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Singapore – A Strong & Growing Healthcare Industry

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Singapore has established itself as a leading country in biomedical sciences manufacturing and R&D activities. In addition, it also provides numerous opportunities for private enterprise to partner with its public-sector research institutes, clinical-research units in hospitals as well as international research organisations.

While Singapore already has one of the most efficient healthcare systems globally (ranked second by Bloomberg Healthcare Efficiency Index 2016), its integrated approach towards the bio-pharma business environment continues to further strengthen its position in an otherwise difficult time for pharmaceutical and biotechnology companies. As organizations across the spectrum struggle on multiple fronts – declining R&D, pressures on costs and margins, heightened competition – they are increasingly getting interested in leveraging Singapore's enabling and efficient ecosystem to further their productivity and profitability. This is quite evident from the fact that more than 30 leading companies (including the likes of GlaxoSmithKline, Novartis, Amgen and Takeda) have chosen Singapore as their base for APAC operations and are using the city-state's enabling facilities to drive innovation, efficiency and business growth.

According to a recent study by research and consulting firm GlobalData (published in June 2017), the pharmaceutical market in Singapore is set to rise from S$1.28 billion in 2017 to around S$1.6 billion in 2021, and will first exceed the S$1.35 billion mark in 2019.

Singapore's approach to attracting sectoral investment sector is multi-pronged, with a (1) focus on government initiatives and friendly policies, (2) enabling public-private partnerships, (3) making it easy for Singapore to become a preferred manufacturing base, (4) creating dedicated infrastructure to provide synergies and economies of scale, and (5) providing necessary incentives and impetus on digital health and med-tech. According to EDB, this has in turn helped the sector catapult itself into a significant and growing contributor to Singapore's economy – about 3.5 to 4.0 percentage of GDP is already attributable to it, amounting to roughly around S$ 27 billion (of which, approx. ~S$16 billion is from pharma and ~$S11 billion from med-tech). This is not a jobless growth either, as it has resulted in creating more than 18,000 jobs in recent years (with an approx. split of 2:1 between pharma and med-tech).

Public healthcare expenditure in Singapore is an equally important area that deserves a mention, as it provides unforeseen

challenges and opportunities for the business. Though the city-state has maintained a modest overall spending in this area, a significant expense towards costly healthcare facilities is still privately spent.

Preferred Pharmaceutical Manufacturing Base

Process research and development capabilities in Singapore are helping companies innovate and improve biologics as well as small-molecule production. Further, with the objective of getting industry and research to collaborate, Biopharmaceutical Manufacturers' Advisory Council (BMAC) – a think-tank comprising of members from local pharmaceutical plant site directors and government agencies, is committed to making Singapore become a highly-skilled manufacturing economy with a proven record of quality and process development capabilities. Other examples include Singapore's Institute of Chemical and Engineering Services (ICES) opening a pilot-scale laboratory facility to aide pharma companies in process development and improvement.

All these efforts have yielded results, with all pharmaceutical commercial manufacturing facilities here receiving validation from international regulators such as the US Food and Drug Administration (FDA) and the European Medicines Agency (EMEA). A world-class physical and regulatory infrastructure, excellent global connectivity and a highly skilled human resource, therefore gives Singapore a competitive advantage.

This enabling ecosystem has helped Singapore become a leading choice of biopharmaceutical companies that are setting up their global manufacturing base here. Firms like Abbott, GlaxoSmithKline, Lonza, MSD, Novartis, Pfizer, Amgen and Sanofi-Aventis – just to name a few – have multi-purpose plants here that have the capability of manufacturing a range of active pharmaceutical ingredients (APIs), biologics and nutritionals. Generally speaking, it has steered a number of pharmaceutical and biotechnology companies to diversify their operations over time and led to a focus on developing manufacturing capabilities other than APIs. The country has made significant inroads in areas such as biologics manufacturing: with Baxter, Lonza, GlaxoSmithKline and Roche announcing capital investments for setting up biologics facilities in the range of S$2.7 billion.

Over the last few years, there are some examples of growing interest and investment in this area:

- GlaxoSmithKline (GSK) provided ~S$8 million in research funding to 14 principal investigators under GSK-Singapore Partnership for Green and Sustainable Manufacturing (GSM). This is a second tranche of such investment that has provisioned S$33 million of funds totally. The focus of this grant is to conduct research in areas related to chemical-, physical- and bio-transformations, facilities and supply chain, equipment and technical operations, life cycle assessment, and solvent selection and optimisation, with the objective to develop innovative solutions that improve operational efficiency and viability of global operations.
- Abbott made its first major capital investment in Asia – also its largest ever investment in nutritional space, with its S$450 million nutritional powder state-of-the-art manufacturing facility in Singapore. This aims to address the increasing regional demand for nutritional products.
- In the area of biologics, Amgen is amongst the latest in Singapore, and its facility is truly "next-gen": utilizing single-use, disposable technologies. This also helps make its footprint significantly smaller (~75%) than conventional plants, while maintaining similar output levels.
- Lonza invested CHF 10 million to expand its biopharmaceutical development services platform in Singapore. This is an expansion to its biological manufacturing facility here, augmenting it with 1858 sq. mt. of state-of-the-art laboratory space and associated equipment, which will seamlessly integrate to enable a full range of front-to-back service offering: from development through pre-clinical and small-scale manufacturing, to large-scale commercial supply. Focus of this platform is to provide support to areas such as cell line construction, upstream and downstream process development, and a wide range of analytical services.
- AbbVie simultaneously announced regarding two new manufacturing facilities: one each for small-molecule APIs and biologics, aiming to build capabilities for both small and large molecules.

In recent years, Singapore has seen investments in a wide range of capabilities, such as: bioprocess development, next-generation facilities and cell therapies. It also remains committed towards developing a skilled workforce that is ready for future challenges and opportunities in biotechnology and pharmaceutical manufacturing. The sector is supported by a growing base of ~5,000 skilled engineers and technicians, and more than 300,000 skilled employees in related sectors such as chemicals, electronics, engineering. Already representing a thriving sector of Singapore's economic growth, industry is also a significant contributor to GDP and job creation.

According to Datamonitor 2012, Singapore was the third fastest growing nation globally in the export of pharmaceutical products from 2000 to 2010. The trajectory continues upwards, thanks to the government's focus to make Singapore a destination of choice for the sector.

Public Private Collaboration: A cornerstone for Healthcare Advancement

Singapore has established itself as a leading country in biomedical sciences manufacturing and R&D activities. In addition, it also provides numerous opportunities for private enterprise to partner with its public-sector research institutes, clinical-research units in hospitals as well as international research organisations.

Singapore's medical advancements propelled by Government's strong commitment to basic and clinical R&D, is further demonstrated by the establishment of dedicated state-of-the-art infrastructure, which co-locates public sector research institutes with corporate labs. Biopolis, at One-North, is a pioneering effort to facilitate such collaboration in the life-sciences and bio-medical space. Similarly, Tuas Biomedical Park (TBP) is a 360-hectare stretch of ready-prepared and specifically-zoned land set aside by the government for pharmaceutical and biologics manufacturing.

Encouraged by government focus, a number of pharmaceutical companies have taken the lead in leveraging this opportunity by making investments or financial commitments towards establishing and growing their centres of excellence for research and development:

- Rocheestablished its Singapore Hub for Translational Medicine (CHF 100 million) comprising of a multi-disciplinary team, to partner with scientific and medical institutions in the country. Objective of the hub is to focus on disease biology for accelerating drug discovery and development.
- Bayer Healthcare invested S$14.5 million in five projects with local academic institutions to advance research and development towards oncology diagnosis and treatment *(source:EDB).*
- GlaxoSmithKline established its first Academic Centre of Excellence in Singapore, with an initial focus on early-stage research in ophthalmology, regenerative medicine and neuro-degeneration.
- Maccine had earlier started a joint initiative with A*STAR's Singapore Bioimaging Consortium to form the Translational Imaging Industrial Lab (TIIL), which aims to be a state-of-the-art preclinical imaging facility for drug development.
- Siena Biotech is also partnering A*STAR's Experimental Therapeutics Centre, for developing molecular inhibitors of a major signalling pathway in oncology that will target difficult-to-treat cancers.
- Humalys SAS and Cytos Biotechnology are working with Singapore Immunology Network to develop antibody-based therapies for infectious diseases that are relevant in the Asian context.
- GSK Biologicals and A*STAR's Bioprocessing Technology Institute are partnering on vaccine and adjuvant system-related research projects.

Further, with an objective to facilitate research and innovation in the sector, government has started a number of programmes that are focussed at nurturing collaboration between scientists and industry experts, so as to translate research into implementable solutions. Some initiatives to facilitate this process include:

- Singapore Translational Research (STaR) Investigator Award recruits leading clinician scientists for pursuing translational and clinical research
- Clinician Scientist Award (CSA) provides financial support to medical researchers
- Translational & Clinical Research (TCR) Flagship Programme (with a 5-year budget of up to S$ 25 million) provides an avenue for collaborative scientific problem solving and translating academic research into healthcare solutions for patients
- Competitive Research Programme (CRP)(with a 3-to-5-year budget of up to S$10 million) provides funding across a spectrum broad of research ideas, including supporting initiatives that help identify new strategic research areas that have the potential to strengthen the core capabilities of the sector
- Health Services Research Competitive Research Grants (HSR-CRGs) – a maximum of S$ 1 million provided by Ministry of Health to eligible public healthcare and academic institutions, promotes research and its translation into policy and practice

Advances in Digital Healthcare Solutions

Further building on the conventional Singaporean skill-set, which already has a strong and capable presence in Infocomms and IT sectors - focus is to work with healthcare industry into translating these competencies into applications within healthcare. Strategy also greatly aligns with Singapore's vision of becoming a Smart Nation. EDB, along with its partnerships, as well as other similar institutions with a related mandate, help meet the objectives of creating job opportunities and

partnerships, as well as opening up new possibilities to enhance the way we live, work, play, and interact.

The Global IT Hub in Singapore, setup by MSD, apart from focussing on software engineering - puts a lot of impetus on emerging and increasingly relevant areas of technology such as data science and cyber security. More recently, and with an aim to harness technology for healthcare – it has also expanded its competencies into areas such as digital health, bioinformatics and cognitive computing. Similarly, Merck (MSD) has also invested in a global innovation hub in Singapore, focused on harnessing digital technologies. Apart from core IT operations, it also supports skill development that are traditionally non-existent in healthcare companies, but are increasingly becoming important.

Generally speaking, there is a growing interest in the industry to invest in capabilities that are digital in nature and harness data driven analytics to provide insightful solutions for addressing real-world healthcare problems. From Singaporean perspective, it is of great essence to create an ecosystem the enables med-tech companies to build such capabilities and platforms, which further the advancement and growth of healthcare industry.