Biomedical Science (BMS) is one industry that is being pursued by Singapore since it embarked on a path to transform itself into a knowledge-based economy. In 1999, the life sciences sector was officially declared by the government as the “fourth pillar” of Singapore’s manufacturing sector, after electronics, chemicals and engineering. Since then, progress has been dramatic. Over five years, BMS has grown to account for 9.1% ($17.2 billion in 2004) of total manufacturing output in Singapore. Most BMS output is dominated by pharmaceutical production. The medical technology (medtech) sector accounts for only about 11.8% ($2.0 billion in 2004) of the total BMS output. Despite the low base, the medtech sector has shown tremendous growth potential. For the first half of 2005, medtech manufacturing has outperformed BMS overall, with medtech output growth of 11.5% year-on-year, as compared to 7.7% contraction in overall BMS output. Moreover, the medtech sector accounts for 58.3% of jobs in the BMS cluster. The robust growth is a result of long-standing efforts by the Singapore government, led by its Economic Development Board (EDB) to promote and attract leading global medtech companies to establish operations in Singapore. The island nation now hosts the manufacturing operations of leading multinational medtech companies, such as; Applied Biosystems, Baxter, Becton Dickinson (BD), Biosensors, CIBA Vision, Fisher Scientific, Hoya Healthcare, Japan Medical Supply (JMS), MDS Sciex, Siemens Medical Instruments, 1800-Contacts, Essilor, Olympus, Philips Medical.

Medtech versus Pharma Performance

“Although the life sciences instrumentation sector (medtech) occupies a niche market, it plays an important role in supporting the BMS industry. As this BMS industry gains a strong foothold in Singapore and the region, the life sciences instrumentation sector is well-positioned for tremendous growth.”
Singapore–Asia’s Medical Technology Hub

Aside from attracting foreign players, Singapore’s favorable environment has also encouraged the establishment of local medtech companies. Although homegrown companies, such as Eutech Instruments and Forefront Medical Technology, represent only a mere 10% of total medtech output, they are instrumental in helping to build the nation’s indigenous technology capabilities. Multinationals can also tap into these local expertise to boost their research and development activities in Singapore. In recent years, Singapore’s diverse medtech sector has seen a shift from high volume devices such as medical disposables and consumables (e.g., syringes, catheters) to high value devices such as electromedical equipment and instrumentation (e.g., research instruments, analyzers, hearing aids). Moving forward, Singapore’s medtech sector is also expected to see further diversification into drug delivery and molecular diagnostics devices. Already several new projects for setting up high-value devices manufacturing facilities in Singapore have been announced recently. MDS Sciex, a subsidiary of Canadian-based MDS Inc, announced that its facility will be ready to manufacture the company’s Cellular Analysis product line and the transition of selected mass spectrometer in 2006. Forefront Medical Technology (Singapore) will be expanding its plant to contract manufacture medical devices used in the field of anesthesiology. “The opening of the Singapore facility is a pro-active move that is part of a broader strategy designed to ensure MDS Sciex maintains its market-leading position in an increasingly competitive environment.”

Strong Local Support Industry

Considering the increasing number of medtech companies preferring Singapore over other locations in Asia, we can only assume that Singapore has its unique attraction that sets it apart from others. One very distinct feature of Singapore is its very strong base of electronics and precision engineering industry built up since the 1980s. The engineering industry alone employs around 90,000 people and generates more than S$19.2 billion in manufacturing output in 2004. This supporting industry offers strong technical backing for medtech companies, which includes: Precision engineering of a wide variety of materials such as plastic, rubber, silicon and metal. Mold design and tooling services. Designing, prototyping and building industrial automation equipment /systems and providing automation solutions

Electronics components such as integrated circuits, connectors, optics, PCBAs, cables and wirings, power supplies, displays, resistors, capacitors, PC hardware, etc. There are more than 50 companies in precision engineering that offer contract manufacturing services to medtech companies, ranging from components building and sub-assemblies to final product OEM manufacturing. Aside from leveraging on the expertise of these local precision engineering companies, there is also a significant cost savings to medtech companies for using local contents. Conversely, according to the Agency for Science, Technology and Research (A*STAR), the entrance of more medtech firms could also help diversify the precision engineering and electronics sector. Already these companies are upgrading their quality systems and skill sets in order to increase their value-added to medtech companies in Singapore and elsewhere.
Effectively Growing Local Scientific Talents as well as Attracting Foreign Scientists

Clearly, the small size of Singapore has raised some concerns about the shortage of local talents trained in medtech to meet the growing demands in this sector. Nevertheless, if Singapore's historical development is anything to follow by, the country has never failed to perform despite its limited resource. Singapore recognizes this shortcoming and has undertaken a pro-local and pro-foreign policy to address the manpower issue. The pro-local initiatives involve the active nurturing of local talents in medtech. The two leading universities in the country, National University of Singapore (NUS) and Nanyang Technological University (NTU), have both started their own bioengineering degree programs aimed at producing manpower cross trained in both engineering as well as biomedical sciences. Additionally, the EDB’s Biomedical Sciences Group also offers Training and Attachment Programs (TAP) in partnership with medtech companies to create positions for technicians and professionals to undergo on-the-job training in R&D, clinical research, and manufacturing practices locally or overseas. The pro-foreign approach complements the local talents through active international recruitment, which has already successfully attracted some of the world's top scientists to the country to carve out their own niche and build links with the local research community. Lastly, one also cannot ignore the fact that Singapore does have a substantial pool of existing English-speaking and well-trained engineers with diverse expertise in electronics, materials and software engineering that medtech companies can already tap into.

Constantly Encouraging Innovation

Singapore may not have a very long history of innovation, but since it decided to transform itself into a knowledge-based economy, the pace of innovation has been rapid. Strong initiatives both in the private and public sectors to promote innovation are in place. The EDB has the Proof-of-Concept Scheme (POC) and the Startup Enterprise Development Scheme (SEEDs) program to help technologies find their way into the market. In the private sector, there are several ventures set up to incubate promising medtech companies. One such set-up is the Bioventure Centre (BVC) operated by Becton Dickinson together with John Hopkins. Some other private ventures have emerged recently as well, such as Merlin Medical, Surgilance and Biosensors. These activities suggest that Singapore is becoming an increasingly exciting environment for the development of innovative startups.

Comprehensive Infrastructure in Place

The Biopolis and the Tuas Biomedical Park is dedicated to support the BMS cluster, including medtech. The Tuas Biomedical Park is primarily focused on manufacturing activities, while the Biopolis is built specifically for R&D activities. The two-million square feet integrated R&D complex provides state-of-the-art facilities for medtech companies near to research institutes and universities. Companies at the Biopolis can leverage on common facilities to lower R&D costs. These shared facilities include X-ray crystallography, nuclear magnetic resonance, electron microscopy, DNA sequencing as well as shared conference and teaching facilities. As for general infrastructure support, Singapore offers world-class logistics and supply chain management capabilities in Asia backed by international standard airport and seaport facilities.
Strong Intellectual Property (IP) Protection
Since 1997, Singapore has been consistently ranked number one by the Political and Economic Risk Consultancy (PERC) for IP protection in Asia. Singapore has a credible track record for protection of intellectual property rights (IPR). It has one of the most comprehensive frameworks for IP protection in Asia. This is reflective in an increase in the level of patenting activities in the country with a rise of 22% in filings and an increase of 62% in the number of patents over the previous year.

Attractive Tax and Financial Incentives
Singapore has various attractive financial incentives to lure investors. A foreign investor granted the preferred status is offered a range of attractive incentives that ranges from 5–10 years tax “holidays” to liberal exemptions for capital equipment and expatriate staff. In addition, the government is also relatively liberal with grant funding. As an example of Singapore’s financial support to its interested investors, John Hopkins received a US$2.2 million grant from A*STAR for research. In addition, Singapore has a well established financial sector that could provide medtech companies with plenty of venue to raise equity financing through venture capital or listing in the public market. One example of a recent successful IPO in Singapore is the recent listing of LMA International on the Singapore Stock Exchange, a Netherlands-based company that makes airways devices for general anethesia procedures.

Leverage on Quality Medical Expertise
Medtech companies have also leveraged on Singapore’s medical care and clinical excellence for product development. Singapore has state-of-the-art clinical centres with excellent reputation for quality medicine in a broad range of specialty areas including cardiology, gynecology, orthopedic surgery, oncology, neurosurgery and ophthalmology in the region. This strong reputation for clinical excellence has led to many collaborations between medtech companies and clinical centres in the country. For instance, the National Heart Centre (NHC) have worked on the development of new devices such as novel drug eluting stents. NHC also conducts clinical trials for companies like J&J and Medtronic.

It is too premature to start evaluating the success of Singapore’s medtech initiative. The sector is definitely growing rapidly due largely to government capital injection and foreign private investment. It may take several more years of development for the sector to reach critical mass in terms of number of researchers and firms before it becomes self-sustaining. However, Singapore has made great strides to become Asia’s newest medtech hub. It has shown tremendous will to build up this sector by integrating biomedical sciences, including medtech, into the foundation of its public policy, economic development and manpower training. With the continued government support, and increasingly enthusiastic private sector, Singapore has all the right ingredients to succeed and is on its way to become the medtech hub in the region.