

**INTERVIEW
WITH
CHARLIE FINE
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SLOAN ORAL HISTORY SERIES**

C: Charlie Fine
B: Bob McKersie
G: George Roth

B: When did you hear about MIT and what brought you here?

C: I grew up in Massachusetts and I always thought I'd like to go to MIT as a student, as an undergrad. But when I was in high school we moved to Florida, so I finished high school in Florida and ended up going to college at Duke in North Carolina. I wasn't sure I could handle the winters in Massachusetts after spending several years in Florida. But MIT was always on my mind.

G: How old were you when you moved?

C: I was 14 and I had three years of high school in Florida, then I went to Duke, after which I went to Stanford for grad school and then I decided to come to MIT. I began my career at MIT in January of 1983.

B: So you came here right from writing your PhD at Stanford?

C: I received my PhD at Stanford and came in January 1983. I joined the Operations Management Group, which at the time was Arnolando Hax, Steve Graves, and Gabriel Bitran. They invited me to the group and immediately thereafter Arnolando moved to the Strategy Group, so it was just Steve, Gabriel and me.

We held down the fort until the Leaders for Manufacturing (LFM) program was started in 1988. I would say that a very important event in my career and my life was the creation of the LFM Program. My training had been theory and mathematical modeling, and I hadn't been exposed to the real world of business to a very

Int. w/C. Fine
5/7/15

2

significant degree. I hadn't been exposed to companies. At that time, it was hard and costly to get involved with companies. They weren't at our doorstep. You had to go sell yourself. When LFM came along, all the sudden MIT was paying the faculty to get involved with companies and there was a rich opportunity to get work on more applied problems. LFM opportunities dramatically changed the orientation of my career. In fact, I distinctly remember Steve Graves telling me, "If you want to get tenure, you are going to have to be engaged with the Leaders for Manufacturing program; you can't just be a theorist" — which was a different message than I had heard earlier. I jumped in with both feet.

The first few years I advised more LFM theses than any other faculty member. I really got involved, and taught every year in the LFM program for the first 15 years or so. For every single class I taught the core Operations class or the Manufacturing Strategy class. We also created an "Accounting for Manufacturing" class just for the LFM students. The LFM program became a central part of my engagement with the School.

I enjoyed the students. I enjoyed the thesis projects. We weren't using the term 'Action Learning' back in 1988 when the LFM Program started, but that was what we were doing. We were doing six-month thesis projects with the students in the field, and the faculty would spend time with them. I found that very enriching and rewarding.

My tenure case rested primarily on theoretical work that I had done, but my post-tenure work was more field work in the LFM program. Later, in the early 1990s, I got involved with the International Motor Vehicle Program. After *The Machine That Changed the World* was published by Dan Roos, Jim Womack and Dan Jones, I was asked by Dan Roos to serve as co-director to the International Motor Vehicle Program, which I did for much of the 1990s. The combination of having the opportunity to study automotive manufacturing through IMVP, and a broad range of other manufacturing industries through LFM, gave me a rich, rich lens into manufacturing and operations. It launched me into the practice side of management, which, very frankly, was missing in my PhD and my early work.

Int. w/C. Fine
5/7/15

3

In the late 1990s I published the book *Clockspeed*. One of my mentors at Stanford, Mike Harrison, said to me when I was a grad student, “If you ever write something and five years later you still think it’s good, then it’s probably time to retire.” At the time I was excited about the book but in retrospect, it was naïve. I thought I knew a lot then but now I see that I didn’t know that much. It was an attempt for me to connect the dots on the ten years of exposure to LFM companies and automotive companies. I tried to create a framework to think about manufacturing supply chains across multiple industries. The book was an important milestone for me to pull all of that together. Although, in retrospect, I think it could have been much better.

G: It had a pretty significant impact on your career.

C: Yes, it changed my career. LFM changed my career, and then the *Clockspeed* book changed my career again. After the *Clockspeed* book, I began to learn how to teach executives. I had only taught MBAs previously, and I enjoyed teaching MBAs. I found there was an executive audience for the issues in the *Clockspeed* book, and I started getting drawn into executive education teaching.

Interestingly enough, at first my exec ed teaching was outside of Sloan. I wasn’t invited to teach in the Sloan exec ed programs, but I was getting invitations to speak and create workshops for external companies where people had read my book and wanted more. These external opportunities enabled me to build a knowledge base and a skill base that I began to apply internally to the Sloan executive programs. That coincided with Sloan dramatically ramping up its non-degree executive education programs.

Bob, you probably remember, the Sloan once had the Senior Executive program, but that was shut down. One of the things that grew to replace it was executive short courses for non-degreed executive education, which we now do a lot of. Over the last ten years, I have gotten more involved in executive teaching and relatively less involved with the Sloan Fellows and a little less with MBAs. It is probably a natural lifecycle, that as you get older you enjoy teaching older students more. At least I have found that to be the case with me.

Int. w/C. Fine
5/7/15

4

B: Let me back up. All the thesis work you did with LFM, and then with the new version of LFM. You mentioned Arnoldo Hax, and he used to have this concept of a structured thesis seminar where you'd get a feed from the thesis into your own work. Did some of that happen for you?

C: Yes, I did. I sort of copied Arnoldo's models, whether he was the innovator of that model, I am not sure. I did have a number of structured thesis projects around supply chain design and supply chain dynamics, which led into some of the *Clockspeed* book ideas. Having the Masters thesis projects was a different sort of work. In essence, it was action learning research or action research, as opposed to a more traditional research that we would do with the PhD students in the OR Center and the PhD students at Sloan. The LGO/LFM theses served that role, as did the MBA thesis projects. Sloan Fellows theses as well, provided a path to exposure to a broad range of issues and enabled faculty to test ideas in companies. Again, that was a forerunner, perhaps, of what we do in action learning now. Arnoldo was being innovative in that space, LFM was being innovative in that space, as were numerous other people around the School.

B: We are always interested to how Sloan relates to the rest of MIT; particularly to Engineering. And you're in the LFM Program and its partnership and you are in the OR Center. Do you want to say anything about that continuing issue of how Sloan feels?

C: That is a really good question. I feel, similar to a number of the other Operations faculty, that I am relatively high on the scale of interaction with the Engineering School compared to some of the other groups in Sloan. I've probably advised between 75 and 100 LFM theses over 25 years as a Sloan advisor. Since they each have a Sloan advisor and an Engineering advisor I have gotten to know several dozen Engineering faculty over the years, as partners in the LFM thesis advising. That

Int. w/C. Fine
5/7/15

5

has been very enriching. Unlike many MIT faculty, I don't have any MIT degrees, although my Masters is in operations research from the Stanford Engineering School. So, I have an engineering degree but operations research isn't exactly the core of what MIT thinks of as engineering, although certainly our OR Center is an important link between Sloan and other departments at MIT.

I learned a lot of engineering by osmosis, by sitting with these engineering faculty as they were coaching our joint LFM and LGO thesis students. That was very enriching for me, as was my interaction with IMVP, which also had a lot of Engineering faculty. For a while I was involved with the Microphotonics Center, based in EECS, in which I was the only Sloan professor involved.

B: Can you say more? I don't know that center.

C: Lionel Kimerling started that center. He is in EECS Department. He came out of AT&T-Bell Labs. He's been at MIT 20-plus years after 20-plus years at Bell Labs. Microphotonics is about the technologies for fiber optics in telecommunication systems, primarily laser systems, fiber cables, etc. Kim put together a group of faculty to study the microphotonics industry and those technologies. He asked me to be the industry/supply chain/Sloan person. I learned a lot about the technology from that, and I got interested in the telecommunications and media industries as a result.

In 2001 or 2002, I was a co-founder of the Communications Futures Program (<http://cfp.mit.edu>), joint between Sloan, the Media Lab and CSAIL. The Communications Future Program was launched to look at the Communications and Media Value Chain through the lenses of both Sloan modeling work (and particularly my own work) and the work of some of the more technologically oriented people, such as Dave Clark in CSAIL. For me, the Microphotonics Center was an introduction to the world of communications technologies, which led to the creation of CFP.

After spending time with people in the Microphotonics Center, I got to know the landscape of the telecommunications, media, and electronics labs across campus. These labs struck me as focusing on highly interdependent issues and yet each

Int. w/C. Fine
5/7/15

6

seemed to exist separately at MIT. You had different people at MIT looking at radio signal research and end device research and protocols for sending signals and a wide range of other issues. I identified about ten labs that were doing research on different parts of the Communications Value Chain, yet no one was looking across the Communications Value Chain. I drew a picture of the Communications Value Chain, and I brought that picture to each of the ten lab directors I had identified and said, "Here are all these different components, and here are all the different labs that study the different components, and here the people who don't seem to talk with each other very much."

I said "Let's create a program that looks across this whole value chain," and that became the Communications Future Program (CFP). I asked each of the lab directors if they wanted to sign up for this -- in the end I signed up a handful.

G: My experience in having worked with faculty in the Engineering School was that there is a pretty clear model for engineering faculty: get your grants, get a group of PhD students, postdocs, and some Masters students, and attack a problem. The incentive for them to play in a broader project like CFP really depends upon their own attitude and desire to have a big impact.

C: Yes, and not everybody wanted to play. But it created a platform for us to think more systemically about the end-to-end value chains in communications and media, and that has been quite interesting. Those connections grew out of my exposure and comfort with a broader range of engineering faculty

More recently, I was the founding co-director of the Tata Center at MIT. I had spent some time on research and teaching in India. My Indian connections started about ten years ago when I was asked to do a consulting project for the Tata Corporation, looking at 80 different businesses across their empire. Increasingly, India was being exposed to more global competition; the competition for the Tata companies within India had not been intense, and Tata was number one in almost every industry they played in. But more recently, getting global competitors were entering India. Tata found they

Int. w/C. Fine
5/7/15

7

weren't fully prepared to compete with the outside global companies entering India. Somebody in the company found my work and said "Your work on *Clockspeed* is an interesting opportunity for us to try to use one framework across all of our companies. We have companies with a lot of different clock speeds, but with the same issues across those companies."

I ran a few workshops with multiple Tata companies. I got particularly interested in Tata Motors. At the time they were building a new, innovative small car, the Nano, and I started talking to them about the possibility of using lightweight materials. They hadn't thought about lightweight materials at all.

G: And you were in the Materials Lab at MIT. We missed talking about that; I thought you did that....

C: Yes. One of the faculty areas I got to know was the Materials Systems people and Joel Clark. That group does a lot of work with lightweight materials and applications to automotive lightweighting. I started doing some work in automotive lightweighting, and how one might use India as a place where automotive lightweighting might be aggressively investigated. There is a long story there, I won't go into the story, but it led me doing some research in India which led to the Sloan School asking me to play a role with the Indian School of Business.

The Indian School of Business (ISB) was founded in 2001, with Wharton and Northwestern, but they decided to open a second campus and create a manufacturing program about five years ago and asked Sloan if we would partner with them to help create their manufacturing program. And since I had been doing work in India, the Dean's Office asked me if I would be the point person between the Sloan School and the ISB manufacturing program. I ended up teaching a number of courses at ISB (in both Hyderabad and Mohali) and helped designing a curriculum for ISB in manufacturing.

That led me to get involved with an institute-wide effort (coordinated by MITEI, the MIT Energy Initiative) to create a proposal to do a more general set of

Int. w/C. Fine
5/7/15

8

projects in India and negotiate a grant from the Tata trusts. We ended up with about 10 faculty across campus working on this proposal. I went to one of the meetings. The faculty involved seemed to not be converging on a proposal concept that MIT could bring to the Tatas. My contribution to that group was to conceptualize a "productization" of an MIT offering. I said: "Why don't we create an LGO-like program where we propose to use the funding to support graduate students who build their theses around projects in India." We would require students to spend their summers and their IAPs in India. We will take Master's and PhD students from all across the Institute, and give them two-year fellowships with the provision that they have to do this fieldwork in India."

We pitched that to the board of the Tata Trust. They gave us a \$60 million gift. We launched that program, which is doing very well right now. We have 50+ funded students. As a "reward" for helping to conceptualize the program,, I served as co-director for several years. I just stepped down from that when the Asia School of Business project in Malaysia ramped up.

B: Before you go to Malaysia, one question we often ask is: have you taken sabbaticals and what did you do with sabbaticals?

C: My sabbaticals were almost independent of all this. My first sabbatical I took at Stanford. I was just newly tenured, I had done my PhD at Stanford, I wanted to go back. I felt that Stanford Business School was my intellectual home and I loved it. When I got back to Stanford (eight years after finishing my PhD there), I felt disoriented. I didn't fit in any more. It wasn't Stanford that had changed! It was I who had changed. When I left Stanford I was an operations management theorist (if that's not an oxymoron). When I got back to Stanford, I wasn't a theorist any more, and most of my colleagues were still theorists. I felt the disconnect between how they thought and how I thought. It was quite interesting. I taught there, I interacted with my colleagues, but I didn't go back to the trajectory I had been on before. I had "gone native" at MIT. To me, native at MIT means "*Mens et Manus*," blending theory and practice.

Int. w/C. Fine
5/7/15

9

B: Did they think you had sort of sold out to practicality or something?

C: No, I don't think so, but it was just a different orientation. I couldn't see the differences in orientation until I got back to Stanford and saw how much I had changed by being exposed to MIT. The *Mens et Manus* culture at MIT makes it quite a different place from many other universities.

My second sabbatical I took at the Technion in Israel. I shared the MIT model of LFM, and helped bring more manufacturing strategy thinking into their curriculum. They were in the process of transitioning from an industrial engineering department to a business school, and working on how to integrate manufacturing into a business school.

My third sabbatical I took at Harvard Business School, partly because I had four kids at the time and they were all in school. It was really hard to bring three kids to Israel, and I thought it was going to be even harder to bring four kids someplace far from Boston, so I just went across the river. I taught "Technology and Operations Management" in the HBS MBA core, using the HBS case method with the whole core teaching team. I learned a lot about how Harvard teaches, and what they do in technology and operations. Participating in the a large teaching team was fun and interesting. I enjoyed that. However, I mostly stayed involved with my MIT activities while I was at Harvard. I didn't really separate from MIT.

B: And PhD students along the way?

C: I had a block of PhD students during the time I was doing the *Clockspeed* research. Students working on supply chain strategy. One of them, Ed Anderson, who went to University of Texas at Austin; Jeff Parker went to Tulane and then Dartmouth, and Nitin Joglekar went to BU. Chris Couch went to Toyota for about 10 years and later became CTO at Lear Corporation.

Int. w/C. Fine
5/7/15

10

More recently, I have supported PhD students , such as Chintan Vaishnav and Sergey Naumov, through the Communications Futures Program. Chintan became a senior lecturer at Sloan working with the Tata Center.

Let me talk about my two current projects. One is the Project to develop the Asia School of Business in Malaysia and the other is the development of research and curriculum on Operations for Entrepreneurs. I will tell you about Operations for Entrepreneurs first. At Sloan School we have a dozen or more courses in entrepreneurship, none of them much related to Operations. We have Marketing for Entrepreneurs, we have Finance for Entrepreneurs, and we have Team Building for Entrepreneurs. But we have very little on how to build operations capability in an entrepreneurial firm.

I talked at length about this with Ed Roberts, with Fiona, with Scott Stern, and they all agreed, we don't know much and we don't teach much about operations for entrepreneurs. If you look at our operations curriculum, we have a lot of courses, covering many aspect of operations management, but nothing for entrepreneurs. For the most part, we have been teaching operations for mature organizations. I concluded that we had a hole in our knowledge base and our curriculum and I wanted to try to fill that hole.

I had no formal training in entrepreneurship. However, in 2001-02 I was involved in one MIT \$50K competition project. I was an advisor to the project team that created the company called Greenfuel. We came in second out of 140 teams that year. That project constituted the entirety of my education in entrepreneurship. Once I decided to invest in the Operations for Entrepreneurs project, I began by writing (with students and colleagues) over a dozen case studies on operations for entrepreneurs. This was combined with interviews of senior people that had been serial entrepreneurs over an entire career. I asked each of them "What did you learn about operations over time?" The desire was to seek principles of operations for entrepreneurial firms that might be different from the principles that we had for mature firms.

Int. w/C. Fine
5/7/15

11

I have been building a framework to explain what we are learning from this project. This is a work in process. I have two PhD students working on that now doing both modeling work and field work. It is fun, it is interesting, I'm really enjoying it, and I feel like I'm connecting to another part of the School, the entrepreneurship side, which I hadn't really connected to previously.

Then the opportunity came to be an entrepreneur, which is to be the CEO of a startup, which is called the Asia School of Business in Malaysia. The MIT Sloan Dean's Office, in fall 2014, asked me if I would look at the opportunity that they were pursuing to collaborate with the central bank of Malaysia – Bank Negara Malaysia – to create a new school of business that would have Sloan DNA in terms of the rigor of the Sloan core curriculum, the rigor and relevance of the research, the action learning emphasis, BUT with a strong Asian flavor. Southeast Asia has about 650 million people, but outside of Singapore, the region really doesn't have a very strong contingent of business schools. The characterization that has been made of the Singapore business schools is that they all “look west,” that is, they all aspire to follow the American and/or European model of a business school. They may not aspire to be Asian particularly. The idea for the Asia School of Business is to create a business school that has MIT Sloan DNA but Asian DNA as well, that develops a curriculum that has an Asian focus -- Asian cases and Asian research -- that can educate students from the West who want to learn about Asia and have careers in Asia, but also educate students in Asia who want to be *in situ*.

Many Western corporations want to expand their business in Asia, but they don't have people in their organizations who understand Asia well. Our intent is to have multiple action learning projects for each student over the course of their 18 month program. We will expose them to the cultures and business environments of Asia.

Asia is a large heterogeneous place, and you can't learn all of Asia in two years or even two lifetimes. Nevertheless, we can give aspiring managers in Asia a head start. And we are going to do some Asia-centric research. I have been working with Arnie Barnett to create a project on aviation safety in Southeast Asia. It is very topical, and there is a lot to be learned about how the rapidly growing, developing economies where

Int. w/C. Fine
5/7/15

12

aviation plays a major role, how do they invest in safety and technology and training? It is quite different. There are many parts of SE Asia, for example in Indonesia and the Philippines, where the population density is spread over thousands of islands, so they have many flights of small airplanes in and out of small airports. Airlines can't put the same kind of (expensive) technology in every airplane and airport in these regions that they can put in large metropolitan areas. So, what is the right strategy for technology investment in planes and the airports and training for the pilots and crews and the airport personnel?

We are hoping to develop an aviation system study for the region. That is an example, in my view, of creating a research study that is relevant to the region. It is research in Asia, for Asia, that hopefully will have some implications for some other parts of the world as well. It is not just transporting a Western research agenda to Asia.

B: We are nearly out of time. I have to ask one question about Malaysia. Given the "gorilla" of China and its aspirations, and how will the blossoming of this flower in Malaysia will take place without somehow relating to a competitive feeling from China?

C: Relatively speaking, both India and China have seen more investment in business schools than Southeast Asia. Southeast Asia has 650 million people itself. On the one hand it's in the economic shadow of China; on the other hand, it has an opportunity to grow itself to a significant degree.

I am told that some Malaysians are actually in high demand for the management jobs in China because they speak English and Chinese well. They tend to have better and more training in English than people who grew up in China. Malaysia is highly multicultural, many people learn English.

G: Is Malaysia a hub for Indonesia, Thailand, and other Southeast Asian countries?

Int. w/C. Fine
5/7/15

13

C: Absolutely. It is a hub. And the Central Bank, Bank Negara Malaysia, which is our fiscal sponsor, has been an innovator in financial regulations to support stable growth. Malaysia has been growing over 5% a year for the last 15 years or so. They have had an very well-managed economy because of the Central Bank Governor, Tan Sri Dr. Zeti Akhtar Aziz, who has been in place the entire past 15 years. Malaysia has had strong leadership in financial policy and monetary policy, which helps them. They are a banking center. They are also the world center for Islamic finance. China is a giant, no question about it, but there is room for other players, and Malaysia has already created capabilities and economic opportunities for themselves and will continue to do that.

B: George, ask whatever you want, and then we have to stop.

G: Yes. What was your dissertation on?

C: It was about the economics of quality improvement. How can you have both higher quality and lower costs.

G: The other question: as you look back over the time, you have done an amazing amount of things in programs. Is there a particular contribution that you are proudest of? Do you think it is still coming?

C: I feel the *Clockspeed* book was an important piece for me in terms of integrating a broad range of thinking around how you think about operations strategy; its dynamics-centric and value-chain-centric approach to operations strategy. At the time I think it was viewed to be novel, and interesting, and distinctive. I would say all the work I did in communication futures and 10 years after that book, was all adding to that but the book was the important piece there and I was fleshing out details. The Operations for Entrepreneurs work is new and different and I am very excited about that.

Int. w/C. Fine
5/7/15

14

B: Eventually a book?

C: Yes, but for that, the best is yet to come. Now I have working papers in process and PhD students in process but the full work hasn't come to fruition yet. Earlier in my career, and this is the work I got tenure for, I was able to articulate models of complex phenomena in operations in manufacturing, phenomena that had heretofore been primarily discussed in a qualitative terms, and I was able to quantify the relevant issues. I think this was the case both in the quality improvement space in the economics of flexibility. That was the work I got tenure for, and at time the work showed how to formalize and structure something thinking that heretofore been more qualitative.

B: OK, great story. We covered a lot in 40 minutes.

END OF INTERVIEW