GoI chips in: Semiconductor industrial policy is welcome. It now needs sharper focus

December 16, 2021, 9:32 PM IST / TOI Edit in TOI Editorials, Edit Page, India, Times View, World, TOI

Semiconductors are the invisible engines of the world, running things as different as mobile phones and automobiles. The world's fourth most traded product, its manufacture is limited to just a handful of countries. GoI on Wednesday announced a Rs 76,000 crore, or about $10 billion, incentive package to encourage its manufacture in India. The aim of the policy is to create a viable design and manufacturing system for semiconductors. It's an industrial policy that hopes to capture a slice of the most important contemporary industrial equipment.

Semiconductor manufacture is unlike anything else. It has three defining features. One, is its complexity – its manufacture needs at least 300 different high-technology inputs. Second, this has resulted in a global supply chain that is also highly concentrated geographically. The chain spans just the US, Europe and East Asia. Within this chain, there's an extraordinary degree of specialisation that makes it vulnerable to shocks. For example, 100% of the world's most advanced (below 10 nanometres) semiconductor manufacturing facilities are located in just two countries, Taiwan and South Korea. Third, the product sucks in the largest investment on both R&D and manufacturing among all industries. It's estimated that over the next decade about $3 trillion in investment will be needed.

The outcome of this unique structure is a winner-take-all dynamic where the top three companies in each stage of the supply chain pull in about 80-90% of the revenue. All of these factors will come into play when companies weigh GoI's incentive package. The $10 billion should be seen as an indicative support because states will also add to it once firms move things forward. It's at this stage that GoI and states will have to narrow the focus on which parts of the supply chain to encourage. Semiconductor foundries are the world's most expensive factories, which fabricate chips in hyperclean facilities. They account for 65% of industry capital expenditure but only 25% of the value addition.

Therefore, to lower the risks of investment, India should look at specially wooing back-end of manufacturing such as assembly, packaging and testing. Once it stabilises and an ecosystem develops, front-end of manufacturing will follow. Simultaneously, GoI needs to leverage the presence of Indian engineers in chip design, the part of the chain that contributes the largest value. Hand-holding startups of entrepreneurial engineers can produce large payoffs. GoI has embarked on a bold industrial policy that now needs targeted attention.