Fong Chin Su – Deputy Minister for Science and Technology, Taiwan



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Deputy Minister for Science and Technology on Taiwan Fong Chin Su gives his insights on innovation, cybersecurity, and the current state of one of the world's most exciting biotech industries.

To start with, could you share what your priorities have been over the last few months as Deputy Minister of Science and Technology?

I have only been in the role for three months. In fact, I started on February 21st 2017. To lead Taiwan's biotech and medical industry innovation programme is a great change in terms of responsibility for me. How to integrate a team full of new staff is a great challenge. We need talent, investment as well as intellectual property development connecting knowledge with commercial ideas. My duty is to integrate all resources in biotechnology, medical technology and health technology. These efforts should encourage not only innovation but an increase in start-ups and entrepreneurship. It is very important to increase the number of companies operating in Taiwan and to eventually export biotech products to foreign countries. This is crucial because as a small island we have to channel and market these products successfully in order for the companies themselves to thrive. The industry refers to this part of the process as "the last mile" and that is just one part that the BIIP (Biomedical Industry Innovation Program) is targeting in order to boost

the industry in Taiwan. Importantly, we have already seen a lot of investment in the industry and 28 new companies have started operating here in light of the BIIP initiative. With that kind of increase, there is a lot of scope for new creation. We are viewing the formation of these 28 new companies as a sort of breakthrough moment in the biomedical industry and we must support this field not just through investment but increasingly by providing better infrastructure and regulations as well. We must encourage these companies to invest more by providing commercial confidence and support where necessary. Specifically, as Deputy Minister, I coordinate the program alongside the Ministry for Economic Affairs, Ministry for Health, National Development Council, Ministry for Education and Academia Sinica.

Taiwan's "new economic model" is based on the five innovative industries, including the pharmaceutical and biotech sector. How would you say the biotech sector has matured over the years and why is it playing such an important role in the future development of the country?

Taiwan's history with biotech only shows 10 years of focused development. The government is committed to an innovative economy centred around the "5+2 Industrial Innovation Program" that includes the biomedical sector as one of its five strategic industries. That initiative in turn is promoted by the Biomedical Industry Innovation Program (BIIP).In my view; a location needs this amount of time (10 years) to create a new and successful industry. We are now at the stage where we need to increase our efforts to promote this development further. I believe this industry will play a key role in the future of Taiwan's economy. Specifically looking at different aspects of the sector, the government expects niche pharmaceutics and medical devices to be pillars of future growth. With our country's changing demographics, we also anticipate growth in the health and welfare sector due to our P4 medicine initiative (Predictive, Preventive, Personalised and Participatory Medicine).

As Deputy Minister for Science and Technology, can you assess Taiwan's industrial and academic competitiveness on the international scale?

Taiwan has a long way to go before it is a leading manufacturer of medical materials but we have managed to build up strong foundations in areas like mechanical engineering, chemical engineering and ICT technology for the sector to utilise. Equally, we are credited with having strong clinical research capabilities and have a field of talented scientists and physicians who provide a

mixture of local knowledge and experience gained from working abroad. The creation of prototypes and new technological developments are very important to Taiwan's competitiveness on the international scale. In addition to building the foundations for more start-ups to succeed, we must continue to focus on machinery, ICT and other factors in order to reduce the time between product creation and that product arriving on the market. However, we are very happy with our current progress. Taiwan is already recognised as a leading country for medical development and is home 14 of the world's top 200 hospitals. The government is looking to build stronger ties with our domestic industry and potential export opportunities with the rest of the world. This would help to position Taiwan as a major hub for biomedical and biotechnological R & D in the Asia-Pacific region. Whilst not an easy ambition, geographically becoming a major hub for biomedical and biotechnological R & D would serve the region well as Taiwan is situated within four hours flight of all the major Asian cities.

A lot of the stakeholders we have met here in Taiwan said that Taiwan's innovation-driven ecosystem has the potential to be widely recognized as a biopharmaceutical hub of reference in the world. How will you ensure your competitiveness in the region? (in terms of investments? (Attracting big pharma?)

Taiwan is particularly proud of the fact it is currently ranked 1st for medical care. This high ranking is due to a combination of two factors; our public health insurance system and our very intelligent and talented medical staff. We have an entrance examination and those who pass this stage of the process are really high-level candidates. The laws and regulations we set have a direct impact not only on medical care but innovation too. We have also managed to put together several teams with different professional backgrounds to encourage research and the commercialisation of new products. For instance, one team could consist of doctors, engineers and biologist. Therefore, it is a real collaborative effort.

What role does the state undertake when implementing measures to facilitate stronger links between academic research & industrial development?

Not only the Ministry of Science and Technology but the Ministry for Economic Affairs actually have been very consistent in their funding and support for biomedical research. The Ministry for Economic Affairs provides certain institutions with grants to encourage not just innovation but collaboration between academia and industrial development. We have a national strategy to

stimulate collaboration.

The recent launch of BioIPseeds enables further enhancement of open innovation culture in Taiwan, fostering collaboration between academia and the industry. How do you see it contributing to Taiwan's innovative life science ecosystem?

BioIPseeds has only really just started but we believe we have supported the programme well thus stimulating companies to take advantage of this innovative culture that we have created. BioIPSeeds is one example but in Taiwan, we are also encouraging academia and commercial players to collaborate using the Internet of Things as well as a variety of other networks. The Taiwanese government is very keen to impress this idea of collaboration. For instance, every science park is connected to an academic network. Our overall strategy has become very popular with companies. It is all about bridging the gap between academia and commercial players. This is something that is not easy to do but programmes like BioIPSeeds can certainly help organisations see the benefits of collaborating with each other.

What opportunities does the implementation of innovative technologies such as BioIPSeeds create? And how can the government help to ensure adoption of open innovation platforms in biopharma industry as well as academia?

Nowadays, cross-industry and cross-domain collaborations are almost mainstream functions and you can see evidence of this in many advanced medical treatments. BioIPseeds is essentially a cross-domain collaboration platform combining blockchain and biomedical science.

We are in an age of open innovation. Therefore, everything is possible in terms of new creations. Because we are not actively promoting specific medical fields the scope for new developments is very wide. Taiwan is a small country that always needs to have a global perspective. The government can facilitate this by creating a brand and a reliable image for the country. The government will also be looking to channel talented young professionals into the sector.

One important point is the grants received by both universities and research institutes. Between 30-40% have intellectual property and are collecting increasing large amounts of data. This is a very important stage in collaboration. Through the MOST project and the expansion of IP, we would like to see larger databases of useful information. Whilst many companies seek early research applications, we are focussed on creating a platform where academia and industry can share

innovative ideas. BioIPseeds does exactly that and we hope it represents a new era in biomedical collaboration.

Taiwan also has a very interesting project in Emerging Stock Brand where the government permits biopharmaceutical firms to list before they are profitable. Being able to go public before revealing profits has encouraged firms to list early for access to easy financing. This has helped transform Taiwan into a particularly favourable destination for biotech IPOs.

Academia is yet to fully embrace the concept of open innovation. Therefore, to bridge the gap between academia and industry BioIPseeds contains a P2P platform which allows academia as well as biomedical companies to integrate internal/external resources and knowledge thus creating a variety of new opportunities.

The Ministry of Science in South Korea has recently initiated world's first blockchain pilot for insurance payments (A blockchain platform built between the insurer and the hospital. This will, in turn, enhance the efficiency of this process while reducing the time taken for payments). IBM data shows that 9 out of 10 governments plan to invest in blockchain by 2018, how has Taiwan's government been responding to the blockchain technology?

I think one of blockchain's best aspects is the fact it provides great support. It is also particularly advanced in the field of artificial intelligence. This is interesting for us because we have invested a lot of money on artificial intelligence ($5Bn). We could use a programme like this to encourage further research. We are also investing a lot in digital health infrastructure (over the last 2 or 3 years approximately $15Bn). That figure also includes telecommunications but generally, we are investing a lot in research.

"The current state of health care records is disjointed and stovepiped due to a lack of common architectures and standards that would allow the safe transfer of sensitive information among stakeholders in the system (Deloitte), this has been proven by the recent cyber-attacks on NHS in the UK and globally." What can governments across the world and in Taiwan learn from this occurrence when ensuring health data safety?

As with any public health service, we have a large database and security is obviously a key factor in its credibility but I would ask the following question. What system was the UK using? I only ask

because it appears to be a privacy concern not a cybersecurity issue. Blockchain in terms of data security is sufficient but one has to look at the transfer of medical data into another party's hands. Privacy of information is what most health services and patients are concerned about. Information security is obviously an evolving government interest and Taiwan is already developing stronger programmes with the aid of private organisations. Currently, the government is still hoping for further cybersecurity evolution before new initiatives are piloted. In fact, the government is also encouraging private-sector research in regards to data security. A leading university has already started an investigation into the improvement of cybersecurity in the field of medical information.

Provide us with some tangible objectives you absolutely want to achieve under your tenure at MOST.

We would like to be one of the best countries in Asia for biotech by 2020. We want to see more and more biotech companies operating in Taiwan thus increasing investment in the industry but ideally, I would also like to see increased export levels to foreign nations.

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