

The Tale Behind the Triple Helix: An Interview with Professor Henry Etzkowitz

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Professor Henry Etzkowitz is a scholar of international reputation in innovation studies as the originator of the “Entrepreneurial University” and “Triple Helix” concepts that link universities with industry and government at national and regional levels. He serves as the President of the Triple Helix Association (a unique international network of several hundred scholars and practitioners of university-industry-government relations) and is the cofounder of the Triple Helix International

Conference Series, which has produced a series of books, special journal issues, and policy analyses since it started in Amsterdam in 1996.

Professor Etzkowitz is currently a Senior Researcher at the H-STAR Institute at Stanford University and Visiting Professor at the School of Management of Birkbeck College at London University and Edinburgh University Business School. Prior to coming to Stanford, he held the Chair in Management of Innovation, Creativity and Enterprise at Newcastle University Business School in the UK and served as Visiting Professor in the Department of Technology and Society at Stony Brook University.

Professor Etzkowitz has authored numerous publications and books, including *Triple Helix: University-Industry-Government Innovation in Action* and *MIT and the Rise of Entrepreneurial Science*. He also coauthored *Athena Unbound: The Advancement of Women in Science and Technology*, *Public Venture Capital*, and *Universities and the Commercialization of Knowledge: New Dimensions for the 21st Century* (biographical sketch adapted from https://hstar.stanford.edu/3helix_about_us).

TI: You are well known for originating the Triple Helix and the Entrepreneurial University concepts, which are important concepts for the better linking of universities, government, and industry. Can you tell me more about how those ideas took shape, how you developed those ideas, and what implications you think they have for the future?

HE: How they took shape really came out of experience and analyzing experience that didn't fit the previous sociological models. My experience came from being invited to come out to California to be an organizational consultant to a firm that was trying to develop solar photovoltaics technology in the mid-1970s, after the first energy crisis. The scientists in this firm, whom I interviewed, were physicists who had made money from stock options in the semiconductor industry. And they said, "We don't write articles! We go for patents." They didn't fit the model of the academic scientist; on the other hand, they also didn't fit the model of the industrial scientist, caught up in a large bureaucracy, told by management to adjust their research to the needs of the firm, losing control of ends if not control of means. Because the scientists were largely funding this firm, they did have a say in the course of direction of the firm. I began to think of them as entrepreneurial scientists and defined that concept. The consultants to the firm from the UCLA chemistry department didn't seem any less entrepreneurial. They were looking for any source of money to fund their research—from consulting for companies like this one to different government agencies—they seemed just as entrepreneurial as the scientists who have been working in solar companies and startups in the industry. I began to look at this phenomenon in the university. I began to get funding from the U.S. National Science Foundation for small projects; we did our first studies of university departments starting with computer science, biology, and physics at Columbia in New York. I wrote an article: "Entrepreneurial Scientists, Entrepreneurial Universities, and American Academic Science." I didn't realize it at the time, but it was the first article on the topic, and it really defined the idea of the entrepreneurial university and entrepreneurial scientist. It's so far back that when people write in this field, they [...] refer to the work in the 90s, but they usually don't go back. I defined this topic very early on, and I stayed with it. I sent in a paper to the sociology meetings, to a session run by a very famous sociologist [...] Joseph Ben-David of the University of Chicago, who wrote some of the key books on the development of universities in the West, and so on. And he wrote back to me [...], "You know, your paper is very interesting—of course I accept it for the session and the ASA," but he then said, "How can you study this topic without looking at the history of the Massachusetts Institute of Technology?" I had to agree—absolutely right.

So I applied to the National Endowment of Humanities for a fellowship and I went to the History of Science department of Harvard to study at MIT. I was doing interviews, but I would also peruse the archives. For example, in the Compton papers—President Compton was president

from the 1930s to the 1950s—I saw these letters between Compton and the governors of New England about something called the New England Council. This was an organization that the governors had set up in the 1920s to call together the leadership of New England. New England was already in depression before the Great Depression, losing industries to other parts of the country. And so the leadership was called together. Usually, from that you get government and industry: public-private partnership. In New England, universities are an important part of the social landscape. It's not just Harvard and MIT—there're dozens. You had an implicit triple helix in the New England Council—university, industry, and government. If you looked at the board of directors of this council, it was almost exactly three equal parts: university, industry, and government.

During the first years [of the New England Council], they went through all the usual ideas of how to renew a region, which we're still familiar with today. Get a large corporation to relocate a plant—today we call it FDI, foreign direct investment. Then, you sent a delegation to Detroit to build an automobile plant in Boston. But these plants were too far away from sources of raw material, lines of distribution. So that didn't work. Next idea, still very commonplace today: let's raise the level of local small and medium size firms, SMEs. They would commission an analysis of each of these strategies, not just jump in and do it, maybe because of the presence of the universities in it. Anyway, their conclusion was that these SMEs were too far back technologically; some firms were making instruments out of whalebone in the plastics era. In that context, Compton, the president of MIT, proposed another strategy: to develop new firms based on research at the university. This had already been going on informally from the late 19th century at MIT and Harvard. Compton and the administrators of MIT thought that this could be made into something systematic. Compton, during the Depression, was the chair of President Roosevelt's scientific advisory committee. They called together scientists for advice on the role of technology. But the board was split: Compton wanted to use technology to put people back to work, but in that time, the general *ethos* in the public and among the political groups was that technology was the cause of the problem. Compton's ideas weren't accepted at the national level. The science advisory board closed down. The report was never published or released officially. So he went back to New England, and at the meetings of the New England Council, he proposed the same policies.

In New England, Compton was [still well respected]. So they did studies and took it quite seriously. From those studies, they came to the conclusions that they had the resources in terms of research and had the necessary financial resources, but those financial resources were tied up in large banks and insurance companies. The rule at that time was the so-called "prudent man rule": you could only invest in large corporations and you couldn't make risky investments because you're holding the money in a trust [that funds] widows and orphans. The large corporations tended to

be in other parts of the country, so this rule wasn't doing New England any good.

They decided to invent a new type of organization that would invest in these new, risky technology ventures. Today, we know this as the venture capital firm. This is what I wrote about in the book *MIT and the Rise of Entrepreneurial Science*. At first, it was a series of papers and when I was doing the study in the mid-80s, American Research and Development (ARD) was still around. I could interview the second generation of people at the firm itself and the people who had gone off to found other venture capital firms in Boston. As well as the business archives, the case studies of the firms are also preserved because the head of ARD was an academic from the Harvard Business School. He preserved the complete records of the firms—all the interactions and meetings between ARD and the firms they were investing in. At that time, he was the only academic in the business school who was interested in creating new ventures. Today, we call it entrepreneurship. He was training people to go out and be entrepreneurs, the first generation of venture capitalists. In his spare time, he was the head of this venture firm, ARD, the first one. It wasn't a venture firm in the way we know it today. Anyway, that is not how I came first to analyzing university-industry, but the concept of the triple helix was still implicit—I didn't yet make it explicit. It wasn't until I was invited to Mexico by colleagues at the autonomous University of Mexico, who were beginning to study university-industry relations and invited me to be an expert on it. We had a workshop and during the break, everyone was talking about government in Mexico. Government is everywhere in Mexico—universities are a part of government, industry is organized by government chambers that are directed collectively by government. So, you couldn't think of university-industry in Mexico without taking into account the role of government. So I thought, university, industry, government, and a light bulb went off—*triple helix*.

I know where I got it from—from reading Watson's biography about the double helix. In that book, there's a triple helix that didn't work for biology, for DNA. I like to say biology is simpler than society. A double helix worked to model DNA, but we need a triple helix to model society. In fact, I think the triple helix idea is much broader than just innovation—it is really a general sociological phenomenon. A social scientist trying to make media into a neutral, experimental thing washes out the most important thing about the phenomenon, which is what's wrong with American sociology in general. But I came out of a humanistic underground of sociology in this country—European scholars who left to flee the Nazis, who were theorists and quantitative analysts, students of Max Weber.

I saw this from classical social theory: there's a work by Georg Zimmel on triads. I adapted that, because it's these triadic interactions. In a dyad, you either come together or split apart: love is the basic dyadic

relationship. Triad: moderated by the third element, the mediator. Everyone knows about the effect of a child on a marriage. Even if people don't care for each other anymore, they stay together for the child. Mediating elements are a way to find compromise. But the way that some look at things in dichotomies meant they couldn't see the effect of the triadic element, of the effect of the media. Social science tends to dichotomize the world. I look at it in terms of dualistic barriers. That's why triple helix is not so much accepted in this country in the social sciences but instead is very much more important in Europe, Asia, and Africa, with their different analytical traditions. It doesn't fit easily within American social science analysis or American political analysis. This is really what I'm coming to as an analysis, as we are talking. I want to write about the triple helix idea on a broader level. It's already been moved a bit broader, from analysis of innovation to an analysis of sustainability.

Triple helix of innovation: university-industry-government; triple helix of sustainability: industry, government, and the public, as the interaction. So you have different triple helices. Typically, what most people do when they want to expand the model is to add a fourth helix. They'll say, "We should add labor as the fourth helix, you know, that's an important element," or venture capital. I've always been wary of that because you lose the triadic pathways of the model, which people often forget is the key to the model. They just think "university, industry, government," but they don't realize the deeper implications of that in terms of the kinds of interactions that take place. As with more theories, when it gets broader and more well known, it gets simplified and you lose the richness. There are people who've added the fourth helix of civil society and I agree that's very important, but my conclusion is that it's too important to make simply a fourth helix. Civil society is the platform of an optimum triple helix—you can have bottom-up input as well as top-down. In our model, we have three different varieties, one of which is status society, where top-down control by government is without civil society, with less room for the bottom-up because you always have it to some extent everywhere, even if it's not encouraged. It's discouraged not only in society, but also in the educational process—people are taught by rote and are not encouraged to be creative thinkers. My argument is that civil society is the platform of the entire model that leads to an optimum triple helix with bottom-up impetuses as well as top-down ones, meeting in the middle in a much more creative way. This is what we saw in Brazil, where you have civil society, especially when they overthrew the military in the mid-eighties. This happened especially from the universities opposed to the military regime. When they won, the oppositional groups were still around [and they thought], "Well, now we've kicked out the generals, we have democracy—what should we do next?" One thing they wanted to do was to contribute to the development of the country with their academic skills. So, they [came] to the States and discovered various innovation mechanisms like incubators and science talks, and they brought those back

to Brazil. In bringing them back to Brazil, they adapted them to Brazilian reality, and they reinvented the incubator. When I first went to Brazil in the late eighties to meet colleagues in Rio de Janeiro who were interested in STS, specifically in network theory and also in university-industry, we started looking at the incubator phenomenon in Brazil. The first thing that struck me was that there were more incubators in Rio de Janeiro than in New York. Eventually, I figured it out: in the States at the time, incubators were seen as something to commercialize high-tech university research. And that was the model that was imported to Brazil. But at that time, they very soon ran out of high-tech stuff to commercialize.

They realized that the incubator model could be applied not only to high-tech, but also to low-tech firms, medium-tech firms, no-tech firms. Teaching poor people [...] how to organize cooperatives. They realized implicitly that an incubator really is not just part of the third economic development mission of the university—it's part of the original teaching mission of the university. But what is it teaching? It's teaching a group of people to work together as an organization. They understood in Brazil the true essence of the incubator. I realized this when I was invited to a graduation ceremony at the Pontifical Catholic University of Rio de Janeiro. It was a graduation not of individuals, but of firms from the university's incubator. The rector made a speech about realizing dreams. One after another, a representative of each firm came forward to say what [they had accomplished after] two or three years in the incubator. And [when I talked to them later] they were surprised— [they remarked], "You don't have graduation ceremonies in the states?" They realized that they were doing education there, but we didn't see that here. We only now, more recently, see these as part of the educational process here, with the lean technology courses and all this. That came much later here, but it started much earlier in Brazil. Anyway, that was the answer to the question, "Why [are there] more incubators in Rio than [there are] in New York?" Because they had [...] applied the phenomenon to a much broader range of issues [...]. They not only had technology incubators and [...] cooperatives, but they also had arts incubators, cooperative incubators, social incubators, all kinds of different applications of the model.

TI: So is this the idea of the entrepreneurial university? Is this the inception of that, almost?

HE: I don't know about being the inception of the model. The inception of the model is really looking at the historical origins of MIT and how it developed as a university. Various stages of that—inventing the various mechanisms, consulting—it's all in the MIT book, including the stages of developing all of these mechanisms which then spread throughout American academia and across the world. One example is the invention of the one-fifth rule: one day a week, a professor can go out into society and do whatever they want—earn money, advise social organizations,

whatever, no questions asked. This rule came from a controversy at MIT. When they wanted to do research, they hired consulting engineers who at that time would be the ones that a firm would hire to invent something new. They became professors at MIT, and when they were professors, they kept doing their consulting. The traditional professors said to them, “You’re a professor now—stop this stuff! That’s not right, that’s not your job, you’re a teacher.” The response given was, “Our consulting makes us better teachers. We bring real-life examples into the classroom.” A committee was formed for this issue, and twenty years later they come back, finally, with a report. The report said consulting shouldn’t be allowed. By that time, the people who were the students of these consultant engineers had risen to high positions at MIT—they were running the school. When they got this report, they said, “This isn’t how I was trained to be an academic at MIT!” They came to a compromise. They invented this one-fifth rule, and nobody knows where it came from, because it’s taken for granted. Even at MIT, they don’t know they invented it—they’re not historians, they’re engineers!