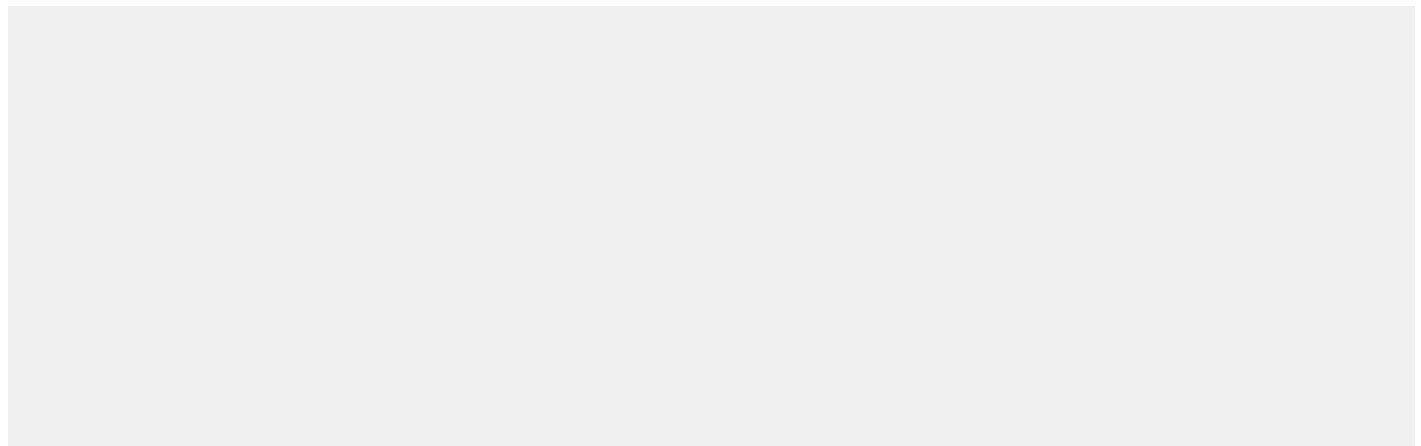


Interview with Benjamin Seet, Executive Director, A* Star



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Tags: [A* Star](#)

Singapore's proclaimed key strengths are: an educated and skilled workforce, a supportive government, great business and regulatory environment, and government-supported research institutes. What role has A* STAR played in building these capabilities?

A decade ago the biomedical industry in Singapore was relatively modest and there was little research activities outside of the universities. However, in the last ten years the biomedical sector has developed significantly. For the first 5 years from 2001 to 2005, we focused on two aspects: building infrastructure and attracting good scientists to Singapore. With regard to infrastructure, we have built laboratories and institutes to conduct internationally competitive research. As for attracting scientists, we recruited talent from outside our borders, while at the same time, trained the next generation of Singapore scientists.

The focus for the subsequent five years, from 2006 to 2010, was in increasing the capabilities of hospitals and universities to conduct translational clinical research. For example, flagship programs have been funded to support research in specific disease themes such as gastric cancer and dengue. Furthermore, there was emphasis on building research infrastructure in hospitals and in training clinician scientists. This is a long-term investment as it generally takes 15 years to train a clinician scientist as they need to obtain their medical degree and PhD, followed by speciality training.

We have entered the third phase, from 2011 to 2015, where the focus is on working with industry for economic outcomes.

One consistent theme across the development of Biopolis is the focus on scientific talent. While we have been successful in attracting scientists from around the world to work here – more than half of our scientists come from as many as 60 countries, we cannot build our research ecosystem on foreign talent alone. For that reason, there has been a concerted effort to train young Singaporeans in science. We have been awarding scholarships to Singaporeans right out of high school, and sending them to some of the best universities across the world. Today, we now have more than 1,100 young scientists in the talent pipeline who will eventually be deployed across Singapore.

Given the importance of continuing to grow local talent, how challenging is it today to convince Singaporeans to study science?

I believe it is the same as anywhere else in the world. Sectors such as banking, medicine and law are more attractive in terms of financial opportunities. One of A*STAR's roles therefore, is getting young people interested in science. We conduct engagement activities and provide research attachments for secondary schools and junior colleges to raise awareness in science. There is a strong emphasis on science education in our schools. This has resulted in a healthy interest in science among our young people.

Now that the country is in the third phase of its BMS initiative, do you believe that Singapore has reached its ambition to be the Biopolis of Asia?

While we have our successes, there are still challenges we have to face. The whole process of pharmaceutical development is evolving. Many large pharmaceutical companies are pushing towards open innovation, leveraging on public sector research rather than developing everything in-house. This provides opportunities for collaboration.

At the same time, Singapore needs to remain competitive in the face of developing biomedical clusters in Japan, South Korea, China and India. Our population is a mere 5.2 million people, hence, we lack the domestic market of these larger countries. To be successful, we need to be competitive internationally.

Where does A*Star stand in translating innovation and advanced technology into viable economic products and services?

A* STAR's purpose is to support economic development in Singapore. We use science as a tool for economic development.

Let us have a look at the economy. One of the key indicators is the total biomedical manufacturing output, which has increased significantly – from S\$6 billion per year in 2000 to S\$27 billion in 2011. Furthermore, 22% of the total manufacturing value-added is derived from the biomedical sector.

Another measure of economic performance is the number of jobs created in the biomedical sciences. This has increased almost three-fold from about 6,000 to more than 15,000, with another 5,000 in R&D.

With regards to Singaporean start-ups, we are still young with most of our institutes between 5 to 10 years old. In the pharmaceutical industry, it would take longer than this to bring a new product from an idea to the pharmacy shelf. In this respect, we are on a good track.

Contrary to the industry's expectations of four years ago, there have been some setbacks. What went wrong and what will be done in order to avoid these kinds of failures?

I wouldn't consider it a failure. New companies across every industry sector anywhere in the world fail for various reasons. While some of Singapore's biomedical and med tech companies have not succeeded, there are also success stories. We need to see the larger picture – there has been substantial growth in the pharmbio and med tech industry here, and certainly more success stories than failures.

In a recent speech, honourable Prime Minister Lee mentioned how Singapore cannot afford to stand still but instead keep pace with a rising China and India. Where do you think Singapore stands in terms of science and what is next?

We produce world-class science. As a small country, our scientific output is small compared to Japan or China. However, if we look at the Nature Publishing Index that assesses different countries by how they perform in terms of publications – Singapore is number five in the Asia Pacific. When we normalise this ranking in terms of the number of high impact publications per scientists, we are number one.

For us to be competitive, we need to be differentiated. We need to offer companies a good enough reason to shift their R&D operations to Singapore.

Stratified medicine is one example. The way that cancer has been treated in the past was based on population data derived from clinical studies and observation, rather than from each individual's

biodata. An interesting change is that technology has become affordable, which allows us to obtain a lot of information at relatively low cost – this includes genomic sequencing and molecular studies. This allows us to identify biomarkers to personalize healthcare, where treatment decisions are tailored according to an individual patient's genetic or other information. In the context of Singapore, we are well poised to conduct research in diseases that primarily affect Asians, for example gastric or hepatocellular cancer, or that present differently in Asians, for example obesity. We cannot only study differences between Asian and other populations, but variations between different Asian races. This provides for more targeted therapy, while at the same time, allows pharmaceutical companies to stratify and differentiate their products for Asian populations.

Beyond pharma, other industries are also looking towards mechanistic biology to differentiate their products for different populations. Large international corporations in the nutrition and food industry such as Nestle and Abbot have begun to look at how to use biological tools to identify segments of the population that can benefit from nutritional intervention for diseases such as diabetes, obesity and cognitive decline in aging. Ultimately, this could present an alternative approach towards preventing cancer and chronic diseases.

Another area is the personal care industry. For instance, Procter & Gamble (P&G) will be opening its new innovation centre in Singapore. The reason is that we provide a single location to study Asian skin, particularly in the tropical climate, allowing such companies to develop products for growing Asian markets. By establishing this centre within Biopolis, P&G also has ready access to the scientific capabilities, knowledge leadership and research support services here.

Beyond biology, A*STAR is also converging capabilities from across biology, chemistry, engineering and the physical sciences into common thematic areas. This allows us to work towards new solutions in energy, materials and chemicals. Examples include the conversion of biological products into other products, such as chemicals, as well as synthetic biology.

To sum up, we have to identify niche areas to remain differentiated and competitive in pharmbio, while at the same time, expand our horizons to find new opportunities in other industry sectors. The underlying theme has to be a strong foundation in basic science that could be translated into clinical or industrial applications.

A*STAR has Public Private Partnerships with diverse industry players such as Roche, GSK and Bayer. How has A*STAR developed these win-win PPP models?

There is no fixed model for collaboration and partnership. It is important to be flexible.

For example, there is the one-to-one model where a single research institute collaborates with one pharmaceutical company. On the other hand, we have the many-to-one model where several research institutes collaborate with one company; as well as consortia where the relationship involves many-to-many.

One useful instrument is the MRCA or Master Research Collaboration Agreement, which we have signed with companies like Roche and GE. This enables an MNC to work with different public institutions including A*STAR institutes, universities and hospitals through a single collaboration agreement. This allows companies to leverage on the wide range of scientific capabilities that span Singapore, ranging from biology, engineering, computing to clinical trials, without having to sign multiple agreements. It saves time and cost.

In brief what is A*STAR and Singapore's commitments to the pharmaceutical and biopharmaceutical industry?

Singapore has made substantial financial, infrastructural and human resource investments to develop the biomedical sciences. From 2011 to 2015, the Government has committed S\$16.1 billion for R&D, of which about 40% has been allocated to the biomedical sciences. This represents a 12% increase from the previous budget allocation. The total spending on R&D is close to one percent of our GDP and is a clear indication of the Government's continued commitment to this area.

When it comes to people, A*STAR continues to sponsor some of our nation's best scholars for education in science and engineering. This creates a talent pipeline that extends as far into the future as 2022. These individuals represent the future of Singapore science.

Before joining A* Star you had a 22 year career as a medical officer in the Singapore Armed Forces. How exciting has it been for you to start this new position?

Prior to coming to A*STAR, I served in a leadership position in two organisations. As the Chief of Medical Corps of the Singapore Armed Forces, I oversaw the health needs of our servicemen; and as the Chief Medical Officer of the Department of Peacekeeping Operations at the United Nations, I was responsible for more than 200 clinics and 20 hospitals across some 18 post-conflict countries.

There are many similarities between these positions and my current job in A*STAR. It involves managing substantial resources in a large organization. It involves formulating strategies and developing plans to drive the organisation forward. It involves managing the process of change including getting buy-in from stakeholders. The key difference and my biggest challenge is the

subject matter itself – science and biology are developing at a rapid pace and I have to read extensively to keep current. With my schedule, it has not been easy to do so.

What is the most rewarding part of being a public servant?

I would say it is the satisfaction of seeing early ideas develop into concepts and policies, and to see these translated in turn into funded programmes, which eventually lead to new structures and capabilities. Just over a decade ago, the biomedical science story in Singapore was an idea; today we have the Biopolis with its research institutes, companies and more than 3,000 researchers from the public and private sectors. The rewards come from being a part of this development and having a role in creating its future.

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