BioSpectrum the business of Bio & Health Sciences ASIA EDITION

Autonomous buildings key to driving pharmaceutical advancements

April 7, 2021 | News

By Cheah Lin-Ken, Regional Director, Life Sciences, Lendlease



With COVID-19 accelerating the digital economy and the shift to Industry 4.0, how can pharmaceutical companies drive further advancements in construction for faster, safer, and higher quality delivery?

As a leading biomedical sciences hub, Singapore joins the ranks of other front runners such as the US and Germany in the global fight against the coronavirus, with local human clinical trials of a vaccine well underway.

While the world continues to grapple with the economic fallout from COVID-19, this search for a vaccine has spurred a global market rally in the pharmaceutical industry akin to the ongoing tech one. Amidst all the gloom, it is fast becoming clear that the biomedical sector holds the key to boosting Singapore's post-pandemic recovery.

Biomedical manufacturing a bright spot for Singapore

At the macro level, the pharmaceuticals and biotechnology sectors have long been strategic plays for Singapore. According to Goldstein Research, Singapore's pharmaceutical market is anticipated to grow at a compound annual growth rate (CAGR) of 6.40% during the forecast period from 2017 to 2030. Meanwhile, its biomedical industry, which employs more than 24,000 people, accounted for about 20% of the manufacturing sector in 2019 which in turn accounted for about a fifth of the country's GDP.

Data from Singapore's Ministry of Trade and Industry has revealed that in the pandemic environment, the largest contributor to the growth of the country's manufacturing sector in the first half of this year was the biomedical manufacturing cluster. This was driven by a surge in the production of pharmaceutical and biological products and is expected to continue throughout the second half of 2020.

With the pandemic fueling the demand for Singapore's pharmaceutical exports, and in turn, underscoring the significance of the sector to the country's overall economic health, the government has signaled and reaffirmed its commitment to the industry by allocating greater resources to support its growth, including providing more opportunities for talent development and upskilling.

Renewing focus on pharmaceutical facility design

At present, Singapore is consolidating its position as a global pharmaceutical manufacturing hub in Asia. Core to this is the creation of a conducive ecosystem centered around people and partnerships, as evidenced by the 2019 launch of the Experimental Drug Development Centre (EDDC), a national platform for drug discovery and development. As part of this future-proofing exercise, Singapore is also bolstering its strong pipeline of talent, and against the backdrop of the pandemic, it is concurrently expanding its vaccine manufacturing capacity so that production can be efficiently increased once a COVID-19 vaccine is found.

To value-add to Singapore's capacity-building efforts, a refreshed look at the entire biomedical value chain is required. In adopting a whole systems approach and analysis, it then becomes easier to discern the white space where other players can come in to contribute to the wider industry – the built environment.

Owing to the complexity of the research and manufacturing of pharmaceuticals, the industry is traditionally well-regarded as being at the forefront of science and technology. This need for highly specialized skill sets, however, extends beyond the research and development (R&D) and manufacturing aspects and also spills over into the design, construction, and management of pharmaceutical facilities as well.

For example, the life science sector requires extremely high standards to be delivered, with zero tolerance for environmental and production contamination. Safe delivery and execution, coupled with minimal disruption to ongoing production lines, are equally critical. Additionally, no two pharmaceutical projects are the same – each comes with its own unique set of challenges and requirements. The set up for a facility focused on biologics, where living organisms such as cells and tissues are mixed, would differ greatly from one that produces bulk pharmaceuticals such as oral drugs.

Given these requirements, the built aspect of the biomedical industry can rightfully be considered as a hotbed of innovation, and promoting advancements in this space will not only enhance the pharmaceutical ecosystem but also improve its ability to safely manufacture at scale to keep up with the rising demand. However, one question still remains: how do we build agility into pharmaceutical facilities going forward?

Embracing autonomous technology to meet pharmaceutical supply chain needs

The spread of COVID-19 has accelerated the digitalization of the pharmaceutical and biotech sectors, shining the spotlight on Industry 4.0 to support this unprecedented growth.

The move towards Industry 4.0 focuses on delivering and enabling transformation through digitalization, and in the pharmaceuticals industry, the next frontier to explore is autonomous technology, which promises to fundamentally change the way pharmaceutical manufacturing facilities works. From autonomous robotics and autonomous cleanroom design types to new in-line and at-line process analytical technologies that facilitate fully automated production with the automatic product release, embracing such smart technologies can help to unlock greater efficiencies across the supply chain.

These include the conception of a more holistic and integrated building design, as well as greater accuracy and the automated use of construction components. Meanwhile, with the implementation of digital twin technology, we are also able to solve problems earlier in the cycle while saving money and constructing better and safer facilities.

As the vaccine race intensifies, speed to market is of utmost importance to the pharmaceutical and biomedical firms keen on maintaining their industry leadership. In this instance, the use of modular design and construction, as well as mobile systems would be useful in speeding up programmes and fast-tracking deliveries. Here, the choice of partners is of paramount significance.

For example, integrated property and infrastructure groups are equipped with the expertise to guide their partners beyond maximizing value towards innovative and sustainable outcomes, at every stage – from development and investment

management to construction and asset and property management. An integrated project management system is also better suited to holistically manage risk, save time, reduce cost and deliver quality, while simultaneously prioritizing safety at all times.

The biomedical industry is now at a crossroads, and the time is ripe for pharmaceutical companies to take a bold step forward. While poised to lead in a post-COVID19 world, they must be surefooted in their take up of autonomous technology by partnering with the right developer. Only then can they confidently execute their growth strategies and help cement Singapore’s position as a world-class pharmaceutical hub.