Innovation in the 21st Century

A Conversation with Professor Haiyang Li

Interview by Eric Collins

Professor Haiyang Li is H. Joe Nelson III Professor of Strategic Management & Innovation, Jesse H. Jones Graduate School of Business, at Rice University, Houston, Texas. Professor Li gained a PhD from City University of Hong Kong and is a recipient of the College of Business Distinguished Alumni Award. City Business Magazine caught up with Haiyang in Cambridge and talked about change around flattening hierarchies, the disruption myth, and the future of a market-oriented university.

We last talked about corporate innovation in 2018. What has happened in the last six years?
There have been many changes. Business model innovation stands out, particularly with the emergence of online businesses driven by digital technologies. Generative AI is another significant shift, providing tools that enable organisations and individuals to innovate in ways previously impossible. It's transforming how problems are approached and how organisations can be run. A third trend, not entirely new but increasingly adopted, is open innovation.

Could you define open innovation for us?
This involves leveraging ideas from both within and outside an organisation. Traditionally, innovation was confined to R&D or technology teams. Now, many companies allow ideas to flow from anyone, including external contributors. So, to take one example, Proctor and Gamble (P&G) has reduced its R&D investments but increased innovation outcomes by sourcing ideas from consumers and experts outside the company.

NASA is another example. While core technologies may be kept private, open innovation happens in areas like space life science (e.g. astronaut food or clothing). These are places where external expertise contributes. It's about managing the innovation process to leverage outside resources without compromising sensitive data. With the growth of digital technologies, open innovation will become more relevant and important for organisations.

But managing data privacy around core technologies must be challenging?
True. But even in advanced fields like AI, you see collaboration between organisations. For example the Stargate project, announced in 2025, is a joint venture created by OpenAI, Softbank, Oracle, and investment firm MGX. Rarely does one company develop advanced technologies alone. I think the issue here is co-developing technology innovation. But the geopolitical environment can add complexity, particularly for multinational companies which might hesitate to innovate in certain countries. For instance, in China in the early 2000s, General Electric's Shanghai Innovation Center adapted products for the local market and gained valuable insights. However, partly due to geopolitical tensions, it was shut down despite its success.

▪ Flattening Hierarchies

So, how effective is innovation within companies?
It can be very effective, and it aligns with the principles of open innovation. For example, more than 10 years ago, I went to visit Haier, a Chinese home appliance company, and in one building they had a huge banner saying, "Everybody can become a CEO." In Haier, employees across different levels are empowered to identify problems independently, form cross-functional teams, and develop innovative solutions, with performance evaluated on project involvement and revenue generated. This structure transforms employees into intrapreneurs, driving innovation from within the company.

Companies are reducing hierarchies to foster innovation. In the past, bureaucracy has made innovation less effective in some large organisations, think of Kodak or Nokia. Middle management can sometimes impede the flow of innovation ideas from frontline employees to the top. Nowadays, leaders like Elon Musk are advocating flatter structures to improve efficiency and communication.

▪ The Disruption Myth

Will disruption remain central to innovation?
Disruption is often misunderstood. It refers to innovations that make incumbent firms irrelevant, not ones that outright destroy them. For example, Kodak wasn't "killed" by digital photography but became obsolete because it failed to adapt when the industry was shifting from film to "filmless."

Labeling oneself as a disruptor can be risky, as it provokes resistance from incumbents. Effective innovation grows markets rather than targeting existing players directly. If you really want to have an innovation culture, it's not about what kind of terminology you are using, it's more about developing a process.

What about the relationship between corporate culture and innovation?

Culture is critical but not necessarily CEO-driven. For example, 3M has been consistently innovative, but how many times have you heard of the CEO's name? Meanwhile, companies like Google or Apple rely heavily on visionary CEOs. A CEO-driven innovation is less sustainable because leadership changes can disrupt progress. If you want an innovation culture, it's less about technology itself and more about developing processes that foster innovation. 3M's innovation culture is reflected in its institutionalised process for fostering innovation.

When asked on how to innovate, Elon Musk has responded: Challenge authority.

Challenging authority isn't about disruption for its own sake. It's about doing things differently and improving existing systems. For instance, IBM dominated the computer industry in the 1960s, but later it was overtaken by companies such as Compaq, HP and Lenovo. Because of the change in the rules, that is, from mainframe computers to PCs, these companies overtook IBM by offering better alternatives, not by directly challenging it. Competition is about creating better value, not destroying incumbents.

> "Innovation is not about disruption but about doing things differently"

So, disruption doesn't necessarily suggest progress?

That's exactly the point. I don't like the word "disruption" because it's a little bit misleading. An innovation cannot be preemptively labeled as "disruptive" before it has proven its market impact. Disruption is not a predetermined characteristic, but an outcome determined solely by market response. In my view, innovation is not about disruption but about doing things differently, creating unique value propositions, addressing unmet client needs. Disruption is not a strategy but a potential consequence of successful innovation. Successful innovators concentrate on competitive differentiation and value creation, allowing market dynamics to validate their approach.

▪ China's Rise in Innovation

How innovative are Chinese companies?

It's a very interesting question and to answer it is important to ask: How to define "being innovative" or "innovation capability"? Are we able to compare innovation capability across companies, industries, or countries? A widely used measure of innovation capability is the number of patents. However, the number of patents alone isn't reliable because it varies by industry and country. The quality of patents also varies.

My recent research[1] develops a new measure of innovation capability by addressing both the issues of patent quantity distortion and patent quality variation. By using this new measure, my study compares innovation globally using US and European patent data from 1983 to 2017 across 22 manufacturing industries. China excels in computers, electronics, optical products manufacturing, and electrical equipment manufacturing but is average or below in other sectors. The US is also not necessarily ahead in other sectors. At the firm level, I believe that Chinese firms lead in some areas, for example they are way ahead in electric vehicles, but face challenges moving from imitation to leadership.

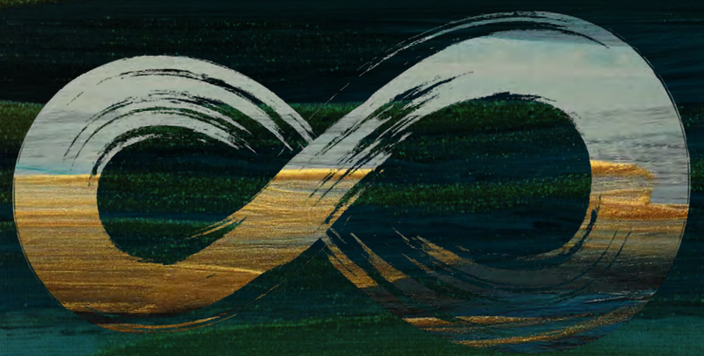
Knowledge accumulation is a factor. Leading requires a strong foundation, which China lacks in fields like AI, compared to the US, where generations of research laid the groundwork for recent breakthroughs in AI. However, things may change over time because of AI and machine learning.

▪ The Power of Imagination

Do you see a distinction between data-driven R&D and conceptual innovation?

Both have value. Yesterday I was visiting the National Gallery in London with my son, and we were looking at the different kinds of paintings, some incredibly innovative such as Picasso's cubism. Without imagination it's very hard to make breakthrough innovations. Conceptual innovation requires imagination while data-driven R&D can refine ideas. Education needs to balance teaching fostering creativity and data analysis, as breakthrough innovation often combines both.

> "Without imagination it's very hard to make breakthrough innovations"



Will AI take over the creativity role?

AI is just better, more advanced technology. So, it will help us a lot by augmenting our intelligence. We will do a lot of amazing things with it, but humans will still play a very important role because we have the imagination. We will have to decide how to use AI to innovate and improve our life.

But this is a very hard question because of the "I" in AI. How intelligent can these things be? There are a lot of uncertainties. I hope we can develop AI in a safe, ethical, and legitimate way. If we look at previous innovations, Microsoft Excel for example can compute very fast, but it hasn't eliminated what we are doing. Humans are learning very fast, as fast as AI I would say. So, there's still a place for humans because of the emotional thing, the social and the imagination.

▪ Driving Innovation: Science Parks

What role do science parks play?

Science parks, or technology clusters in general, are vital for startups, offering tax benefits and infrastructure. They can also attract service intermediaries such as venture capitalists, legal services, and headhunters, which are crucial for startups' growth.

About 30 years ago, Professor Annalee Saxenian from UC Berkeley published a seminal study, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128.* Route 128, by the way, was America's First High Tech Region in the vicinity of Boston, Massachusetts. Right after World War II both areas had a very similar starting point, but after 40-50 years Silicon Valley was way ahead. Why? One of the reasons was that Silicon Valley developed a decentralised but cooperative industrial system with well-

established service intermediaries, particularly VC financial firms, facilitating information flow and startup development in California. My own research[2] also highlights the importance of service intermediaries for startups' innovation in science parks in China's Guangdong province.

How about the influence of government funding?

Government funding has played a role, especially in industries close to national security and strategic importance. For example, Stanford University's growth was tied to World War II demands. However, in China many of the most innovative companies like Alibaba and JD.com grew with little government funding. Most innovations there come from market-driven private firms. But some industry sectors, such as electric vehicles, are more government-subsidised, both in China and the US whilst other sectors such as online business rely almost entirely on market forces for growth.

There are some cons associated with government fundings, for example, becoming less engaged with the broader commercial market. Also, government funding priorities may shift, potentially leaving especially small firms vulnerable if they become too reliant on this source of capital.

> "Regulation is a double-edged sword"

Does regulation inhibit innovation?

Regulation is a double-edged sword. It ensures market fairness and consumer protection but can slow innovation. For example, in industries like pharmaceuticals or space exploration, regulations can delay progress. Striking a balance is key, adapting rules without compromising safety or fairness.

▪ Diversity can be Elusive

How important is diversity?

Diversity, particularly in cross-functional teams, can add value to innovation. Mixing disciplines such as business and engineering can create new perspectives. But it doesn't always work. For example, in some business schools, faculty have been encouraged to take an office away from their parent area. So, in that way, a faculty working on strategy can meet their colleagues in, say, the finance or accounting area. But do they really talk? Not always. You've got to have a reason for people to talk across subject areas to explore new research projects.

How far can innovation be taught?

Good question. Some successful entrepreneurs have never attended business schools, but education provides value by helping students understand the logic behind business actions. As a business school professor, I don't teach how to run a business step-by-step. Instead, I encourage students to develop strategic thinking and understand how to adapt to market changes.

For example, in my classes on strategic innovation management, students learn to connect theory to their daily work. This helps develop a mindset for tackling problems from a CEO's perspective. The goal is to provide frameworks for decision-making rather than prescriptive solutions. That can be really powerful.

I don't teach how to design an iPhone. But we might consider: as the CEO, if you want to make your company more successful or sustainable, what are the key questions in terms of innovation you need to ask? What are you going to do? How do you strategically transform your businesses for sustainable growth? That's the value we can add.

▪ The Market-Oriented University

Is academia too distant from market needs?

Most universities, especially business schools, are trying to reduce the gap between academic research and the market through entrepreneurship programmes and collaborations, etc. But it is also important to ask: what is the purpose of having universities and academia? I believe that academia's role includes both teaching and advancing fundamental knowledge, not just market-oriented research. We've got to strike a balance.

Are universities still fit for purpose?

My prediction is that over time universities will need to change. Given the AI technology, given that the accessibility of knowledge has been significantly improved, I think the time that students spend on campus can be significantly reduced. Digital transformation is not just for industries. But many universities are old, and institutionally the evolution can be slow. The way we are teaching today is quite similar to 100 years ago. If we don't adapt, we will become obsolete.

> "The time spent on campus can be significantly reduced"

So, a more agile approach?

Absolutely, and more customised to the students. Given the AI, we can gain insights into each student's profile. So, we can offer something highly relevant and personalised to each student. This customised approach not only enhances the overall student experience but also saves time for both educators and students. By providing targeted resources and support, we can add significant value to the educational process. Ultimately, this creates a win-win scenario: students receive the personalised attention they need to thrive, while educators can focus on delivering impactful instruction. Embracing this level of customisation will lead to more effective learning outcomes and greater satisfaction for everyone involved.

[1] *Zhu, Zhijing and Haiyang Li. Patently catching up: How innovative are Chinese manufacturing industries? Working paper.*

[2] *Zhang, Yan & Haiyang Li. 2010. Innovation search of new ventures in a technology cluster: The role of ties with service intermediaries. Strategic Management Journal, 31: 88-109*