

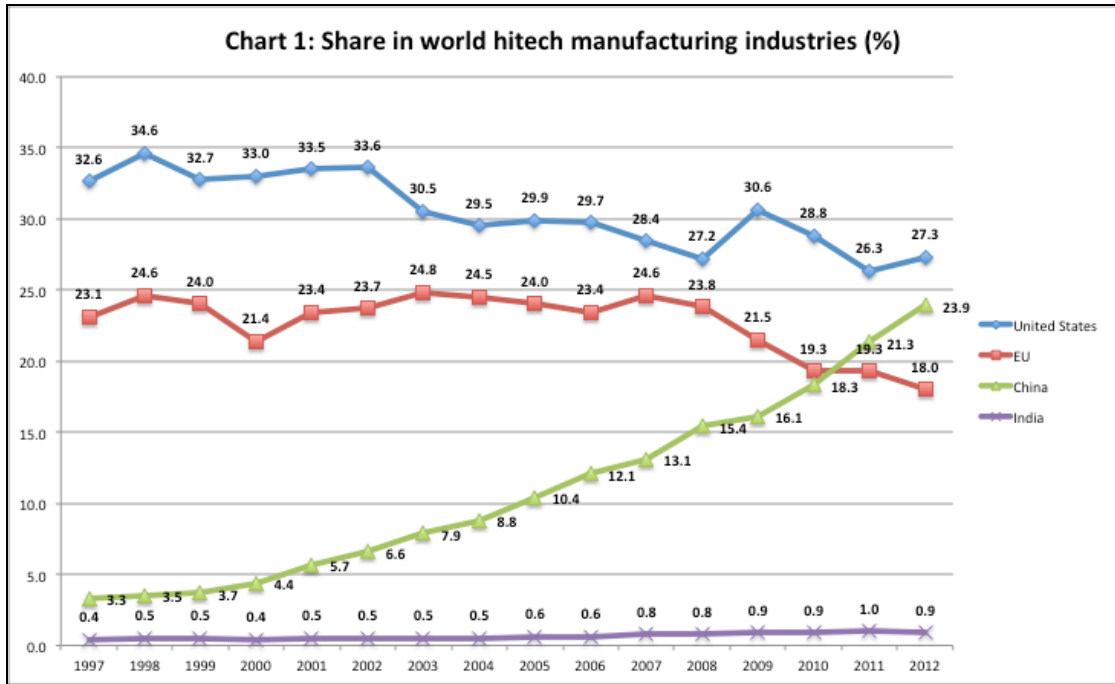
India's High Technology Deficit*

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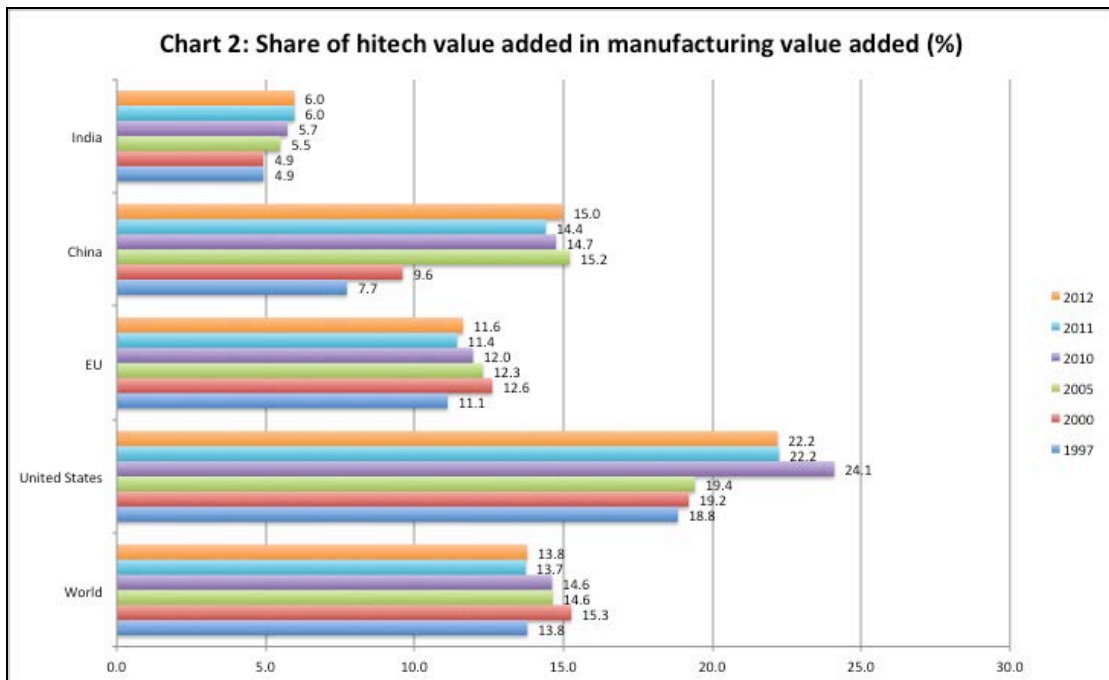
A new Indian government searching for ways to revive Indian manufacturing, seems to have chosen to emphasise integration into global value chains at the lower, labour-intensive end, by exploiting its cheap labour reserve. That not only turns the tables on the kind of industrialisation strategy that the Indian government emphasised from Independence to the 1970s, but also ignores the immense potential that exists for hitech manufacturing growth for a country with the necessary skilled manpower. This comes through when we examine the most recent 2014 edition of the biennial [Science and Engineering Indicators](#) report of the National Science Board, a division of the National Science Foundation (NSF) of the US. Perhaps influenced by the erosion of US competitiveness in hitech manufacturing, these reports have for some years now tracked the changing geography of the high technology manufacturing sector, defined to include the following sectors: aircraft and spacecraft, pharmaceuticals, computers and office machinery, semiconductors, and communications equipment, and scientific (medical, precision, and optical) instruments.

The tracking exercise has yielded one striking result. Not only has the geography of hitech manufacturing shifted as expected, but that shift reflects a significant displacement of the US and the EU as producers as a result of a rise of wholly new competitors. In fact, if in the past US attention was directed at Japan as an emerging competitor, more recently China and India have been under the scanner. When it comes to hi-tech manufacturing, the focus on China is indeed warranted. But, India, which attracts disproportionate attention because of its success as an exporter of software and IT-enabled services and its recent high rate of growth, has lagged far behind. Thus, if we take the 15-year period from 1997 to 2012 (Chart 1), the share of China's hi-tech manufacturing industries in global value added in the high technology sectors, which rose slowly to 4.4 per cent in 2000, subsequently shot up to 23.3 per cent by 2005. On the other hand, over the 15-year period as a whole India's share in global high technology manufacturing value added increased from a negligible 0.4 per cent to a marginally higher and still insignificant 0.9 per cent. Interestingly, the US which had seen a significant decline in its share of global value added in hi-tech areas between 1998 and 2004, managed to hold its own during the second half of the 2000s. Thus China's gain was at the expense of the EU and the rest of the world outside the US.

The remarkable performance of China is also reflected in the relative share of the high technology sectors in its manufacturing sector as a whole. Chart 2 compares the relative share of value added in the hi-tech sectors in aggregate manufacturing value added in a number of countries. Across the world, that share fluctuated in a narrow range between 1997 and 2012 and averaged around 14.5 per cent. The EU's performance tracked this trend well, with the relevant share stagnating around 11.5 per cent. The US performed better, with the share in its case rising from 18.8 to 24.1 per cent. India's performance, however, was unimpressive. Not only was the absolute value of that share much less than the global average, but it increased only marginally from 4.9 to 6 per cent over the 15-year period. On the other hand China's performance was remarkable, with the hi-tech share in manufacturing rising from 7.7 to 15.2 per cent between 1997 and 2005 and staying more or less at that level through the crisis years when exports were adversely affected.

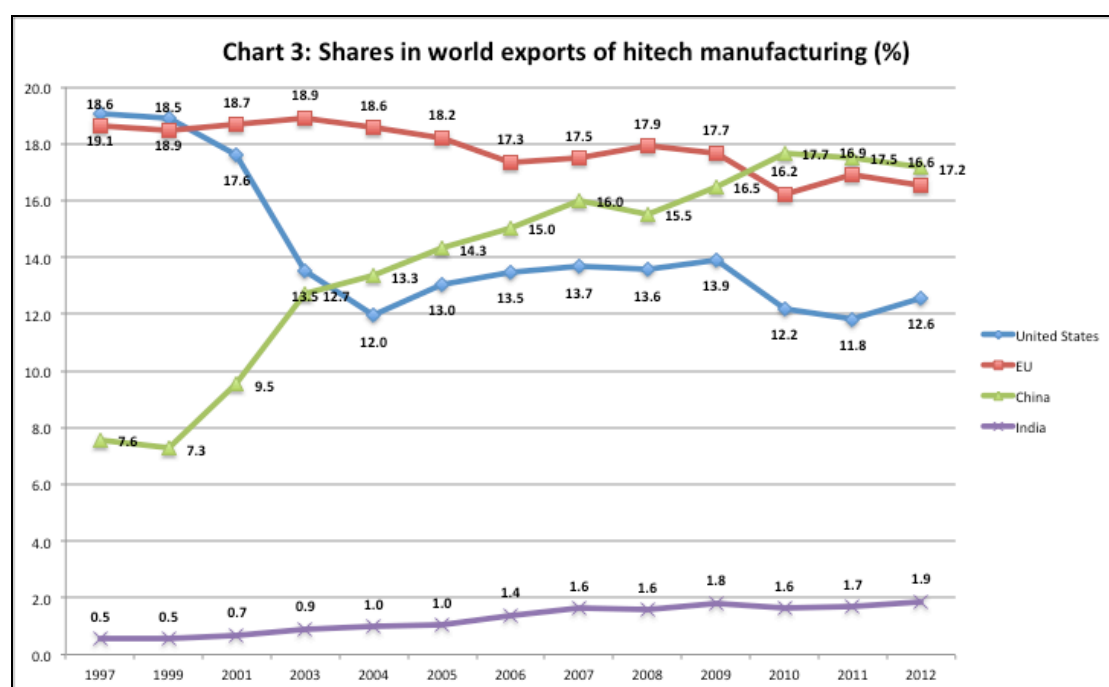


China's success as a hitech producer has indeed been dependent on its success on the export front, which is reflected in the evidence that its presence in global hi-tech trade was substantial. Its share in global hi-tech manufacturing exports rose from a little more than 7.6 per cent in 1997 to well above 17 per cent after 2009 (Chart 3). This rise paralleled a decline in the shares of both the US and the EU in global trade in these products. On the other hand, India has been and remains a non-existent player in global markets for high technology manufacturing, with a small increase in export share from 0.5 to 1.9 per cent.



What is of special interest is the structure of the hi-tech manufacturing sectors in these countries. In the case of China, in the period before the global crisis, semi-conductors, communications and more recently computers and office machinery dominated. It was only when the crisis affected exports in these areas that pharmaceuticals acquired a larger share (Chart 3). In sum, information technology hardware is central to China's hi-tech success. On the other hand, though India is considered an information technology power, the three information technology-related sectors (semiconductors, communications and computers), which accounted for around 35 per cent of hi-tech value added in 1997, contributed just about 22 per cent of that value added in 2012.

In fact, the industries that have come to dominate the hi-tech sector in China are the same as those in the developed countries, reflecting its ability to displace local producers in those markets. The structure of India's hi-tech sector on other hand was completely different. What is noteworthy is the high share of pharmaceuticals in India's hi-tech industries. That sector accounted for 57 per cent of value added in 1997 and a dominant 68 per cent in 2012. It is well known that India's pharmaceutical prowess came as a result of a combination of protection for domestic production, control over the operations of foreign firms in India, and, above all, a patenting regime that recognized process patents and not product patents. These were all policies typical of the interventionist, import substituting strategy of development adopted during the first three decades after Independence. The result was the growth of a large and diverse pharmaceutical industry that could ensure the availability of good quality drugs at prices that were among the lowest in the world. The capacities and technological capabilities built up during that time has meant that even though India has given up many of these policies and today recognises product patents as well, it is in a position to compete globally in many drugs that are off patent or are on the way to being so.



This competitiveness is also reflected in the growing external orientation of India's pharmaceutical sector. From around \$1.7 billion in 1997, exports rose to \$9.5 billion

in 2007, and then spiked to reach \$25.6 billion in 2012. This makes pharmaceutical production and exports the most successful components of India's otherwise dismal hi-tech manufacturing performance. It is not India's two-and-a-half decades of liberalisation and "reform", but the strength created during the import substitution years that drives hitech manufacturing in India. By allowing international firms with deep pockets to enter and take over India's pharma producers the government may be giving up even that advantage.

*** This article was originally published in the Business Line on August 4, 2014.**