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The Evolution of China's Innovation Capability

An Interview with Hengyuan Zhu

Hengyuan Zhu talks with Jim Euchner about the many ways innovation practices are being adopted, adapted, and reinvented in China.

Hengyuan Zhu and Jim Euchner

Hengyuan Zhu has been studying innovation practices in China for more than 20 years. In this wide-ranging interview, he discusses the shift in China's economy from manufacturing products invented elsewhere to innovating new technology at home, and describes how Chinese innovators are leveraging the powerful context of a large, rapidly growing economy, a robust higher education system, and new approaches to innovation that emphasize speed and meeting local demand first. To compete, Zhu argues, multinational companies will have to rethink their approaches to the management of innovation in China.

JIM EUCHNER [JE]: There has been tremendous change in the last decade in China's innovation capabilities. What has been driving the shift from one primarily focused on manufacturing to one focused on innovation and a high-value-added economy?

HENGYUAN ZHU [HZ]: I think that there are three factors that have combined to drive the economy from a labor-intensive, product-manufacturing economy to an innovation-driven economy. Number one, since China entered into the WTO, we have built up a sophisticated

manufacturing system in almost every industry, which enables us to make products rapidly when innovation comes about.

The second thing is that from 2001 to 2013, the R&D intensity in China grew from 1 percent to 2 percent, which is a significant growth. It means that the nation has put a lot of resources into research and development activities. China's R&D intensity is now higher than that of the European Union as a whole.

Third, within the past 10 years, a way of innovation and entrepreneurship has emerged in China that relies on innovating for the local demand. China's entrepreneurs are creating new ways of innovating that are different from what we have learned from the United States or from Japan or from Korean companies.

Those are the three factors: we have a manufacturing system that can turn innovative ideas into products; we pour a lot of resources into R&D; and Chinese entrepreneurial companies are creating a new way of innovation which works especially well in this context. These are developments that have all emerged in the past 10 years.

JE: The rapid increase in investment must have been very challenging, just in terms of bringing sufficient innovation resources to bear. You've doubled national R&D intensity in a decade.

HZ: Yes, we have. That's a significant change. It began in the aftermath of the financial crisis; at a time when many countries were cutting their R&D budgets, China was increasing its investment in innovation. In 2001, we reached 1 percent; in 2013, we reached 2 percent. Last year, I believe we reached 2.12 percent.

JE: The question is, how did you do it? Where did you get the qualified manpower?

HZ: I think that there were three things that enabled the growth. One is that China has a very good higher education system. This year, we have more than 8 million college graduates. I guess that's the biggest innovation talent pool

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in the world, which makes it easier to hire, especially entry-level engineers.

The second thing has been borrowing from multinationals, especially those companies from the United States, Europe, Japan, and Korea. They set up branches in China, and after 10 years, there has been a lot of transfer of people from those multinational companies to the local companies. This is an important source of local innovation. Expertise in innovation spills over from the multinational companies to Chinese companies.

Finally, in the last 10 years, there have been a lot of returnees from overseas. These are people who got educated overseas, often in prestigious universities; they worked for foreign companies for a while, either in the United States or in Europe or in Japan, and then they came back to China to start their own businesses. We call them *returnee entrepreneurs*. This is a huge boost to the Chinese innovation campaign.

JE: Can you talk more about the Chinese entrepreneurial way? How is innovation in China different from what we may be familiar with in the US or Europe?

HZ: I have been doing innovation research in China for nearly 20 years. It has become clear to me that Chinese entrepreneurs are creating different ways of innovation. I should call what they do “contextualized innovation.”

This kind of innovation gives particular emphasis to the context of the product or service. I define contextualized innovation as innovative activities centered around the context of the environment: the R&D context, the manufacturing context, the supply chain context, the market context. Context refers to the time, place, and circumstance in which the product or service is designed, developed, manufactured, assembled, distributed, and consumed. Two important contextual factors in China are the rapid growth in local demand and low-cost manufacturing capabilities. These are enabling speed, and so, fast iteration techniques are common.

Contextualized innovation involves adapting the whole innovation process to the environment in which it takes place. Let me give you an example. There’s a Chinese company that is very famous in manufacturing, BYD. In its early years, it was focused on battery manufacturing for the mobile phone. At first, from a technology point of view, they were not very good at it, so they purchased a supplier from a Japanese company, Toshiba. At that time, the assembly line was totally automatic, but it was capital



Hengyuan Zhu helps multinational companies understand the innovation dynamics of China’s rapidly changing business environment.

intensive. The founder of BYD, Wang Chuan-fu, decided that they would change the assembly line from totally automatic to semi-automatic to improve flexibility and lower cost. Labor, at the time, was not too expensive. Workers controlled the pace of the line and the quality. It was a sort of retrograde innovation, but it worked well.

RTM has published about frugal innovation. It is a very similar phenomenon. Frugal innovators are adapting to the local environment, not just in terms of the local user scenario, but also with reference to the local manufacturing scenario.

Chinese innovators also use very rapid iteration to get to a product. They learn very quickly and make quick improvements and adjustments. They are not waiting until the product is very good and then releasing it to the market. They release a minimum viable product, an MVP, into the market, and then they make improvements, very quickly. These Chinese companies work closely with local customers and make products that fit into the demand of these local customers. From the initial customers, they get valuable feedback that they then invest back into the innovation cycle. In this way, they evolve the product very quickly and sustainably.

JE: You mentioned Vijay Govindarajan. He discusses frugal innovation, but also reverse innovation. Reverse innovation operates on the premise that you start by meeting local market requirements, then you migrate the innovations to markets in the developed world. Is that happening a lot, or are there just a few apocryphal cases?

HZ: These kinds of things happen very often. We take a technology or product idea, adapt it to the Chinese market, and then diffuse that product globally. This can start with diffusion throughout China. You have to understand the sophistication of the Chinese market; the Chinese market is totally different from those you have seen in Europe or in the United States.

First, China is a very big and diversified market. Almost any product can get to a large scale, just in the China market. China includes both totally developed markets—if you go into Beijing or Shenzhen or Hang Zhou, you may imagine that you are in New York or Paris. But if you go to the counties that are in the Western rural area, on the other hand, it may seem like you have entered into some of the less-developed African countries. In some sense, China is not a market, it's multiple markets integrated under one social system.

We say that it's a hybrid market. In such a market, a product concept can find a user scenario from the very high end to the very low end, from the very sophisticated to the very simple. The demand in China is highly diversified, and it changes very fast. The large, diversified, and dynamic market makes it a great path to market for any product.

There's a Chinese company called Tecno Mobile, which started out making mobile phones for African markets. The founder came from Bird, which is the company that supplied mobile phones for the Chinese countryside—the rural market—and achieved leadership there. They tried some of these ideas in the African market and became number one in the African mobile phone market. I think that if you can win in China, then you have a great probability to win globally.

JE: Can you talk about the role multinationals play in this world and how that's changing? For a long time, multinational companies would bring technology to China and get out low-cost product. As this is changing, what do multinationals need to do?

HZ: Starting in about 2000, multinational companies from developed countries, especially at the very high end of the innovation pyramid, fell into a pitfall strategy. They would take products for the developed countries and put them into Chinese markets with little adaption to the local markets. They had great brands, and they had great innovation processes, so they had business success.

Starting in 2005, more and more multinational companies began taking into account the local demand. They reasoned that they had global resources and would use these resources to face into the local demand. I read your interview with Navi Radjou.¹ He gave a perfect example—a Siemens CT scanner designed by Chinese engineers for the Chinese market that turned out to be a bestseller in the US and Europe.

¹See Navi Radjou and Jim Euchner, "The Principles of Frugal Innovation," *Conversations*, *RTM* 59(4), pp. 13–20.

I think that if you can win in China, then you have a great probability to win in the whole world.

The main idea is that, if they want to be successful, multinational companies will have to give more decision-making power to their local branches in China. They need to do this so that they can leverage global resources, integrate into the innovation system, and innovate in China for Chinese customers. Nowadays, you can profitably innovate for the Chinese market and use the experience there to enter global markets.

Let me speak frankly: the innovation advantage for multinational companies has shrunk substantially since the early 2000s.

JE: What can multinational companies do to be successful in China in today's competitive environment?

HZ: For multinational companies, I suggest that there are two things. Number one, they have to think more about the significance of the Chinese market itself, not only as a manufacturing center and a place where products that were designed for the developed countries are adapted for Chinese markets. They must consider the Chinese market itself as an engine for global innovation.

The second thing I would suggest is that multinational companies need to join the local innovation network. Get involved in the local ecosystem. Many multinational companies have great technology, they are very good at managing the innovation process, and they have a global network, but they are not hooked into the local ecosystem.

A good example of how being connected with the local ecosystem can work is the story of Segway in China. Segway is a Boston-based company that is very famous for its electric balance scooter. Segway has great technology, but they had two challenges. The first was market scale. The market for their products in the West was too small to have success as more than a niche product. Number two, the price of the product was high; they sold it for \$10,000.

At that time, the product didn't have very much market potential, but in 2015, they partnered with Xiaomi in China. Xiaomi brought two things. One was its very good capability in the manufacturing supply chain. They have a great ecosystem for electronic products manufacturing, and they were able to cut the cost to nearly one-third.

That's number one. Number two, Xiaomi is a very famous brand among the Chinese young generation. Xiaomi introduced the product to its community, and sales of the product quickly increased. It was a combination of the local manufacturing capability and use of the local

demand for the first scale-up. One of my suggestions to multinational companies is to emulate Segway; they should become part of the local innovation ecosystem rather than stay on the outside of the system.

JE: Can you talk more about what it means to integrate with the local ecosystem?

HZ: Yes. There are three things to keep in mind when talking about the innovation ecosystem in China. The first is to use trial and error to learn in the Chinese markets. Learn, see what works, and transfer that experience into other markets to harvest the full innovation value of your product.

Second is to innovate using the local demand in China, as Segway did. The China market is big enough for any innovation to get to scale. There is huge market power from the demand side, so use the market to learn and to get to scale.

Finally, to really integrate with the local ecosystem, multinationals need to change their organizational philosophy. They need to give local teams more decision-making power. Let me talk about something you may not have imagined.

This is a case from the early 2000s. There was a very famous multinational mobile phone company. The local innovation department at the local development center proposed a new product, and it went into the company's global evaluation process for new products. It didn't pass the evaluation. The reason was very simple: the criteria they used were the same used in the United States for such a product. When they looked at demand, they saw only, say, 100,000 units, which did not meet their criteria for economies of scale. But the local business in China believed that the product could easily surpass 200,000 units. There was a lot of debate back and forth, back and forth, and back and forth. And finally, the local company leader used his influence and found some other way to get the product approved. It ended up selling more than 350,000 units in the first year it was introduced in China.

This made the local team happy but also very frustrated; they were very entrepreneurial, and they knew different criteria were needed—they had learned from the competitors in China—but they had difficulties convincing headquarters, which was very far away, in the United States.

Multinational companies in China will have to become global thinking but local acting. Otherwise, they will not be able to compete with local Chinese companies.

JE: You've written about the sources of innovation in China and how they've shifted over time. The innovation capabilities started with universities, and then Chinese

firms replicated what multinational firms were doing. Now you see customers as the principal source of innovation. Can you talk about what the sources of innovation are in Chinese companies now and how they might differ from the West?

HZ: That's a really interesting question. Traditionally, Chinese companies learned from their Western counterparts. Nowadays, they are more reliant on other things. They have set up branches in the developed countries; for example, they might set up a research center in Silicon Valley, in London, in Paris, or in Boston. Through this, they can hire great local scientists to do research for them. Number two, they are doing acquisitions of technology-intensive companies. Finally, they are also spending more on inside R&D. You can see it in Chinese R&D expenditures, which show that three-quarters of the R&D expenditures in China come from companies, not the government.

Chinese universities and Chinese companies are not yet leading in the far front end of basic research, but they have multiple other sources of innovation adapted to the local demand. That's what I have observed.

JE: What about intellectual property and patents? I believe that China now files more patents than any other country. Historically, though, there's been a lot of concern about intellectual property protection in China. Can you talk about that?

HZ: That's a good question. A lot of friends of mine from multinational companies are very concerned about intellectual property. In the last 10 years, intellectual property rights protection has been moving very quickly in China, but not as quickly as our Western counterparts might have imagined. Enforcement has been improving in recent years, but in practice the system needs time to change gradually. This is the issue.

And it's not just a problem for multinational companies. Local companies are facing a challenge with IP enforcement, too. Tencent has a lot of lawsuits over IP issues. But even though China is a sophisticated power in the global innovation competition landscape, it is still a developing country. The intellectual property rights protection system in China is good, it's improving, but it will need to continue to improve. This needs to be considered in the context of the surging demand in China. You can help to protect your innovation value if you act quickly in the market. When I advise business leaders, I suggest that you should file a patent, but don't think you can rely on your patent to protect your business.

JE: Do you feel like the management of innovation in Chinese companies has progressed in terms of the use of tools like portfolio management, new product development methodologies, open innovation, and so forth? Do you feel that there has been a growth in maturity in firms in those areas?

Multinational companies in China will have to become global thinking but local acting.

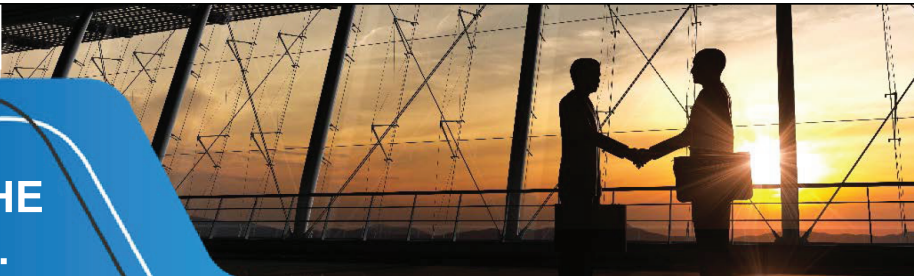
HZ: Let's take Stage-Gate as an example. Motorola established very good Stage-Gate processes in China, and starting in 2000, they became the benchmark for local companies. They even set up seminars for local companies and their local partners to talk about the Stage-Gate process and its management. But nowadays, multinational companies are also learning from local companies in the management of innovation. I am talking about the processes for contextualized innovation. There is a fast, effective innovation process happening in China. Companies are not waiting for perfect products to launch. They use fast launch improvement cycles. This is a significant change, and many product innovation management tools developed in the industrial age may not be as effective. I don't think that companies can survive long if they do not make significant changes in these areas.

In the Internet age, we have very good information technology. We have very sophisticated tools to explore or anticipate customer needs. And we can do it fast. It is my hope that 10 years from now there will be a new product development process and a new set of innovation tools to manage the new innovation process. These will be based on technology that enables quick feedback and

communication. IDEO and Google are practicing this kind of innovation right now, and there is a new managerial practice emerging in China, as well. Ten years from now, we will have new tools and new methodologies to do product innovation.

JE: Innovation in China has come so far, so fast. What do you see looking into the future? In 10 years, what will we be talking about?

HZ: I think that one of the gaps for Chinese companies—especially for those leading companies that really want to be global leaders—is that they need to use their innovation capabilities to solve global challenges. This is one of the things that we really need to do in the next 10 years. I mean things like global poverty, the digital gap, and climate change. Chinese companies now are doing well locally, and when the Chinese markets get more crowded, they will need to go global. When they do go global, they really need to help the global community solve global issues, global challenges. This is also a great opportunity for collaboration between developed countries and Chinese companies.



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