Innovation: Does Asia need Newton or Edison?

Bridging the gap between the lab and the market.

By Rajendra K. Srivastava and Philip Zerrillo

Ask who has contributed the most to innovation over the past five centuries and you might get very different answers. On one end, you would have to consider Sir Isaac Newton, who was one of the most influential scientists of our time. A philosopher, physicist and mathematician, Sir Newton was the leader of the scientific revolution, and his work at Cambridge University laid the groundwork for many of the world's greatest inventions. And on the other end, you have Thomas Alva Edison, who attended school for a total of 12 weeks in his life. This self-taught inventor with nearly 1,100 patents to his name is credited with having created the motion picture camera, the phonograph, the radio, and the light bulb, while also developing practical solutions to assist industry titans such as Henry Ford and Harvey Firestone to scale the rapidly developing U.S. automobile industry.

So, what does Asia need: a Newton or an Edison? It depends on where you are, what are your most pressing needs, and which part of the innovation process you lack.

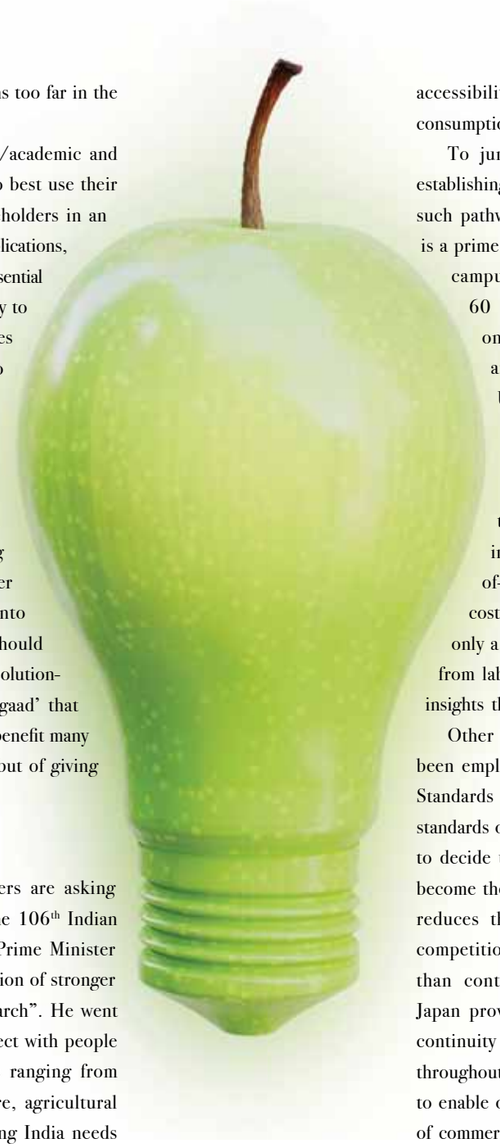
The path is long and laborious

Innovation that is driven by disciplinary research, by and large, comes with a great amount of uncertainty, a long gestation period, and payoffs that are hard to estimate. Basic research is often undertaken not for practical outcomes or the betterment of society, but to learn more or all about something that a researcher or a group of researchers find interesting. The logical endpoint of such research doesn't always culminate in an impactful innovation that improves the welfare of society or enriches lives–but it hopefully substantiates enough evidence to the world that the principles are sound and might provide clues to innovations that can be robustly applied.

The merit of such research has begun to be questioned. Upstream basic research has tended to be the domain of universities, their metrics–such as research papers, publications, scientific citations, peer evaluations, and patents–are financed by research foundations, university endowments or government grants. Commercial firms, in general, tend to avoid such long-cycle projects as the risk is too high, the returns too far in the future, and the predictability too low.

Despite divergent interests, the scientific/academic and business communities have to work together to best use their financial resources to meet the needs of stakeholders in an ever-shortened time horizon. While scholarly publications, patents, and scientific breakthroughs provide an essential starting point, they aren't always a direct pathway to commercialisation. In response, funding bodies have begun demanding that a roadmap to application and impact be provided if future funding is to be continued. To a disciple of Edison, proof of concept means little if it can't be transformed into a meaningful invention.

As many economies in Asia are battling with large or growing populations that are outpacing income growth, it raises the question whether the limited funds for research should go into incremental, science-based innovation. Or, should emerging economies be focused on need-based, solution-oriented innovation. Frugal innovation or 'jugaad' that develops ground up need not cost a lot and can benefit many people. It may not be about new innovations, but of giving existing innovations reach and affordability.



Market-ready research

Increasingly, governments and political leaders are asking for a return on scientific work. Addressing the 106th Indian National Science Congress this year, Indian Prime Minister Narendra Modi emphasised, "the need for creation of stronger pathways for better commercialisation of research". He went on to urge the scientific community, "to connect with people and commit themselves to address problems ranging from clean air, water, energy, affordable healthcare, agricultural productivity and affordable housing". Emerging India needs to focus on developing a technology that can make goods and services available to the lower-income segments. It needs process engineering that focuses on reducing costs, widening accessibility and improving durability–qualities that fit the consumption environment.

To jumpstart this sort of innovation, India has been establishing a series of collaborative centres to help encourage such pathways. The Indian Institute of Technology, Madras is a prime example, as it consists of a 1.2 million square-foot campus, complete with labs and equipment, where 60 percent of the faculty come from industry and only 40 percent from academia. Such collaborations aren't unique to India. For example, at the University of Vietnam in Ho Chi Minh City, the School of Agriculture has begun an on-campus incubator focused on agricultural start-ups and technology transfer. Thus, in developing economies, the focus has to be on frugal innovations and inventions that help society. Developing new state-of-the-art applications is less important than reducing costs and attaining scale, when the environment can use only a fraction of the current technical capacity. This link from lab to industry is being tightened by gaining market insights that ensure meaningful application.

Other ideas for reducing the risk of basic research have been employed in Asia for decades. The Japanese Industrial Standards Committee has not only been tasked to raise the standards of Japanese products, but perhaps more importantly, to decide upon which of the competing technologies should become the national standard. Once established, the standard reduces the risk for investors and industry as it allows competition to focus on manufacturing and scaling rather than continued R&D. This was a way that developing Japan provided investors a market signal and assurance of continuity to reduce risk. Similarly, sovereign wealth funds throughout Asia, via government regulations, often endeavour to enable or protect precious capital by establishing the rules of commercialisation.

Singapore too has shown a way in terms of how governments can facilitate bringing together academic research and society's needs. Developing R&D and making it market-ready has been an integral part of the country's economic strategy, serving as a source of innovation and value creation. In 2002, the Agency for Science, Technology and Research (A*STAR) became the leading institution for fostering research and development and developing talent. Simultaneously, Exploit Technologies Pte Ltd was established, charged with the responsibility of commercialising the outcome of A*STAR's research institutes and consolidating the patent portfolio of these institutes. Together, they have contributed to a pipeline of innovations that has fuelled Singapore's knowledge-based economy and high-end talent pool.

The path forward

Scientific research is not a luxury and Newton is certainly required. But, research without impact is becoming increasingly unpopular in societies with competing financial priorities and under-served needs. The Edisons of the world come to the fork in the road between pure science and applicability with a different set of skills and an appetite for taking very different risks. Their skills in capital management, human capital development, business communities, operational excellence, and market commercialisation are very different from their academic brethren and are suited for a different purpose. But in the end, if we are to clap, both hands will be needed.

As populations migrate to the major cities of Asia, the purchasing power, the basket of goods in demand, and the location of markets are changing quickly. The steps in the innovation process will need to be flexible and responsive to these needs. The solutions will need to be thrifty with broader reach. We are already seeing some unique models and frameworks emerging in Asia. The question Asian countries need to ask, and answer for themselves, is: Are we translating existing research into something useful for society?

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