actually working very closely with and actually learned a lot. And I would say he's probably the one, the best teacher I ever had, and also my role model.

Craig Addison: Just backing up a little bit. You said Nobel Prize winners from Taiwan, was that in Physics?

Matthew Miau: Physics, right, physics. Franklin Yang and Tsung-Dao Lee, yes. Those two they were the first Chinese who got the Nobel Prize. And those kind of... So I said if I want to win Nobel Prize, I guess I would try to put myself in the place, where [would be] the best probability to win it. And I looked and studied and found out that UC Berkeley had [developed] the most Nobel Prize laureates.

Craig Addison: Of course Berkeley had the reputation as being kind of a radical campus. Were you that kind of...

Matthew Miau: That was a surprise to me actually, when I... In fact, I was there during the very exciting years, during the Vietnam War. I graduated in the early part of 1970. And so I've seen a lot of this love and peace movements, you know, People's Park, all that. Yes, those very exciting days. But being an engineering student I think, there were, actually a lot of work, so I didn't get the opportunity or [many] chances to participate much like my officemate my roommate did. But it was interesting, interesting to observe the campus activities, and that was quite an eye opener for me, as a foreign student at that time.

Craig Addison: So you weren't aware of the Berkeley reputation before you went there?

Matthew Miau: I wouldn't say... I wasn't aware of that. I was just thinking about how to win a Nobel Prize. And a lot of work in the engineering school, so... but just to observe the situation and the democracy, and the... you know, the student movements all that. But it's... some violence there as well, right.

Craig Addison: Why did you choose the particular field of study that you chose?

Matthew Miau: I like business and I like technical stuff. So the one school offer both actually was Berkeley, which offered IEOR, Industrial Engineering and Operations Research. In fact, that was the reason I went to Berkeley, one of the reasons, aside from the physics [department] and all that. And there was a professor called Prof. [Edward R. F. W.] Crossman, very well known in the Industrial Engineering field. But again, like you just mentioned, during the year when I was graduating, that was close to the end of the Vietnam War, and [there were] a lot of issues about the unemployment [and] all that. So I think it's probably easier for me to find a job [if I found] finding an area [where it] is probably easier for me to get a job. And that was in the EE areas. So I kind of switched [in my] last year to a EE [major]. called EECS, Electrical Engineering and Computer Science. I think that was a good move for me.

Craig Addison: Just backing up, your schooling in Hong Kong and Taiwan,do you remember anything about that in particular? Any...

Matthew Miau: Taiwan is very…kind of, everyone was very rigid, that kind of an environment, but of course this was when I was very young. Hong Kong again was a big change for me because it was a very open environment. I went to English school there, and I graduated from St. Stephen's College in Hong Kong, which is British high school. And there I actually learned a lot of extracurricular activities. Most sports that I have picked up were [picked up] then. You know, fencing, judo, all these activities I learned there. And that was also probably a good steppingstone for me to, get into the United States college from Hong Kong.

Craig Addison: Was there any family pressure from your mother or father to do business or to get a...

Matthew Miau: No, it's more of a..., more of a financial pressure, because it was kind of against the wishes of the family, to have gone away, so I was not supported financially. So I had to make my own living when I was very young.

Craig Addison: So your family wanted you to stay in Taiwan and work in the family business?

Matthew Miau: No, I mean, that's too young to talk about working in the family business. But I think they think about the traditional schooling, [thought that was] probably the proper way. It's probably good and bad. So I did learn a lot by, by kind of, left home when I was 13 years old.

Craig Addison: Oh really, 13 years old?
Matthew Miau: Yes, right. So...kind of early.

Craig Addison: So did you live with relatives or...

Matthew Miau: It's boarding school. So I did have some relatives in Hong Kong. Right.

Craig Addison: So this was in Hong Kong?

Matthew Miau: In Hong Kong. Then after Hong Kong I went to the US. So this is a... I wouldn't say lot of pressure, but the first year kind of lot of pressure, when I was 13 years boy to make his own living is a little bit hard. I did get some support from my mother, yeah.

Craig Addison: How old were you when you went to the US?

Matthew Miau: 19, which was for college, [I was] ready for college.

Craig Addison: How about your early job history? What was your very first...

Matthew Miau: After Berkeley I actually, this was 19... the early part of 1971. Jobs were very difficult to find. So I actually went to the Yellow Pages, and started typing, you know, a, b, c, d, typing. I typed a couple hundred letters [requesting] interviews. Most of my friends had applied for further education, Master's Degrees. After the [Vietnam] war there were a lot of unemployment issues. But fortunately for me [was that] I [had] kind of self-studied on the semiconductor stuff. There was a company called Texas Instruments, that had good books about integrated circuit design, so I kind of, while learning something in school, and we also picked up some semiconductor designs from the application notes of TI, Texas Instruments.

And that helped me to get my first job. This was a company called Electronic Arrays, later bought by North American Philips. And they were designing calculator chips. And that was very exciting and I was very happy to get one [a job]. After 200 letters, I got this one good offer. And that really kind of give me a... I guess the first job usually you take, usually sets the path for your future career path. And this was helpful because calculator design is very similar. I mean, it's like the fundamentals for microprocessor designs.

We used a very old, ancient [semiconductor process] technology called P-channel. Of course, we were talking about a 6 micron device, which is, you know, very ancient today. We're talking about nanometers today. P-channel means you deal with 12 minus, plus/minus 12 voltage, and the 5 volt and the zero ground. So you actually do the layout of the chip, actually it is quite complicated with the 3 power lines, running all over the chip. So... but however it helped me very much on the logic design, how to design a computer. Well, a calculator is a computer, you know, how to do all these functions, plus, minus, multiply, all that, with digital counters and…Also you learned something about the process, you know, semiconductor process, which, of course was P-channel. And this is the logic design of calculator you have to have mirror device, you have the CPU, I/O chips. So it's very, very similar, while later, when we got into the microprocessor in the Intel days.

Craig Addison: How long did you stay with Electronic Arrays?

Matthew Miau: That's only about a year. And then actually the economy was getting better. So a lot of companies started recruiting. And so I started looking for something even more challenging [to do]. And Intel had just started up a 4004 team, or a general microprocessor team. They had built a 4004 4 bit microprocessor. And that is very interesting, because many people were recruiting [me]. I got many offers, but Intel did not give me really good package, but actually... I was really enchanted by the technology and the... some of the new products, like first of all the microprocessor itself, a programmable one. That was very exciting. The 1702, which was an EPROM, which means you can erase, erase a memory after you programmed a chip, you can erase under UV light. And that's to me that's very fantastic, something which is so marvelous. And then the concept of the microprocessor itself, you know, be able to shrink the huge 1620 IBM machines, into a very small, small chip set. And that's the time they wanted to move from 4 bit into 8 bit. And I think that kind of excited me. So even though I got good offers good package, good money all that. I chose the one which offered less---less money, fewer stock options. But I think I... I was very proud of this. I could see the possibility of learning, and to work for something, which is like one step, like a quantum jump in what I was doing. So that got me really excited. So I joined Intel.

Craig Addison: What year did you join?

Matthew Miau: 1971.

Craig Addison: Did Bob Noyce or Gordon Moore interview you personally?

Matthew Miau: Andy Grove and Les Vadasz. Les Vadasz was the one... he was the CTO, or the chief engineer. And he interviewed me and I presented him a design I did, which was on the cover page of the Electronic Design. That was the largest ROM read-only memory. It's a funny size, it's 38 K. At that time it was quite big. It was the biggest read-only memory in the industry. I did that for the calculator chip, for the previous company I worked for. And I found many problems with the chip I designed. I think that's why I got them interested in me, because I could tell the problems, rather than how good this chip was. So..., he didn't let me go. I heard [what he said when he went downstairs [from Les Vadasz]. I think he walked to Ann Bowers' office. Ann Bowers was the Personnel Manager at that time. And... I could hear that he said "we got a good one, we got a good one".

He asked me to go his go to his house for a drink, and I did. And I wasn't drunk, but I decided to join Intel. And he... this is small story but interesting. He said, "come to my house for a drink". I went to his house, but he just moved to this new house. There was no furniture, only one sofa there. And... but he did find the drink. So we had a good talk. A few years ago, Les Vadasz visited me here. And he said "Matthew, I moved to a big house, do you want to come visit me in the Napa Valley area"? So I said, "Sure". And both he and I said the same thing, "this time you have furniture." He said "we have lot of furniture in my house!" Anyway, I worked very closely with Les Vadasz. He later became the President of Intel Capital. And of course, during the years I worked very closely with Andy Grove, and he always gives us talks and seminars, training, even how to write memos. Dr. Noyce was very charismatic. Dr. Moore, a very good businessman, he knew the technical stuff very well. So I say, I was affected very much by the three of them, but was very close to Andy Grove.

Craig Addison: What assignment, what project were you working on at Intel when you first joined?

Matthew Miau: When I first joined, as much as I wanted to try the microprocessor, I was given assignment to do a custom chip design for Disney World, for the company called the Mars Money Systems, to design a vending machine chip that recognizes the coins, to recognize a quarter, a dime, a nickel, and accumulates, and can then dispose the candy or whatever. And then, that was a very interesting project for me, very challenging. And I was very happy to be able to design the whole thing, and later write my test program. And that's challenging for an engineer I think. I wish that all engineers have this kind of opportunity, to design for something and to write the test program itself, and to see that the chip works and sells.

So that was the first project before we set up 8080 team…the 8080 was the enhancement of 8008, ten time faster than 8008. That's why we called it 8080. So the 8080 team had 5 people, each one took one chip. So 5 chips [in total] . My officemate did the 8080, Masatoshi Shima. He was the original Busicom guy who came to [work at] Intel, to take on the programmable calculator, and that later became the 4004. So he's my officemate [1969]. And later he left Intel and [then returned in 1980] to become the [Director of] Intel's Design Center in Japan. I had... then, I took the 8251. The 8251 is a USART chip, Universal Synchronous Asynchronous Transmitter Receiver. And it's a very, I would say, complicated chip. So those 5 chips including the DMA chip, the interrupt chip, and I/O chip, came out as the 8080 chipset at about the same time. That was very lucky and [the result of] very good management of the schedule. And that became big hit. I think the 8080 has then took off.

The 8251 was very challenging for me, as a junior engineer, to design a chip, and be able to work with a process engineer, and testing engineer and the QA people, including Gerry Parker, [Keith] Thompson and Albert Yu...he just resigned retired in the last few years. So we worked with the processing people. We're testing a depletion mode N-channel device, compared to the old P-channel device. We use a single 5 volt. Of course everybody used single volt later, but to us, it wad a new process, and new system, which you know, is very... that I think, that is the, while we working on the microprocessor chip, we also see the potential of how dynamic...We don't know, we never thought about the personal computer PC at that time. But we, while we work on this microprocessor set, we could see the future without realizing what [would] happen today, but we could see the potential, the future. And actually many of us who worked on this team, actually later [took] different [career] directions, but we either started our own businesses or actually took what we did then, [and used it] to develop something bigger.

Craig Addison: Intel has the reputation of driving its people very hard. Were there a lot of late nights to work on that device?

Matthew Miau: You know, that's the image Andy Grove has given to a lot of people. But actually, I would say a lot of the drive came internally from the person, the engineer, who wanted to get things done. And in fact I think most people, I would say, in general, don't mind working hard. But people do like a clear direction, a vision. And seeing something that you are working on is so exciting, you wanted to finish that on time. And sometimes, yes, we all worked very late, and we went into the office on weekends. And you know, the greatest moment was when you saw your chip come out of the wafer fab, and you test it, and it

works, [but maybe] not working right away. It's usually, you know, it's close to working, you can debug it using a probe to test the chips and that's very exciting.

So I would say yes, the environment was such, that we have a tight schedule and high requirements, high demand. But I think that is the challenge. I think a lot of pressure and demand actually comes from yourself. I would say that's true for many of the people who worked at Intel at that time. I think that's actually under the good leadership of the few people mentioned. So, this is probably true, but in addition, I think it had to be coming from inside, from the engineer himself.

Craig Addison: At that stage obviously there were other products, but was there a lot of pressure on the 8080 to be a winning product?

Matthew Miau: There was lot of competition, well not a lot, there was 6800 from Motorola. Actually the instruction set of the Motorola [chip] is, more meaningful to the user because, before the microprocessor days, everybody, all the people, were familiar with mini computer type of instruction sets, so [it was] more understandable. Whereas 8080 was not. So [we found] out that many instrument people, and medical and all these… they all used the Motorola [chip]. So that actually caused me a lot of thinking about how to win. Even as an engineer, I was very pro-business. So I talked to the marketing people and they really needed the value of 8080 [to be better understood]. So we as engineers actually [went] out to teach users how to use them. And I had some interactions with customers as well. In fact, that's why later I switched to marketing. But back to the question yes, there were a lot of competitors. TI had a chip that also came out with a lot of application notes written [for it]. Rockwell had chips in the PPS-4. And so yes, [there were] a lot of competitions. But I would think there was one time, we were not sure [about] the game...[that] we were going to win the game then…

Craig Addison: After the 8080, what did you do?

Matthew Miau: I already [had been] in Intel for 5 years, and I learned a lot from the technical environment, as well as the dynamics of a company growing its business. I got very interested back to my college days. I really wanted to find an area in which I could use my technical expertise, and mingle that with business. So I had requested the company to let me switch to more of the business side. But I guess I wasn't really qualified to do that. But I think I found out my weakness so... of course, I did not have good business training, so... but among other things, I was not very good at dealing with really end customers.

Okay, sales, that was not my bag. But I figured I needed to do something.

So I worked with Intel, I said, if I go to school I go get my MBA degree, would you... Andy says of course, that's encouraged. So... so it wasn't a big negotiation but anyway, they paid for my school, [for me] to get my MBA. And I think that Intel was very people-oriented in that sense. It's just not driving people crazy, like a machine. No, they valued the people. And I think that gave me a good foundation.

So when I got my degree, I also...I successfully switched to marketing. It wasn't customer marketing. It's more like product marketing. So I was just really asking for a lot of training from the company. It's really what I could contribute, in a sense. I knew the product well, I knew the problems of the chips I designed. I could explain to the, you know, how to fix those problems, without fixing the chip itself. It was difficult to fix the chip. I could write a few firmware programs to set the chip-set in a certain mode and they would work beautifully. In fact, those chips had bugs in them but they worked very well. And they became a benefit to Intel because some of the people later tried to copy, not copy, but second source the product, and they could not copy the bugs I designed in, not on purpose designed in, but those had made the... This is kind of a funny story. Some of the chips needed to be redesigned to last longer, because all the bugs could be fixed in a certain way, and yet they could sell, because people didn't want to change the programs they had already, they had already done.

Craig Addison: When you shifted to marketing, what products were you involved in?

Matthew Miau: My colleagues joked with me that now I have to suffer with the poor products I designed. I had to sell them. So I was in product marketing. We worked very well, product marketing people work with sales people. I went out to do training all that. And that's the beginning of the… we made a lot of video tapes about how to use chips. And so by then I sort of overcame my shyness. I was very... it built my confidence to express myself, to find out the benefit, the value of the chips, the product we built… how to fix the issues and problems, and really design it in. So design wins were very important then. So I think in that sense, I think that, quietly, we have contributed to the company, to promote the new products.

Craig Addison: Are there any memorable design wins that you can recall?

Matthew Miau: Yes, I have traveled to like middle of nowhere NCR, National Cash Register in Ohio, here and there. One of the sales guy said, Matthew, you come out here and I'll fly you to see all the

customers. So... I didn't realize [it was] just in the middle of nowhere. You had to really travel by airplane. So I, after that one, Hewlett-Packard also used a lot of Motorola chips. And so they wanted to try our... Xerox, and... I worked very hard in the marketing sense, even shifting from [being an] engineer. Engineers worked very hard day and night, but when I shifted to marketing, actually I found there was so much to learn, and so much to deliver, to the value proposition. I think that worked very well. I wasn't good in sales but because my passion, and enthusiasm in explaining those chips and products, how they worked into systems, I became very popular among our sales people. So I had a lot of calls all to come out [to see the customers] And I took advantage of being asked, so I went out. I went to see IBM. I went to see all the the possible customers. So I wanted to cover everything as much as I could, in a short period of time. So I did... even [though it was a] short stay in marketing. I enjoyed the learning steps. And that's what all the young people should do. I think many of the successes of Taiwan's IT businesses, whether in the design or in manufactureing, all of these actually, are designed to grow, to learn, that it actually motivates, and it would be successful in one way or another.

Craig Addison: You just spoke about some of your marketing experiences at Intel, and being on the road in Ohio and so forth. Just to finish that off, anything else in the marketing phase at Intel to talk about?

Matthew Miau: Yes. Some of the interesting, I think imaginary, marketing is for creative people. So I think when one chip came out. I think when 8080 came out and so... to set the price, okay. So I asked the marketing guys, "why you set the 8080s price to be 365 dollars per chip? And the answer just came back to me, "because there are 365 days in a year". To me, I thought was a smart answer, but I still didn't know why. But then I thought about anything you can come out logical reason, which makes sense and, or basically you can sell it at the price. That's very interesting to me. But okay, that's in a way, a joke. But actually the people must have studied the pricing structure with competition all that. I think all that comes into play.

Craig Addison: Did you get a lot of push back from the customers on pricing in those days?

Matthew Miau: No, not then. Not only, not pushing back. I think the product was in a way self-selling, and people all got very excited in the potential of those chips that came out. It was really to design it in or not. Not because of price, I think, because they liked the easiness of use, and how quickly they could come out [with their products, with a shorter] the time to market. I think that was it, at that time. That was good old days, the product, actually the features were very good.

Craig Addison: How much further, how much longer did you stay at Intel after that?

Matthew Miau: That was a short period of a year in marketing. I wrote a lot of application notes and all that for Intel, and helped design the peripheral chips related to AP microprocessor. And in fact some of the notes were taken by, by Adam Osborne, who came out with an introduction to micro computing. In fact, he collected a lot of, he collected a lot of application notes from various companies, not just Intel, and came out with this book, which was very popular. And he made some money and sold it to McGraw-Hill, and made good money for that.

Craig Addison: You would have had a very unique look into the early computing days, in the company developing computers, and of course later on that happened in Taiwan. Was there any sort of insight...?

Matthew Miau: Remember those are…we're talking about the days there was no PC. And of course, Ken Olsen from Digital came out with, with a PC called Rainbow. But he said that's never for commercial use, for consumer use. So he was quite early in doing that. And one of our colleagues at Intel, Albert Yu, he came out Video Brain. He left Intel to try to startup something, although he had the insight of doing something very big. But I think it wasn't until later, when, I think the Taiwan people took the OEM model, and ODM model, and then began to really drive down the cost. And of course, that's based on the Intel and IBM and Microsoft, by opening up the operating system, and that really standardized the PC, allowing the Taiwan computer industry to do something quantumly different from the past.

Craig Addison: Let's just talk about why and under what circumstances you left Intel, your thinking and so on.

Matthew Miau: Earlier I said we did not know exactly what this microprocessor was, in all the applications, but we all felt that there was something great, something revolutionary. It could be applied to a lot of things. So I wanted very much to, actually to get into the business. I think it's very interesting to have Intel gone out. Intel had already been very strong then in penetrating Europe. But in Asia, I felt like there was a great potential. So we took... I had requested Intel to come to Taiwan. This was looking for distributors in Taiwan. So I think that was a time, also I felt like it was good timing for me to probably start something more adventurous. And I came to Taiwan to work with some colleagues, who I already negotiated with [while I was at] Intel, to get them to distribut the [Intel] products in Taiwan. So I joined [the

founders] and [helped build] MiTAC]. That was the first computer company in Taiwan, by the way. But...

Craig Addison: You left Intel on good terms then?

Matthew Miau: On good terms. Intel said, “you cannot leave all these messes behind”, meaning, it’s joking with me, because there were many chips that I designed, and some had bugs in them and I needed to sell them, and which I did. So I was kind of back and forth for a year. And that was very good terms with Intel. So I kind of, in a way I felt that I was responsible for a job that I had not quite completely finished. I want to see Intel win all the design wins. So I kept on coming back. And for first year and a half I did that.

Craig Addison: Coming back from Taiwan you mean?

Matthew Miau: From Taiwan to work for Intel, to back and forth Intel, for a year and a half. Something like that.

Craig Addison: Were you still employed by Intel when you came to Taiwan?

Matthew Miau: No, actually in a way, thinking back I was doing something. I never asked Intel to pay for my trip expenses. It was an interesting arrangement. I kind of felt like [I was] obligated and I did that. But also I, there... I had to work with my family to move back and all that, but anyway, it’s on my own terms. But at the same time, I got a lot of support from Intel to setup the MiTAC in Taiwan. It wasn’t called MiTAC, it was called TAC, Taiwan Automation Company.

There were no personal computers. And so we focused on using microprocessors to design into the process design sequence control, numerical control, all these things in the industrial environment. But also, without the PC, we felt like we very much needed a Chinese computer. So MiTAC invented the Chinese computer, which I feel very proud of. So as of today, here, this company here it’s called MiTAC Inc. It was the first computer company established in Taiwan, working on system integration. As of today, before spinning off the manufacturing, Synnex, all that. So MiTAC Inc. was the first computer company established. And then we tried to get into the manufacturing of Chinese computers, which we did, using the 8080 chip set as the front end. For the back end we used mini computers to process the Chinese stuff. So then there’s IRS, Taiwanese IRS, the Police Bureau and all these government agencies, who needed

Chinese names, for the first time they have computers. So we have many patents on the Chinese input and output methods, including the so-called Unified Invoice in Taiwan, that was our patent, but we opened it up to everybody to use.

Craig Addison: The company TAC, you said some other people founded that. Did you join them?

Matthew Miau: Yes. There… two gentlemen formed this company called Taiwan Automation Company. So I came back from Intel and they... at the time there was about 12 people, so I joined them as a small team.

Craig Addison: You joined them as what?

Matthew Miau: As Chairman.

Craig Addison: Okay, so the boss.

Matthew Miau: Well, I sold some of my Intel stock and be able to fund this small company. Yes, it was about a 50,000 dollar company, a small company

Craig Addison: US dollars?

Matthew Miau: US $50,000, US. That's 2,000,000 NT dollars. And so I injected another 100,000 US dollars, and became the largest shareholder.

Craig Addison: At first were you just distributing Intel products? Or you immediately started designing the Chinese computer?

Matthew Miau: Both. In fact we were distributing the microprocessors, as well as trying to be a system integrator. [Then we] took on printers, hard drives, Shugart drives. Shugart, yes. I worked with him early days in designing the floppy disk controller back in the States. And we took CPM machines, we took Intel's testing tools, and we supplied the communication, defense [industries] and also for education, universities, so we were kind of doing two businesses. One is system integration for process control, numerical control, and process, that's called Taiwan Automation Company. The other, we were actually

distributors to other companies, that used microprocessors. And those were very exciting days because the sales grew 500 percent per year, we need... And Intel never, I told Intel “don’t bother me, I know the technical stuff well enough, I’m training the people so Intel you emphasize in elsewhere, in Japan, in Europe”. So I took care of Taiwan, marketing those [microprocessors in a] technical way, to teach people how to use microprocessors.

Craig Addison: What year did you move back?

Matthew Miau: This was 1976 when I moved back.

Craig Addison: Was it kind of a reverse culture shock from Silicon Valley back to Taiwan?

Matthew Miau: Yes I was away for quite a few years. I was 13 years old when I left. So I like to do things in my own way. I like to go shopping and grocery shopping in the US way, rather to be helped by the family. So it’s a culture shock for, maybe more so for my wife, and she liked to do things and now... it’s different. But fortunately she also had a job with her family. So I worked quite hard for the first few years, every day until midnight. Every day. For many years.

Craig Addison: Can you just talk a little bit about the atmosphere or the feeling in Taiwan around that time in 1976...?

Matthew Miau: In a way, it’s very lonely. They lacked [any] infrastructure at all, there was no infrastructure. You have to bring in everything to Taiwan. There’s no infrastructure in the supporting products. The microprocessor cannot be by itself, you have a lot of peripherals to work with. And we had to bring in everything. And we had to design, even design tools were not very available. Physically there was no factories to support the IT industry. There was no capital market. And also there was a lack of people, a lack of talents, who had clear a product in mind to design. Again, there was no PC available then. So that’s why... But also we were lucky then, because nothing was there, so [that gave us] also a lot of opportunities to educate the market.

So we worked very closely with many [in the government].... A few techies, technocrats like K.T. Li and those guys, they are very much in running the country. But they were very excited about the new products, new concepts. So I was, in a way, I didn’t mind to be a nusance. I just called them, knocked on their doors.

And... then it was not difficult to see a minister at that level. And I told them what I would like to see. I needed some incentives.

And we proposed to build a science park. We proposed a research organization. We proposed to supply, to educate, to fund, the market. So we started the so called Information Week, that's in December every year. MiTAC sponsored everything. By then we had about 200 people in the company. We sent 100 people to take the tickets, design the entrance display board and to organize the whole thing. We encouraged... we expressed the need to have a science park. So later it was build in Hsinchu which was very good. ITRI was formed, about the same year. MiTAC was... there was in, I should say ERSO, Electronic Research under ITRI. And then with Dr. Pan we took in the RCA semiconductor transfer. So UMC was formed, then the first semiconductor company. So MiTAC took the task then to educate the market. We played big role in the commercial field. Then we invented the Chinese computer and started a small manufacturing [effort]. Until 1981, that was when IBM opened up the IBM PC, compatible operating system to everybody. And then that's, everything took off.

Craig Addison: Could you just talk about some of the challenges and setbacks in the early days at MiTAC and how you overcame them?

Matthew Miau: So I mean, first of all, I mention that... we had to [indentify and] create the market. There was no PC; we had to create the market. So we worked with the highway [department], to automate, the highway display boards. We had to work with the communication lab. We worked with Chung-Shan Institute of [Science and] Technology. We worked with universities to [create] a lot of development tools and kits. Talent was short, not very many people knew how to design with the microprocessor.

Everybody at that time, either you're hardware people, or you're software people... "software people" actually meant using the big machines, IBM machines, CDC machines, all these. So for the first time, the young engineer began to integrate hardware and software in one person. So I'm designing, I used microprocessors, the system design, and also I write the software. That's very exciting. But we get to train the people. The marketing, as I mentioned, wass a big problem. So we worked with some of the government agencies. There's no private sector to use too many of [these tech products], in a large volumes. The chips at that time went into washing machines and air conditioning and chemical factories. In fact, for some of the chemical factories that we built, we designed the process control. Air separtation plants, we also designed those in. Finance was a big problem for MiTAC then; there was no venture

capital available. And we didn't know how to [get] money too, when the company was growing so fast. And, not just MiTAC, I think all the companies faced the same issue. So it was difficult in a sense, because we [could] see the market [was] going to take off, but actually there were a lot of issues. There were no tax incentives. But all this we worked on, knocked on doors, pushed the government to give some incentives to small companies like us [so that we could] grow.

There were many restrictions in the importation of chips and all that. We had to work around those [issues] with the custom offices. We worked with STAG (Science Technology Advisory Group). Those included Bob Evans (IBM), Dr. Mackay (Bell Labs) , AT&Ts chairman, And TI chairman Dr. [Pat] Haggerty. They were all my good friends, we brought in foreign advisors to advise the government on how to set the strategies for the country, but we also fed our counterparts, the foreign advisors, with a lot of dialogue about ..what Taiwan should do to become very strong in the IT industry.

Craig Addison: Did you help recruit any of the advisors?

Matthew Miau: Some... it's the other way. Sometimes they found people and then they asked [me about] the reputation of those people. So they came to MiTAC, they saw what we did. And Dr. Haggerty wrote a letter to our Premier saying, we should encourage more companies like MiTAC, doing a lot of research and young and dynamic, after they saw what we were trying to do.

We tried to automate the traffic system. We tried to build the pig auction system, to improve for the farmers the speed of auctions. And we built the silo sequence control for importation of grains, wheat and barley brought in, we used electronic controls for the weighing systems, to keep track of the inventory, which small farmers owned what kind of grains and in which silo. And then, of course, we built the Chinese computer, which was quite exciting at that time. Finally we saw a finished product that could be used by all the commercial people as well as government people. Dr. Haggerty wrote a letter to our government about MiTAC. And so [it was] even more encouraging for us and [then] more emphasis was put into this area. So that's when I suggested to our government that we should look for global business, because the Taiwan market was too small. So I kind of introduced this ODM, OEM model. That means we don't have a Taiwan Chinese computer market [that was] so big. Maybe we should manufacture for US companies. So I think that was in a sense, I think, I made some contribution to building a computer, low cost and higher volume [one]. And this was gradually shifting into this current. Some of the models were much better than what I tried to do earlier. But many companies came out of that concept.

Craig Addison: Let's move on to the PC. There was Apple first, and a lot of Apple knockoffs were made in Taiwan, and then IBM clients. Can you talk about how that came about in Taiwan?

Matthew Miau: There was a time before the PC days, when Apple II became available. It's not just Apple II, it's the electronic games, at one time there's suddenly, again, using 8080 chip set among other chips to design…there were many electronic games available,. So this too, suddenly [in] Taiwan…small businesses saw this opportunity. Everybody started making electronic games. And many people started try to build Apple-like machines. And suddenly I found that's very interesting. So we supplied chips to those businesses. And it's like mushrooming; it's booming. But booming in such way that government stepped in. Our government one day said "okay, too many school children are not going to school, but they are going to the alleys and [playing] electronic games" and they put a ban on the electronic games. So suddenly this market disappeared.

So one of my companies that's the predecessor of Synnex almost went bankrupt, because suddenly we lost all the customers, but that was a good experience. People began to understand this booming thing, like Apple II and electronic games. And then 1981 Apple was growing the market, and IBM did the very interesting strategy, it opened up the operating system which was a Microsoft-based system, to everyone. So in Taiwan, again people already had some training on the Apple II, and saw a big potential. So everybody jumped in to start making the IBM PC, IBM-like type of PC.

Craig Addison: You've talked about the OEM, ODM models. What was your thinking there, and what motivated you to move in that direction?

Matthew Miau: Again the market in Taiwan was very small. So in order to build a business out of it, we had to look for a global market. So I discussed this a lot: how to attract the other companies, the US large companies to come to Taiwan, to award us the business so we can manufacture for them. And that was the so-called the OEM model then. And all the US companies at that time…there was a company called Compaq, Rod Canion [was the CEO]. He and his wife came to Taiwan and talked to us to see whether we can start up manufacturing for them, and they took our machine to the US to see that, but the real case came later, when Qume was founded by David Lee, who sold the machine to, who sold his company to, ITT (Xerox). And then officially I think ITT was first one came to Taiwan, awarded us the PC. I think a lot of contribution from David to have done that. And at that time science park just started. There was not huge

factory like you see today. But David was the one, he could understand that we could do it. I would say first OEM PC contract came from ITT then.

Craig Addison: And Qume...

Matthew Miau: Qume, well he sold Qume to ITT. David Lee, he's the founder of Qume.

Craig Addison: He's Taiwanese?

Matthew Miau: He's American Chinese.

Craig Addison: Did you know him before?

Matthew Miau: I knew him way back in the Bay Area days.

Craig Addison: In fact he kind of helped you get the first contract from ITT.

Matthew Miau: Right. And then I also introduced him to other companies in Taiwan for the volume I could not digest. So we introduced him to other companies in Taiwan to take more business.

Craig Addison: That must have been an uphill battle to convince US companies to…have a small, unknown Taiwan company...

Matthew Miau: Yes, that was, in fact there was concern on how to qualify the company all that, because even in the US , the PC had just began to take off. I think he had some challenges with his board to do that. Outsourcing was not common then for the PCs. It was something new. But again, there was a standard, there was a PC standard pretty much set. And with Wintel, Windows and Intel, and microprocessors, it's not too difficult for us to build something like that. In fact those PCs were not difficult to build even then, the most difficult thing was to set the standards, [even today]. So this is very important, I think. Once the standard is set, the industry moves very fast.

Craig Addison: I was asking about the uphill battle that must have been to convince the large US computer companies to outsource to Taiwan. Can you just talk a bit more about that? How you overcame

that perception?

Matthew Miau: I guess any change in any business model usually is not an easy one. So we have many of the customers through the years, there's usually a convincing job. But it's kind of a chicken and egg [situation]. When you get some customers that see the benefit of outsourcing manufacturing, gradually moving that way and [they see that] the quality not sacrificed, and the cost is coming down, actually it gradually becomes easier and easier. So a lot of convincing jobs, yes. But I think so far the trend has shifted not only manufacturing, but shifted to design and turnkey [services]. The whole supply chain has changed.

Craig Addison: After the first one, ITT, did it become a lot easier to get the contracts?

Matthew Miau: Yes. Then a lot of bigger first tier companies all came, and not just to ourselves, MiTAC, but to dozen of companies like us. And by that time the IBM machine had become an open platform, so everybody had moved in to this direction, because suddenly the direction was clear, and the chip set was there and the software was all there. You just built it [in a] very fast efficient way, and a low cost way. There was a lot of compatibility testing. And I must say the PC is like the automobile, kind of a locomotive, for lot of industries. The PC, what is PC, PC is made of printed circuit boards, metal chassis and inside, [there are] semiconductors, cables, connectors. So that means when PC industry can actually can [serve] many verticals, integrated into mechanical, chemical, precision, precision mechanics optics, materials, and even later, like today, we have LCD displays, and displays have many layers of glass thin film. So it really... it's the right product, right industry for a country like Taiwan. Because Taiwan has limited natural resources. So by promoting this IT industry, it actually gives you hundreds of products, the materials, the services to grow, not to mention the talent that goes along with it. So I think it's a lot of work in the early days to, to get the government's attention. I shouldn't say a lot of work. It's a lot of work, but it wasn't difficult. Everybody went along with this business model. The market is there it's global-wise, a huge market.

Craig Addison: You talked earlier about the shortage of personnel and engineering. When the PC market exploded, how did you get enough people?

Matthew Miau: The people basically had to be trained. Also by then, the schools, the universities had already recognized the importance of this industry, so PCs came along even before 1981, the schools

had already started educating the people. It was just the demand was growing so fast, I would say it's a combination of the emphasis. Actually many schools started to open up new computer sciences courses and electrical engineering courses. So the base was okay; we had to do some internal [within the companies] training. Basically there were semiconductor houses who trained their own people, and there were computer houses and then all the peripheral stuff.

So once the fundamentals, the basic infrastructure was built, and then you needed the location. Taiwan land is very expensive, not like US. You think Silicon Valley very expensive, but here the land, the building, the land cost about five times more expensive. So by comparison, for small company that wanted to go in to the high-tech industry, we [needed to] put our resource money into building business, not spending it on real estate. The Hsinchu Science Park really helped that. And also the government had many programs, to support the training part of it. And of course later came venture capital, the capital market became available, so became easier and easier for us [to start companies].

Craig Addison: You came back quite early, before the Hsinchu Science Park was built. But after that, many more Taiwanese from the Silicon Valley came back and started their companies...

Matthew Miau: Yes, right.

Craig Addison: How did that...

Matthew Miau: The first four company moved in science park were MiTAC, Acer, UMC semiconductor company and Microtek, they're making scanners. So those four at that time were considered to be the largest companies to move in. Then all small ones moved in. The big ones built their own buildings, the small ones used government built factory buildings, standard factories just to get started. Then outside the park also there were many industrial zones, which were also setting up. And more, as business grew, more people came back from Silicon Valley, and that was very helpful.

Craig Addison: Of course the competition increased as well. How did you deal with the additional competition?

Matthew Miau: The competition was not bad actually then. Because the market grew much faster, the pie was big enough, and the whole PC market grew at such a high speed. I'm talking in the 80s, 90s was

the same way. Until I think... so Taiwan was starting really crank out the products, either ODM model or the... brand, their own brand. Taiwan has many of its own brands. But then Compaq started the price war about early 1990s. So suddenly the price differential gone away. That's a very hard time for many of the companies, who tried to build a brand and made name for the company. But many people just hung in there and survived.So today Taiwan has two business models. One is its own brand. And the other one is computer manufacturing. It's more a CM or EMS companies like ODM model. These have both grown hand in hand, and become the world largest producer or brand in the world.

Craig Addison: You moved into the brand area as well, right?

Matthew Miau: No, MiTAC has kind of…in the PC area, we stay in the ODM model. And many other companies have kept their own brand, but I must say that there are many other successful companies, there are using the ODM model today. [It is] much bigger, so today is entirely different than then…very global. Companies had, in the past, I would say, not even 15 years, all the Taiwanese companies that have become number one, become very global. [Those that became] number two become very vertically integrated. So MiTAC went in several directions. At MiTAC, we went to…vertical integration and horizontal integration. Vertical means that, from the PC you build your own mechanical parts, the PC boards, the chemical materials, etc. That's called vertical integration. Horizontal is, in the course of building up the MiTAC operation, we actually built up a company called Synnex, which became, I'm happy to say became a large distribution company. Those came from the old Intel...we brought in Intel to Taiwan and gradually, not just Intel, we brought in many component and systems [suppliers], to become a supplier to the IT industry, as a components [supplier] or supply systems to consumers. So I'm very happy to see that through the past 30 some years, that we participated from the beginning, in the IT industry in the sense of manufacturing, as well as bringing the atmosphere of supply the consumers and commercial markets with products. And that's Synnex.

Craig Addison: Can you talk about the establishment of Synnex, and what your thinking was, and why you thought it was a good idea at the time?

Matthew Miau: In the early MiTAC days when we had Intel, we had printers, we had disk drives, many different kind of systems. We're kind of supplying the users with a complete solution. But when 1981 came along, we found a huge potential for manufacturing PCs. So that's when we split the company into three companies. We split into a manufacturing company, which is design manufacturing, that's MiTAC

International. I think that is the subject we are talking about here. But we still found that there was a big market for [products] we don't have to manufacture, all the components that I'm used to dealing with, there's a market for those, and that's general purpose distribution, like in the US you have Ingram Micro, Tech Data, etc.

So Synnex took the advantage of being in the business already…we're back 30 years ago…of having Intel [products] as the first ones we sell. We brought in many other products and became a large distributor, which really supplied the IT industry, as well as supply to the consumer, end users. So most of the shops in Taiwan are using our brandname Synnex. And in US it's also quite big. It's ranked number three in the world for distribution. And that's what I called horizontal integration. So you take all the products in, and distribution in a very efficient, homogeneous way. We built up many interesting business models. We built up the back-end operation in Asia. We have the US marke…not just US market, but the global market in that sense. But with very interesting business model. We take advantage of 24 hours time zone to process everything at night, and then supply during day time to the US market.

Craig Addison: Distribution isn't necessarily what Taiwan was good at back then. And of course, you have the experience. Did you have to bring in people from outside? Or how did you get the company going?

Matthew Miau: We wrote a book called 98-2. That means 98 percent of products can be built within 2 days, and shipped worldwide. And this is not easy to do. But then, it's not difficult to do if you have the right business model. Namely you either have a global footprint, so that you can deliver locally. Or, the model we that set up was to have MiTAC do the main manufacturing, then the final assembly is [done] in the global Synnex operations. That means depending on the customer demand, the last stop is that they give you the configuration, the product you want just put in the key component last minute, and they have it on their hand because of distribution. They have all the raw materials, microprocessors, the hard disk drives, and the memories, all in the local [market] anyway. So that we manufacture and build the fundamentals in the MiTAC operation, and then we finally put all the things together locally. And we don't have to worry about the parts, because they are already in the Synnex locations, because we have a huge…we have billions in inventories, at any time and the supply chain is there.

That's interesting... that's an unusual business model. But today the ODMs in Taiwan, they're very large, and they have a different model, not the same as our model. But they're also very successful, by having

another kind of supply chain business model, by having global footprints. And we use the global footprints, we called it horizontal integration and vertical integration in two different locations.

Craig Addison: I think they used to call it just-in-time manufacturing...

Matthew Miau: Yeah, JIT

Craig Addison: Did you learn that from Japan? Or who actually came up...

Matthew Miau: Actually, surprisingly no. In fact I don't know if I'm saying this right, today, Japan's JIT really cannot compare with what we called manugistic model. We do much faster in a sense. The concept yes, JIT from Japan, but... Japan's JIT does not have the flexibility built in like we have here. The one thing we take pride is the velocity. We have a simple 3V concept: the velocity, the visibility, and the value added, we have "The 3V Philosophy". So namely we do things very efficiently, very fast, by finding a very good business model. But there's a lot of investment in this area.

Craig Addison: What about the actual factories to build PCs? Was that a really steep learning curve to build a huge manufacturing facility and be able to get the quality and the throughput and everything?

Matthew Miau: There, first of all the supply chain is very important. You need good visibility [into it] to advance, the MIS [tools] to help you. You need vertical integration in plastics and mechanical and all that, that's what many Taiwan companies have today very successfully invested in, this infrastructure. tthen there is the testing and compatibility test part of it. You have to make sure because with the PC, there are so many programs written to work on it, by the PC, and [it is necessary to] make sure those are very ruggedized, and that they can take all the worldwide software, which were build on Microsoft…stuff like that.

And of course, then there are the reverse logistics. So the product goes out, then there are returns and global services, you have to take care of those, so each company has different business model now. Some are [managing] by themselves, some use our model, we [use] horizontal integration to take care of that. And for new products, you even need more, [such as] after sales support, etc.,…call center technical support. So this evolved through the years, not just the hardware manufacturing. But, this is very interesting too, that created a lot of business opportunities. When you sell a product today, it's not just

…not a hundred percent product, so you sell only about half a product. The other half is after sales support, call center, logistics, reverse logistics and all that, and also future downloading of the software, all that. And that all comes into play. And that's what's so exciting about this business, because you evolve [over time]. And from this manufacturing side, you can, at least Taiwanese companies have expanded into…the manufacturing of the glass for the LCD panels, the coatings, the integration materials and the chemicals and the gases. We continue to find more things to do in the supply chain. It's just not building the box itself. If you take an iPad apart, you can see there are thousands of components inside. All these come from independent individual businesses. And so today it's much more complete than before

Craig Addison: You've talked about working for Intel as a design engineer, and then you came back and started up MiTAC, a very small group, and now you're the head of a very big group. Which part do you enjoy the most? Small company? Designing chips? Or running a big corporation?

Matthew Miau: In our company we have a saying called the "7P Theory", the first P is pleasure, pleasure in working. So the stage I find [most enjoyable], I guess that's something to do with [my] age. At different stages I think, for me at least, I think I find enjoyment. When I was an engineer as I mentioned earlier, I really enjoyed doing design and see my chip working. And then when I move to marketing, I like to see the design, the product I designed in implementing the system. But the business part is even very exciting. So when I got into the business, I want to see that we have a future, a growing business. First of all the market must be there. No matter how well you manage or how strong your design is, if the market is not there, you cannot fight against that trend. So we are lucky in a sense to catch this the PC trend, and that now [it has] evolved into many other products. So I would say that business itself is very interesting, but you have to feel it, you have to sense it, you have to really enjoy what you're doing. If you find it's not enjoyable then means you're...something is wrong. You shouldn't be doing what you are doing. So we feel prestigious, proud, pleasure, and many people joke with me, but lot of pressure, too. So I say pressure is pleasure. I would say that, but in recent years, I have also enjoyed knowledge of many of the domains I'm not really in. I don't mind doing joint ventures and building a win-win situation. So together, one plus one equals two. So we have done many joint ventures to enhance our business. And synergize, I enjoy very much to synergize among our network companies.

Craig Addison: When people look back on the computing history maybe in 50 years, how do you think they would look on Taiwan? What sort of contributions has Taiwan made to the computing industry?

Matthew Miau: I think tremendous, I don't think without Taiwan, plus part of China, which has become a big, very efficient manufacturing factory for Taiwan, I don't think without the Taiwan effort, the IT companies effort, that the PC [would have] become as popular as [it is] today. First of all, as you know, the demand was growing so fast and Taiwan has made it possible to build a reasonable priced machine to supply to the whole world, not just developed countries, but developing countries, underdeveloped countries. They all can afford to do that. Of course, at the beginning stage, you must give a lot of contribution to the chip designers, the software, standardization. I give a lot of gratitude to Microsoft and Intel. For making, for enabling Taiwan to build their core competence.

In the future this model will change. So there's a, from the PC, stand alone PC going more into the cloud, and connected smart devices, and the iPad and tablet PCs taking off, going more consumer with a lot of software. So now that the platform is built, everything becomes boundless. But Taiwan continues to dominate, and, I would say contribute, to make that also available and low cost, and friendly to the whole world to use. We are maybe not as creative and innovative at coming out with the first products, but surely we can execute on those products, and make them available to the world. And so that we all are giving the opportunity to enjoy the technology available to us, and put in our own hand and put into good use.

Craig Addison: What accomplishments are you most proud of?

Matthew Miau: I don't want to say a lot, but… Maybe not accomplishments, but I feel very proud to have participated from the beginning in the microprocessor days, and the design phase, and I feel very proud to have participated in Taiwan to startup this industry in Taiwan. I'm also proud to have created many different types of business model, including the Synnex distribution which is nothing new, but how we executed it in a seamless way to expand that in a short period of time. So, I feel good about my current status, there's a lot of challenges and there's a lot of competition, which is fine. I think most important is, we feel proud we participated in the business, which is based on lot of technology integration. And I feel... I would not be happy if I'm not in this business.

Craig Addison: When you look back, what are the key turning points that you see that put you in a particular direction, what stands out?

Matthew Miau: Yes. Many as you ask me earlier, that joining Intel versus other company, that was a big, [it was] the biggest smart move for young man to choose a company which offered me less salary, but I [thought then], a good environment [in which] to work. Moving back to Taiwan was a big decision for me and my family, that giving up a nice job in Intel, and to start something about which there were a lot of question marks. Entering into the PC space, coming back to Taiwan it was not the PC, but entering into the PC [market] was also big turning point. I would say I must be lucky that I find the right time at the right place.

Craig Addison: Would you do anything differently, looking back at any major decision that you might do differently?

Matthew Miau: I would say I'm happy with the path I'm taking. And there's so many places I could fine tune to become better, but in general I think the direction has been okay.

Craig Addison: What advice would you give to a young person wanting to get a...

Matthew Miau: I have a lot of advice to give to a young person. I would say…have a passion for learning and have it while you have the time and resources, which is very important at my age. I think it's very important for the young people to have a passion for learning, and look at a slightly longer term [timeframe] than a short term [one]. And if you can identify and digest your weaknesses, you should go and improve them, and [make them] strengths. I would say… the young people, I'm happy to see many people I meet today are very energetic, and they wanted to make it. And if you... I do a lot of interviews, if you see young people who have that kind of energetic [personality] and know what they want to do, and with passion, they should be hired right away.

Craig Addison: You do a lot of interviews yourself?

Matthew Miau: Not now but I would say in the past few years.

Craig Addison: What are you working on now? Any sort of pet projects?

Matthew Miau: I'm kind of working on the small projects here and there to the kind of fill in the gaps. If I see an [opportunity] which no one is paying attention to, but has great potential, I probably want to enter it.

And if I don't have the knowledge or the know-how, I don't mind to invite someone to do a joint venture together.

Craig Addison: Do you have any idea what the next big thing might be, or the next big technology challenge?

Matthew Miau: It's very difficult to have a quantum jump of a... or a big breakthrough of something. I would say, I must say, I think is here, is this...it's a simple platform which allows everybody to get on. It's not one big thing. It's like in China it's called Internet of Things, which connects a few billion devices together, and is managed by a cloud environment. It's this environment which I think is the big thing and open sourced stuff which allows everybody [to be] connected any place, anywhere, and it's more than just a small mobile phone. So there's a... the environment is ready to build on this Internet of Things.

Craig Addison: If there's something else that you want to talk about? We can cover that, but...

Matthew Miau: No, I think we pretty much finished

Craig Addison: Thank you very much.

Matthew Miau: Thank you very much.

END OF INTERVIEW

