Henry Chesbrough created the theory and coined the term "open innovation" and his insights into open innovation models have restructured research and development and created new landscapes of business development and innovation strategy. Henry Chesbrough is a professor at the Haas Business School (Garwood Center for Corporate Innovation), UC Berkeley, and executive director for The Center for Open Innovation, which focuses on conducting research, publishing articles and developing teaching materials around open innovation. Professor Chesbrough spoke with ExecEd and discussed his thoughts on open innovation and more.

_____

ExecEd: I'm excited and honored to have Professor Henry Chesbrough with us today. Professor Chesbrough is the leading scholar and practitioner of open innovation, a term he coined back in 2003 with the publication of his book "Open Innovation: The New Imperative for Creating and Profiting from Technology." Since then his work has been cited by thousands of academic articles and adopted by the majority of large firms in the US and Europe. He's been called the godfather of open innovation by the "Economist" and named one of the top 50 innovation leaders by "Scientific American." Professor Chesbrough has written countless articles, appeared on TED talks, and followed up his initial breakthrough book with several more including the more recent "Open Services Innovation," and "New Frontiers in Open Innovation."

Professor Chesbrough is currently a professor at the Haas Business School, Garwood Center for Corporate Innovation, UC, Berkeley and executive director for the Center for Open Innovation, which focuses on conducting research, publishing articles, and developing teaching materials around open innovation. He's also the faculty director for the UC, Berkeley Executive Education program, Corporate Business Model Innovation. Chesbrough received his BA in economics and engineering from Yale University, his MBA from Stanford University, and his PhD in business and public policy from the University of California, Berkeley, Haas School of Business. Welcome Dr. Chesbrough. Thanks for joining me today.

Henry Chesbrough: It's great to be here. Thanks.

ExecEd: Let's get started with some basic terminology to set a level playing field

here. In terms of the words that you coined back in 2003, 'open innovation,' can you just tell us what open innovation paradigm means at the highest level? What's it all about?

Henry Chesbrough: Sure. When I wrote this book in 2003, I did a google search on the term, open innovation, and I got back a couple hundred links at the time. What characterized all these links was that the word 'open' and the word 'innovation' had appeared near each other in a sentence, like, "This company opened an innovation office over here." There was really no meaning to the two words side by side. I did the same search a decade later on the 10th anniversary of the book, and by then there were more than 450 million links. It has just exploded.

Part of that explosion creates some confusion because, just as Eskimos have many, many words for snow, not everybody means the same thing with open innovation. The good news is it has exploded and gone way past anything I ever thought could or would happen. The bad new is it's a little bit tricky to be clear on exactly what people mean when they use the term.

Let me tell you what I mean when I use the term. At its highest level, open innovation is a recognition that no man is an island and we can't do it all ourselves. Organizations should make much greater use of external ideas in their own innovation activities along with their internal ones, and equally, and this is the part that often gets left out, unused and underused internal ideas should be allowed to go outside for others to use in their innovation activities. So there's an outside in part to open innovation where you take things from the outside and bring them in for yourself. Then the second path, which is the inside out, where things from inside go out for others to use as well. That's what I mean by open innovation.

ExecEd: Some people might say, "Oh, that's open source." Can you clarify for us what the difference between open innovation and open source is?

Henry Chesbrough: This is where we get back to the Eskimos because, yes, a lot of people say open innovation means open source, and it's true that there's a relationship between them and they share some important attributes. Particularly what they share is the idea that opening up can be a powerful way to generate new possibilities by going far beyond the usual suspects, so we all share that. Where open source parts company with open innovation is that there's no business model for open source. Indeed, the idea of open source often precludes a business model.

Whereas in the open innovation model, what you bring in from the outside and what you let go to the outside depends entirely on your business model. That's, I think, the principal difference between the two.

ExecEd: Can you talk to me a little bit about your ... I think it was maybe your third book, "Open Services Innovation." You talk about avoiding commodity traps and you talk about Amazon and GE being great examples. Can you give us a little window into that?

Henry Chesbrough: Absolutely. As I mentioned to you before, I used to be in industry myself. For about 10 years I worked in the hard disc drive industry for a company called Quantum, and Quantum fell into the commodity trap. What happened to us is we were innovating hard disc drives starting at 10 megabytes and then ultimately to dozen and dozens of gigabytes, and our sales went from about 40 million when I joined the company to $7 billion at our peak. The sales did great, but our margins got smaller and smaller and smaller over time. Even though we were innovating just as hard and expanding capacity, increasing performance as we had in the past, the market was no longer rewarding us the same way it used to.

This is where you get a commodity trap where you cannot differentiate enough for customers to continue to reward you. This is where the idea of the book "Open Services Innovation" comes to play. If you focus only on hardware, only on product, you're subject to a commoditization trap yourself. For many companies, it might be competition from China. Today, the world's manufacturing workshop and the wages being paid in China aren't so high. It's really hard for you to differentiate enough to earn a premium against that kind of competition.

The way out of the commodity trap, you still have to keep innovating, you still have to work on your costs, but that's not going to get you out of the trap. What gets you out of the trap is paying more attention to your customers, what do they with your products, and how you can help customers do that better, more effectively, more cheaply by more of it with them and for them, so you're adding services to the products you used to sell.

GE is a wonderful example of this. They make these huge aircraft engines that sell for tens of millions of dollars each. These engines are going to have a useful life of 30 years before they're finally retired. Most of the profit in those engines is earned not at the time of sale but over that 30-year service life of the engine. What GE has

done is they still will sell you the engine for tens of millions of dollars if you want to pay it up front, but they now offer you a second choice that they call power by the hour. You can essentially rent power from an aircraft engine per hour which means you only pay when you're using the engine. From GE's standpoint, all of the servicing that that engine's going to need becomes part of the contract for power by the hour. So GE makes more money, but the customer's getting a good deal, too. Because instead of putting all your cash up front, GE is carrying that asset on its balance sheet, and you basically pay only for what you use rather than having to pay for the whole thing at the beginning.

ExecEd: How about Amazon? How would that be a good example of this?

Henry Chesbrough: Amazon does at least two wonderful things that are relevant to services innovation and open service innovation. One is if you go on the Amazon site and shop as I do, as I suspect everybody listening to this also does, you'll see there's lots of input and lots of feedback, not just from Amazon, not just from the manufacturer of what you're buying, but from other customers that have used it or other commentators who have reviewed it. So as a consumer, you get a lot of information, but Amazon doesn't have to pay for that. They get it essentially for free. We get more information; we make better purchase choice without having it cost Amazon anything. So that's very cool.

The other thing Amazon does that has become a new growth and more profit for the company is the same infrastructure they use to process all these transactions that they handle, they've bundled that and made that a service, Amazon Web Services. Like the GE engine where you can get power by the hour, in Amazon Web Services, you only pay for the server capacity that you use. The rest is on Amazon. You only pay as a consumer of that for what you need yourself. This has been a real growth accelerator for Amazon. Again, it's a great value for companies because you only pay for what you need, and everybody wins, and it shows how Amazon is staying a step ahead of all the competitors in online retailing.

ExecEd: I'm curious. Is that what the rental car industry is about then?

Henry Chesbrough: This is a new trend in the rental industry and I would say even the sharing economy more generally where previously when you bought a car, you paid 100% of the purchase price. You pay 100% of the insurance. You got to garage the thing. You got to park the darn thing. Here in Berkeley the parking may be one

of the worst parts of this. You pay 100% of all these costs. They're fixed. Then you use a car a little bit during the year.

I drive about 12,000 miles a year and about half of that's highway driving, about half that's city driving. Let's say I average 30 miles an hour. Simple math says I'm operating my car about 400 hours a year, but there are more than 8,000 hours in a year, 365 days, 24 hours a day, so I'm using my car less than 5% of the time but I'm paying 100% of all those fixed costs. If I can find a way to utilize the other 95%, those fixed costs get spread over more usage. The fixed costs don't go up. They just get shared. This, I think, is what sometimes is missed in the sharing economy is part of what's being shared is not simply access to the asset. You're sharing the fixed costs. That makes it more economical for everybody.

ExecEd: Is Airbnb an example of that?

Henry Chesbrough: Absolutely. Airbnb would be another example of this as well. Initially, why is 'air' in the name Airbnb? The reason Airbnb is called Airbnb is it used to stand for Air Bed and Breakfast, and the initial idea was you would have people on your couch or in your apartment with you there and you would provide an air mattress to them to sleep on. Indeed, the early users of Airbnb, the hosts were given air mattresses by the company. That's why the 'air' is in the name Airbnb.

ExecEd: Fascinating.

Henry Chesbrough: With time, they've learned that actually people don't really want to be in the apartment with you there most of the time. They would rather be out and have you have the apartment to yourself. Nobody needs an air mattress. They're happy to sleep on your beds as long as you've got nice, clean sheets.

ExecEd: Fascinating tidbit of history there for a company that's only been around a few years, but no one probably knows.

Henry Chesbrough: It's been just long enough that a lot of people have forgotten even the little history they've had.

ExecEd: When you talk about service platforms and you need a good service platform to succeed, is that what you're talking about, or can you explain to us what a successful platform is?

Henry Chesbrough: The service platform resolves a fundamental tension in this idea of adding services to be more intimate with your customers to escape the commodity trap. Basically to make things affordable, you want to standardize them so you can share and reuse as much as possible. The problem is we don't all want the same thing. The best way to give us what we want is to have everything be fully customized, get exactly what you want, which may be different than what I want.

The tension between standardization and customization is where the service platform comes in. You embed in the platform the things that can be shared and reuse widely, and then you extend off of the platform to deliver the customized things that individuals want. A quick example of this would be all the apps on our smart phones. The smart phones themselves and the app store that deliver them are the platforms, but none of us have the exact same suite of applications on our smart phones nor do we have to. We get the things that we want but we get them in a way that makes it very affordable for us as well. So that's the idea of a service platform.

ExecEd: I'd love it if you could explain, too ... I know you've been quoted talking about living labs. Obviously it must apply to open innovation. Can you give us a little background on what that is?

Henry Chesbrough: Living labs is something that's really emerged out of Europe. I had the great pleasure of spending nine months last year in Barcelona, which if you have to leave Berkeley, Barcelona's a great place to spend some time. One of the challenges in Europe, they're very envious of us here in the US especially in Silicon Valley for the magic we have of turning all these great ideas and research into new ventures, new products, new businesses.

In Europe they complain about what they call a innovation gap. They've got great science and great technology, but they don't have the same vibrant startup environment, the same new culture toward entrepreneurship that we have in the US. So living labs is a response to try to close the innovation gap. When these research and technology projects are concluded in the university setting, can we find a place to put them to nurture them further and bring them to life? So it's not a traditional academic research lab. It's a much more practical place to work more on these technologies to really get them ready for use in industry.

One area where we're seeing these living labs is in smart cities where municipalities like Barcelona or Amsterdam or London or Paris are trying to put technology to work to really reshape the urban environment in which these people live in ways that make citizens' lives better, bring new sources of revenue to the city, and often save money or improve safety of these kinds of things using technology and experimenting through these labs.

ExecEd: Let's talk a little bit more internationally and maybe emerging markets. How can companies in emerging markets, like for instance pharma companies in Brazil or semiconductors in India employ, open innovation tactics without butting up against strict international IP laws? Is open innovation applicable in those situations?

Henry Chesbrough: When I first wrote "Open innovation," my evidence came largely from the United States. I truly didn't know whether this would have much use outside the US or outside the developed economies. With the passage of the last 13 years, I can now say with confidence, based less on my own work than on the work of many, many colleagues in academia, open innovation is being used quite successfully in many developing economies. Brazil being among them. India being among them. China, if we still consider them developing, absolutely. Yes, it does seem to work there. It doesn't always work exactly the same.

Now the IP laws you mentioned, the good news from their perspective is the IP in the United States has no bearing on the practice of innovation in India. It only matters if the Indian company wants to export to the US. In India, it's the Indian IP laws that control, or in Brazil or in China. It only matters what the US is doing when you're trying to export to the US as a country. It is the case that places like China have a lot of piracy, a lot of illegal copying. Notice that that used to be true of countries like Japan or Taiwan as well. I'm old enough to remember when Made in Japan meant cheap and crummy, and the Japanese were a nation of pirates back in the 1960s.

What's changed is the Japanese technology has become so good that the Japanese companies themselves want and have received strong IP protection from their government. This is, I think, what's going to change it in China. It's not that the Chinese companies want to be nice to companies from the West. It's that the Chinese companies themselves are getting stronger and stronger in their research and technology and, just as the Japanese and the Taiwanese did before, they too

are going to demand protection from the pirates in their own country. It's going to take a few more years, but that's where we're headed, I think, in places like China.

ExecEd: Does open innovation apply just to corporate business models, or can other institutions, like NGOs, government, international, even public sector adopt some of the principles of open innovation?

Henry Chesbrough: My answer is yes, they can. I wrote a chapter in the most recent book, "New Frontiers in Open Innovation," with a colleague from Italy. We wrote specifically on nonprofit organizations using open innovation. We looked at examples from Emergency, which is an Italian nonprofit that does work in conflict zones. We also looked at a Ashoka, which is group of entrepreneurs doing great work stimulating entrepreneurs in many developing economies. We looked at the city of Birmingham, England, and how they were using open innovation in the provision of social services. Those are some case examples.

We talked earlier about living labs and what's being done there. We have a project going on right now with something called smart villages in India where we're actually exploring trying to bring these concepts from cities of millions of people down to villages of maybe 10,000 to see which of these concepts can work effectively even in a rural seemingly isolated village setting. Not everything translates immediately. There do have to be adaptations, but we think we are far enough along that we can say that there's definitely going to be some benefit from thinking in these more open ways even in these settings as well.

ExecEd: We've spent a lot of time talking about openness and open innovation. Let's switch gears for a second. How about closed innovation? How about Apple? Can you talk to me about ... There's an example of a heavily guarded ... They don't have openness. It's all of their own secrets, and they've been very successful in that way. How can we explain that kind of success compared to what you're talking about in terms of open innovation?

Henry Chesbrough: It's a very good question. I think as we speak now Apple may be the world's most valuable company by stock market valuation so enormously successful and, as you say, quite secretive. Not only secretive to the outside world, even secretive inside their own company. They will often give multiple projects names for the same project precisely so they can trace a leak back to a particular group within the company if and when something leaks out before they're ready to

have it leak. There's no question the mentality here is not that of openness and sharing and all the rest. So why are they so successful?

One thing you have to give them credit for is they truly, deeply understand and care about users and user experiences. They are one of the world's best at applying design thinking in deep user understanding, and through their coordination of many different pieces, they can deliver an end-to-end experience that's wonderful for users. We really have to acknowledge the great benefit of that.

A second thing I would point out is that there have been moments in the company's history where the company did open up and had a great success in doing so. An early example would be when the iPhone first came out, Steve Jobs was quoted in the New York Times saying, "Yeah, you can get a few of these apps on the iPhone, but most of what you're going to need is already on the phone. It's not going to be like a Windows PC where the thing crashes and you have to keep rebooting."

Happily for Apple, the company got all these third party developers writing apps that they did not expect. Initially, Jobs resisted letting all these people onto the platform, but his own team convinced him that this would actually be good for the product and they could control the user experience and make sure you didn't have to keep rebooting. So the application environment exploded. The iPhone sales exploded. Even in a company as closed as Apple, there have been critical moments where the company has really benefited from opening up.

Innovation, in many ways, is about introducing variation into a process. You want highs and lows, ups and downs, max and min, so there's a real tension between practicing quality and bringing in innovation. If we're going to bring innovation into a culture of a company the way quality has been brought into the culture of a company, there's a lot of work to do there. Some companies used to keep them very, very separate. We were talking about Apple as a potential example of somebody that really has done a good job managing the quality of their products. Well, their whole operations group is pretty separate from their innovation activities. Indeed, most of the manufacturing is done outside of Apple, so it's really separate from the innovation group.

That's one strategy to manage the tension between those. Other companies are trying to broaden the mindsets of the people in the organization so that they can be, what's called, ambidextrous and do both, both doing a fine job on the current

business for quality but also thinking about the next business where these sources of variability and variation can actually be insightful and useful.

ExecEd: Wouldn't that be Google Alphabet, or is that ...?

Henry Chesbrough: Sure. Well, Google, they do have a separation because the reason Google separated from Alphabet ...

ExecEd: To let them have ...

Henry Chesbrough: ... was to let Google be Google. They continue to do a lot of innovative things around their search business but to have these other so-called moonshot and other activities that might go off in widely different areas. That's, again, more, in part, a separation strategy. Anybody who's been through the interview process at Google knows that innovation's a core value of the company. They're a company that's really trying to keep this as part of the culture, whether it's in Google or the Alphabet parent.

ExecEd: How about the future for open innovation? If you had a crystal ball, if you were looking down the road 10, 15, 20 years from now, where do you see it going?

Henry Chesbrough: Let me give you a short-term and a long-term answer. In the short-term, open innovation is moving from collaborating between individual firms or organizations to collaboration throughout an entire ecosystem of companies, developers, third parties, users, suppliers, a very rich, multifaceted thing. This is actually been labeled open innovation 2.0 by the European Commission which has really gotten behind this as part as their policy going forward. In the short-term, it's easy to say because it's already starting to happen. This is where open innovation is going.

In the longer-term, I think open innovation might follow a path like that of the quality revolution. In the 1980s, the US companies woke up to the gap with Japan and how much more reliable many Japanese products were relative to US products, and so US companies really embraced quality as a strategic imperative. They had quality departments, quality organizations, and they embedded in the companies a real need to do this well from the very beginning of the design, not just inspecting at the end of the process.

Today, most of those quality organizations are gone. The thinking is there, but it's now embedded in how the company does business so you no longer need the quality department overseeing all this. That's a possible long-term future for open innovation. Openness is not going to go away, but it may become part of the fabric of the company. Instead of today having open innovation departments and people with titles of manager of open innovation, director of open innovation, and my personal favorite, vice president of open innovation, in 30 years those titles may be gone, those organizations may be gone, and this may just be part of how companies do business.

ExecEd: I just have to ask one final question because you got your PhD here at Berkeley, we're at Berkeley, you're teaching at Berkeley, and one of the founding principles for Berkeley-Haas is questioning the status quo. Do you feel that this is the right place to be right now for you and doing your work on open innovation?

Henry Chesbrough: Berkeley and the environment here have been fantastic for me. The students are wonderful. I love the confidence without attitude. As you say, questioning the status quo but also the idea of beyond yourself, really taking a big view rather than just only thinking about me, me, me. So the students make it very special. My colleagues have been very supportive, and many of them, too, are exploring helpful related things in innovation, in design and so forth. Then being in Silicon Valley, we have a wonderful laboratory to study these things. So Berkeley has been just great. Although I loved my nine months in Barcelona, as I told you earlier, there's no doubt in my mind I wanted to come back, and I'm very happy to be here.

This culture of innovation that we have in the US in general and in Silicon Valley in particular is really strengthened by this entrepreneurship that has taken root supported by the large venture capital industry that has grown up here in Silicon Valley and, very importantly, supported by a very large influx of people from overseas. My colleague here at Berkeley, AnnaLee Saxenian, has documented that of all the startups in the 1990s, half of them were formed with one of the founding partners from overseas, particularly India or China. So there's a tremendous human capital story here in entrepreneurship and venturing as well where the best and the brightest and maybe the most entrepreneurial have been coming here to really test out their ideas and see what they can do. I think that remains so today.

In an election season where there's a lot of pushback on globalization, on

immigration, but just this week the Obama administration has issued a [policy allowing entrepreneurs up to five years to stay if they are involved in startups. Although the larger issue is still being debated politically, everybody supports the idea of welcoming entrepreneurs from everywhere around the world to launch and grow new businesses. That's not the case in other countries, so we do have something unique and special about that.

ExecEd: Another book in the works there?

Henry Chesbrough: There is another book in the works.

ExecEd: Yes?

Henry Chesbrough: Yeah.

ExecEd: Give us a clue.

Henry Chesbrough: I get paid by the word, so I'm always thinking of something.

ExecEd: What's the theme there?

Henry Chesbrough: The theme is going to be about open innovation in society. As we were saying before, it's not just about firms or organizations. It's entire ecosystems. What this book is going to do is say what about public policies? I'm also going to try to unravel what I think of is an innovation paradox. With all this new technology that we have at an accelerating rate, what some people are calling exponential technology, you would expect to see rising productivity in the economy as a result of all this new technology, it lets you do more things faster, better, cheaper, and you'd expect to see, along with the productivity, higher wages. In fact, what we see is the opposite. Productivity growth is slowing down. In fact, in the last two quarters it's actually gone negative, and wages have been stagnant for a long time. If all this great technology is happening, what gives? That's the paradox.

My answer, which I'm going to explore in the book, is going to try to unravel that, first from a standpoint of rethinking how we approach innovation so that we get more productivity out of how we innovate and unsurprisingly being open is going to be an important part of that. The other part of that is bringing a perspective of public and social investment in infrastructure and a broad base of knowledge for all

of us to use. This isn't going to just be the province of governance but also of larger companies as they can create and nurture and grow their own ecosystems. If they are farsighted in thinking about their own future, it's in their interest to make these investments in growing and supporting the knowledge base that supports their ecosystems.

ExecEd: Fabulous. Now I know when I'm coming back to talk to you when that book is out. Thank you so much for spending time with us today. This has been very illuminating and inspiring. Thank you so much.

Henry Chesbrough: Thank you.