

The truth about Chinese innovation

Is the Dragon Learning to Fly? An Analysis of the Chinese Patent Explosion

By Markus Eberhardt, Christian Helmers and Zhihong Yu

A pioneering study has cast doubt on the idea that China is in the midst of a major technological boom fuelled by increasingly widespread innovation.

The huge explosion in patenting by Chinese firms in recent years has led to claims that the country is catching the West in terms of technical advances.

But groundbreaking research suggests the large-scale transition from imitating technology to producing genuine innovation remains in its infancy.

The findings emerge in a study published by the Globalisation and Economic Policy Centre (GEP), based at the University of Nottingham in the UK.

The authors say the research provides “unambiguous” answers to questions that are of immediate importance to policymakers not just in China but around the world.

Research basis

The research analysed a dataset containing patent filings by around 20,000 manufacturing firms that were registered in China during the period from 1999 to 2006.

It examined patents these firms filed with China’s State Intellectual Property Office (SIPO) and the US Patent and Trademark Office (USPTO) between 1985 and 2006.

Whether companies sought protection only in China or in both China and the US was crucial to helping assess the nature of patents and the decisions behind them.

The direct and indirect costs associated with patent protection in the States are higher, as is the “novelty hurdle” in the patent examination.

Researchers used the data to chart the Chinese patent explosion and then, crucially, to investigate further the factors behind it.

Comments and implications

The study discovered that the top 10 Chinese companies filing with USPTO during the sample period accounted for more than 85% of all patents.

The top 10 Chinese firms filing with SIPO during the same period accounted for around 75%, and a number of companies featured in both lists.

Research co-author Dr Markus Eberhardt, of GEP and the Nottingham School of Economics, said: “We’ve recently seen what seems to be increasing evidence that China is catching up fast in terms of scientific and technological innovation.

Key findings

- A tiny number of firms in the information and communications technology industry account for the dramatic explosion in Chinese patenting.
- The companies that patent in both China and the US are very large, relatively young, more R&D-intensive than their peers and strongly – although not exclusively – export-oriented.
- They represent a small group of truly global players that are highly integrated into the worldwide economy.
- The patent explosion therefore reflects not a wider technological take-off for China but the success of a very small group within a single industry.
- The patent explosion may point to China eventually competing not only on cheap labour and sheer scale but also in terms of innovation, but at present the country has very few companies driving this development.

“Strikingly, the number of domestic invention patents filed with the Chinese patent office went up by an average of 32% a year from 1999 to 2006.

“But our results show that in fact a tiny number of firms in the information and communications technology industry account for the dramatic increase.

“The firms patenting in both China and the US are very large, relatively young, more R&D-intensive than their peers and strongly – although not exclusively – export-oriented.

“In other words, what we’re dealing with here is a small group of truly global players that are highly integrated into the worldwide economy.

“Are these firms really the spearhead of a larger group of companies, poised to lead the Chinese economy to a wider technological take-off?

“Or do they merely reflect an exceptional and highly select group that’s unlikely to represent a broader underlying technological leap?

“The conclusion we reach is that the patent explosion reflects not a wider take-off but the success of a very small group within a single industry.”

Dr Eberhardt suggested the findings could help shed an important new light on China’s innovative prowess and potential development path.

Describing previous studies of Chinese patenting as “surprisingly sparse”, he said: “There’s been very little research at the firm level.

“Our unique approach to the issue provides us with an unambiguous answer to the question of what lies behind the Chinese patent explosion.

“This is important, since China’s transition from imitating technology to producing genuine innovation is of concern to policymakers in China and beyond.

“Although there are caveats – the limited size of our sample, for instance – our analysis indicates that at this stage a wider technological take-off among Chinese companies is unlikely.

“Patenting is concentrated in very few industries, and even within these it’s undertaken by very few firms – albeit highly active ones.

“Some Chinese companies do appear to be highly innovative, potentially even pushing the global technology frontier in certain niches.

“But there aren’t many, and most companies are likely to focus on incremental process innovation rather than ‘new-to-the-world’ innovation.”

Figures show the number of domestic patents filed with SIPO rose from around 15,600 in 1999 to more than 122,000 in 2006.

Dr Eberhardt added: “This explosion may point to China eventually competing not only on cheap labour and sheer scale but also in terms of innovation.

“But the fact is that at present, not unlike other successful Asian economies, China has very few companies driving this development.”

Globalisation and Economic Policy Centre (GEP)

Based at the University of Nottingham in the UK and primarily funded by grants from the Leverhulme Trust, GEP is the major centre in Europe studying the impacts of globalisation and economic policy.

In January 2008 it opened GEP in Malaysia at the University of Nottingham’s purpose-built Semenyih campus, 30km from Kuala Lumpur. In November 2008 it launched GEP in China at the University of Nottingham, Ningbo, China.

GEP is keen to promote its research work and is committed to communicating its expertise. Its academics have advised the Treasury, the OECD, the World Bank and the WTO.

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Research co-author

Dr Markus Eberhardt joined the Nottingham School of Economics in September 2011 as a Lecturer in Economics. He previously held an ESRC post-doctoral research fellowship at the Centre for the Study of African Economies in the Department of Economics at Oxford. His first degree was in Modern Chinese Studies. He carried out the research discussed here with Dr Zhihong Yu, also of GEP and the Nottingham School of Economics, and Dr Christian Helmets, of the Universidad Carlos III de Madrid and the University of Oxford.

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