

# AN OVERVIEW OF THE MEDICAL DEVICE INDUSTRY IN PENANG

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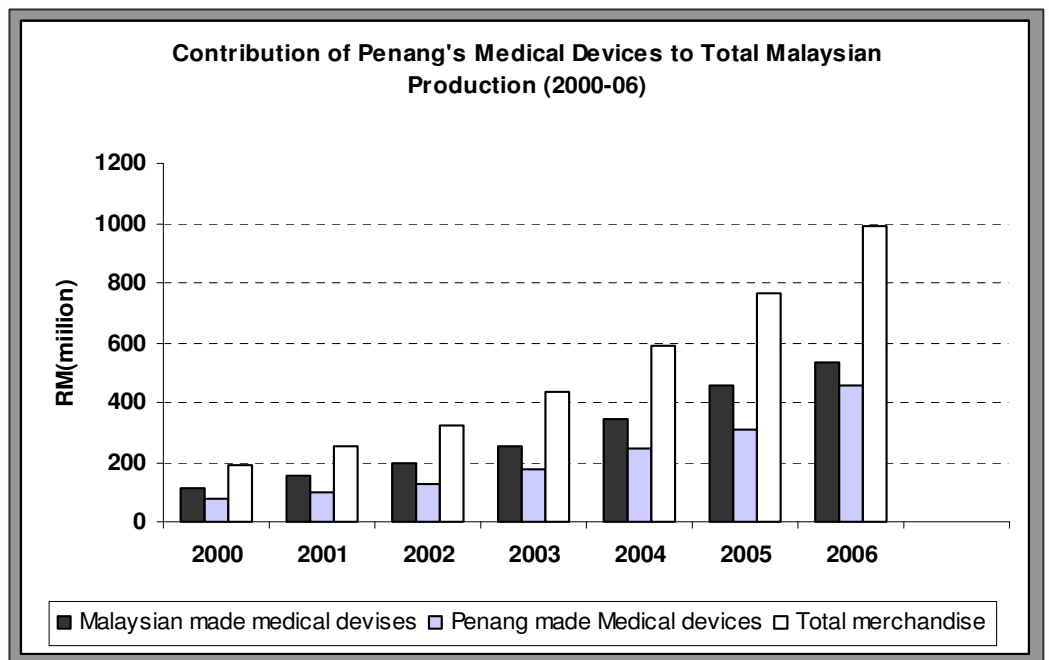
## In This Issue

<b>An Overview of the Medical Devices Industry in Penang</b>	<b>1</b>
<b>Community Composting For Taman Duku Residential Area, Juru, Malaysia</b>	<b>14</b>

## 1.0 INDUSTRY OVERVIEW

Medical devices and instrumentation have drastically reduced the invasiveness of surgical procedures, shortened recovery times, and lowered medical costs. This trend is continuing at a rapid pace, aided by advances in electronics and biotechnology. Medical device manufacturing is a sub-sector of life-sciences that encompasses supporting infrastructure such as research universities, teaching hospitals, medical laboratories and venture-capital firms, making it one of the most knowledge-intensive and research rich segments within the Malaysian economy.

Figure 1: Contribution of Penang's Medical Devices Industry



Source: Department of Statistics, 2006

Figures published by the Department of Statistics indicates the significance of medical device and instrumentation manufacturers of Penang to total Malaysian production of these merchandise ever since 2000 (refer Figure 1). As of 2006, Penang's total contribution is around 70% of total medical devices produced in Malaysia. The medical devise industry directly and indirectly supports hundreds of thousands of jobs and pays above-average wages. Just as important, it is an emerging power-house for Penang's global economic competitiveness.

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In the past decade, regional economies, such as Penang, Nilai and the Klang Valley, have grown and prospered because they built on their existing core life-science assets. They used advances in material sciences, computing and information technologies to strengthen cooperation and facilitate the application of discoveries in the field. As life expectancy continues to increase, so does our demand for improved quality of life. Table 1, indicates an improvement in life expectancy for both genders over the period of 2000-05. One could say that this is attributed to the provision of accessible and affordable health care through a comprehensive network of facilities and the implementation of various programmes that resulted in longer life expectancy of the Malaysian population. As such, there is no limit to the potential for the medical device and instrumentation sector, both in practice and research.

**Table 1: Selected indicators of Health Status, 2000 and 2005**

Indicator	2000	2005
<b>Life Expectancy at Birth (in years)</b>		
<b>Male</b>	<b>70.0</b>	<b>70.6</b>
<b>Female</b>	<b>75.1</b>	<b>76.4</b>

Source: Ministry of Health (2006)

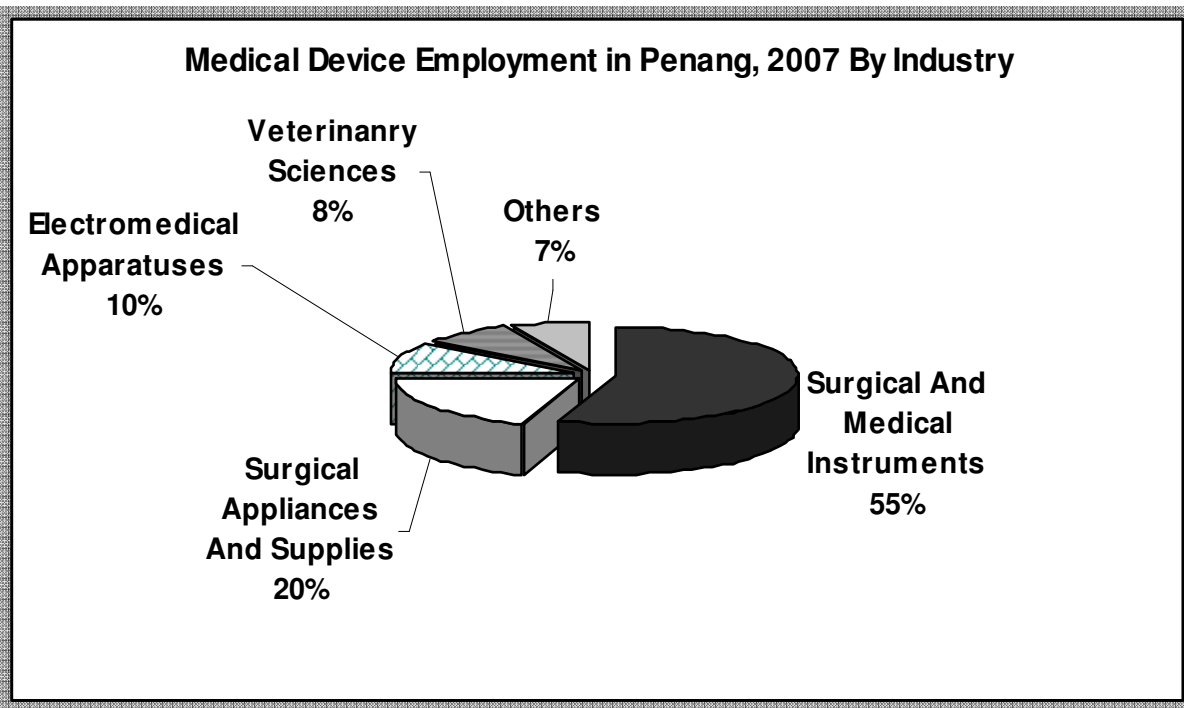
Many regions within the country are actively competing for life-science clusters. They realise the long-term economic potentials are immense. Clusters offer the creation of valuable production industries and jobs. Most of all, clusters promote innovation in science and technology, which invariably lead to sustained economic growth. There is still room for life-science clusters in regions that are experiencing population growth and can boast research universities, laboratory space, medical schools, hospitals, infrastructure, developable land, private investment and obviously a desirable quality of life.

This industry will continue and benefit from the aging population, extended life expectancy rates throughout the world and an increase in the potential number of candidates for instrumentation use. Increasing emphasis on health standards around the world and on the cost-benefit relationship of product use will further increase the demand for this sector. Medical devices corporations in Malaysia have lower interest expenses, raw materials costs, tax rates and general and administrative cost as a percentage of sales when compared with other industries. Overall the medical devices industry is very attractive with above-average profitability and expansion prospects.

### 3.0 ECONOMIC GAINS FROM THE MEDICAL DEVICES SECTOR

Trends in medical device applications and demographics favour continued growth of the industry. Some of these trends, for example the increasing importance of electronics, the confluence of devices, pharmaceuticals, and development of new treatments are especially suited to the state's strengths and bode well for Penang being a dominant player in the medical device industry in the coming decades. The purpose of this paper is to enumerate the ways in which the sector affects the state's economy, quantify these effects where possible, and explore current and future trends of this industry.

FIGURE 2: EMPLOYMENT BY INDUSTRY



*Employment has increased by 3-5% since 1990 for this industry.*

Source: SERI Survey On MNCs (2007)

Figure 2, indicates the composition of employment in various medical device industries in Penang. The bulk of employment within this sector is still concentrated in the manufacturing of surgical and medical instruments. However, with the addition of strategic functions such as R&D, IP Management, Sales & Marketing and supply chain management by existing multinational investors in Penang is an evidence of the attractiveness for a new breed of investments based on knowledge. There is statistical evidence to show that this industry is not operating at maximum technical efficiency. Table 2 shows that in general that the medical device manufacturers in Penang use less capital and more labour per unit of value-added compared to Malaysia as a whole. This evidence suggests that there is room for productivity and efficiency improvements within this sector.

**Table 2: Efficiency in Resource Use (2005)**

Industry	Penang		Malaysia	
	Capital	Labour	Capital	Labour
Scientific Equipment	1.10	0.48	1.30	0.50

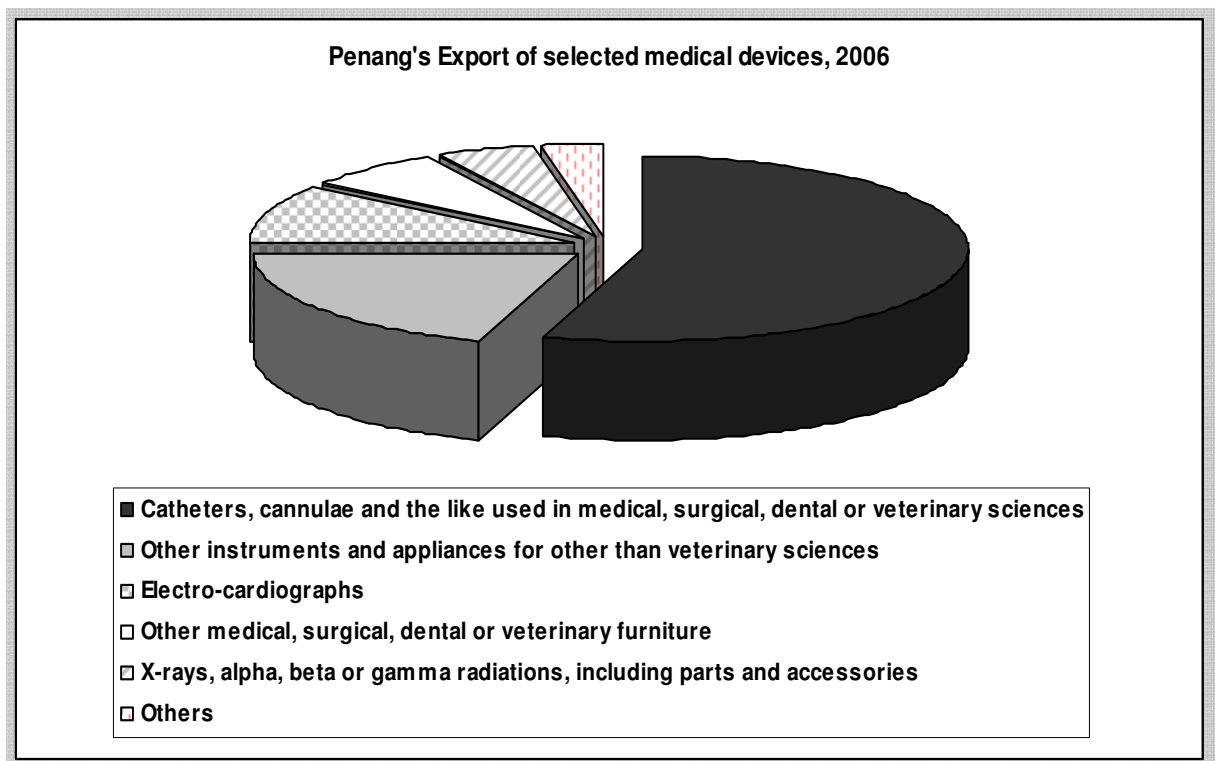
*Medical devices are relatively labour intensive in Penang.*

Source: Annual Survey of Manufacturing Industries, Malaysia (2003-05)

Thus, Penang's success in the coming years will be fundamentally dependent on its ability to achieve an environment where research and knowledge, high level skills and expertise, high quality infrastructure and business services, are combined in some flexible and creative way that is almost uniquely Malaysian.



**FIGURE 3: PENANG'S EXPORTS BY SPECIFIC DEVICES, 2006**

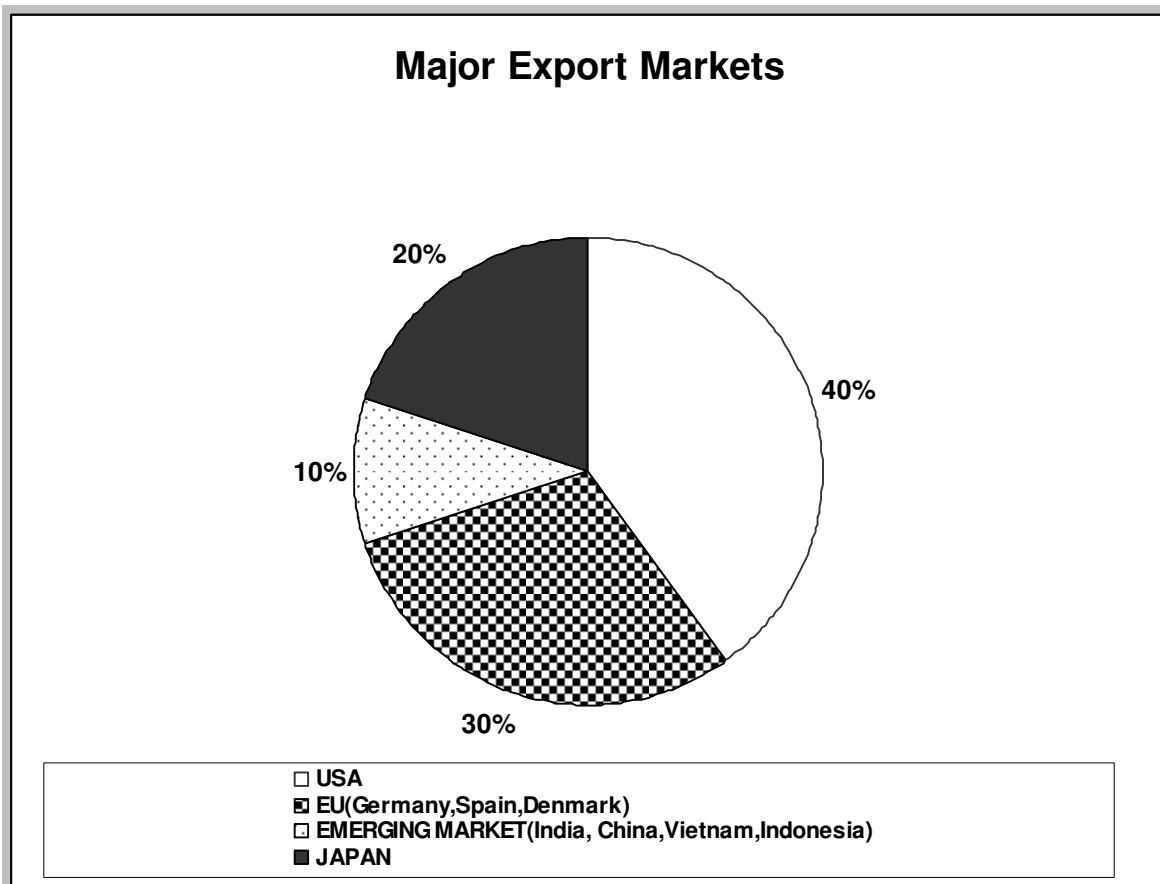


*Globally, there are 19,000 categories of medical devices with more than 600,000 varieties.*

Source: Department of Statistics, 2006

The medical devices production in Penang is concentrated in surgical and medical instruments, and electromedical and electrotherapeutic instruments. Figure 3 depicts the core products for the export market that consist of catheters, cannulae and medical instruments. Most MNC's (B.Braun, Ambu and Cardinal Health) and successful domestic players such as Vigilenz remain optimistic and agree of the increasing importance in linkages that exist between medical device manufacturers and the manufacturers of electronics, producers of precision metal components, and plastics manufacturers within the state, thus a coordinated effort to synergize this cluster is of urgent need.

FIGURE 4: EXTERNAL MARKET

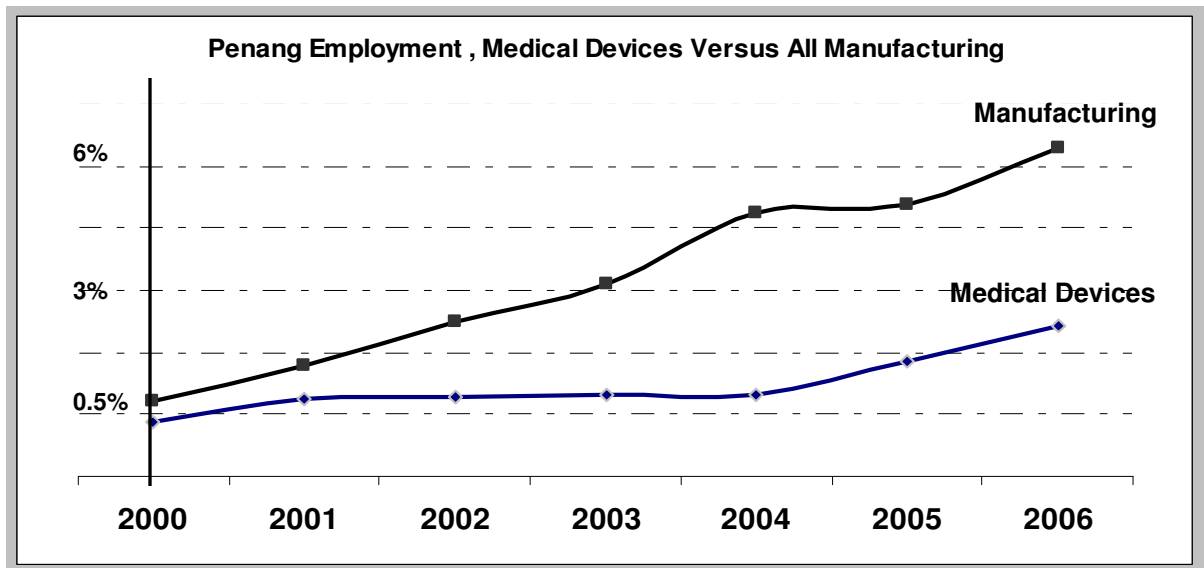


*45% of global market share is concentrated in the USA, 30% in the EU, 20% in Japan and the remaining 10% in new emerging markets. Malaysian medical device exports is a mere 0.5% of global business.*

Source: MATRADE

Figure 4 depicts the major export markets for Penang's medical device manufactures for 2006. Penang exports of various medical instruments and appliances to Germany had soared by more than 35 percent in 2006 while the exports of electro-cardiographs to Denmark, USA and Japan had also showed an upward trend. An upbeat for this sector is the anticipation of increase aging in population in Malaysia (by 2010, Malaysia is estimated to have a population of 30 million with 60% falling in the bracket of 15-70 years) coupled with growth in worldwide per capita incomes should provide a platform for stable and steady growth for years to come.

**FIGURE 5: EMPLOYMENT GROWTH IN THE MEDICAL DEVICES INDUSTRY OF PENANG**



Source: Labor Department & Average Employment (B.Braun, Ambu & Cardinal Health)

Since the inception of B.Braun in 1972, this sector has averaged an annual employment growth of around 3-5% (refer figure 5 above). Most MNC's have diversified or expanded their nature of business that has resulted in the constant demand for both technical and non-technical employees. For instance, in 2005 B.Braun was given the status of an International Procurement Centre (IPC) by MIDA. This enabled them to undertake procurement and the sale of raw materials, components and finished products to its group of companies or other related industries within Malaysia. Naturally, this resulted in the expansion of the workforce and various economic spillovers in the logistics sector (increase tonnage for warehousing, trucking and port & aviation related activities).

Not surprisingly with these expansions, wages and salaries in medical devices remain higher as a whole when compared with other related manufacturing sectors. Mean annual wages of skilled medical device workers were around RM 30,000 during 1999–2005 periods. This figure was based on medical device manufacturers located within the state. The wages were certainly higher when compared to average wage of RM 24,000 obtained in other manufacturing activities. These premiums probably reflect the value of specific job training for those with a high school education or less and higher market valuations for degrees related to medical device research and development for those with a university education. Many medical device workers earn salaries that are relatively high. Some industrialists have even reported that one in twenty employed within this sector earned more than RM 100,000 at any one point. Medical device employers also gave their workers better benefits than employers in other related manufacturing as a whole.

#### 4.0 KEY ISSUES WITHIN THE SECTOR

**General Economic Conditions Affecting the Industry:** The medical device industry is relatively immune from the effects of economic cycles. Demand is relatively inelastic for the products and remained constant during economic cycles as market demand is a function of the overall health of the population. However the globalization of the medical devices and instrumentations industry increases the risk associated with foreign investments and exchange rates. The firms in this industry seek to minimize risks by using hedging practices such as foreign currency forward-exchange contracts, borrowing in foreign markets, and using currency swaps.



**Rivalry among competitive sellers:** This is a strong force as competition has increased among the major players in this industry. Standardized formulations of medical devices have increased price competition in categories such as the hypertensive and coronary care market. Differentiation strategies have been focused on research for alternative use for device and instrumentation formulations in an effort to increase the product life of individual products and extend their use to treatment of other diseases. Niche market concentrations have been used to provide higher returns by some competitors but the majority of manufacturers have an extensive assortment of products to offer users. Recent price increases across the board for all manufacturers have put pressures on companies to derive greater profits through the implementation of

**Firms in other industries offering substitute products:** A strong force affecting branded device and instrumentation products is the increasing demand for generic products as a way to contain cost. Generic medical devices companies do not have the costs associated with research and development. As a result, generic products typically sell for retail prices 60-90% below branded prices especially from China, Taiwan, Turkey and India (FDA, 2006).

**Potential New Entrants:** This is a strong competitive force. The medical device market in Malaysia is among the lowest ranking in terms of barriers to entry. This situation had occurred as the domestic market is very much open due to the lack of regulations. The cost associated with years of research and development compounded by the lack of government regulatory compliance and risk associated with the industry encourages new entrants entering the market.

**Buyers:** This is a moderate competitive force. Recent pressure has been put on medical devices and instrumentation manufacturers to contain price increase. The power of large bulk buyers such as managed care organizations and hospitals has had some pressure on manufactures to contain costs. However, recent price increases in alternatives such as generic substitutes have reduced buyer's bargaining leverage. Branded devices continue to be a cost-effective treatment and what are the criteria on which such decisions are based?

**Suppliers:** The concentration of the majority of industry sales among the large medical devices companies has decreased the bargaining power of suppliers. This industry is a major customer of the packaging industries, plastics and metal manufacturers. These industries has an incentive to maintain competitive pricing practices which enhance the competitiveness of the major player's products in this industry.

**Pending the implementation of Malaysian Medical Devices Regulatory Act:** In the course of recent health care reforms, Malaysia's lawmakers have increasingly resorted to measures that hinder the introduction and diffusion of new medical devices in the health care system. Most of the key concern evolve around the yet to be introduced Malaysian Medical Devices Regulatory Act. As a result, patients in Malaysia may not always benefit from advances in diagnosis and therapy.

Health insurers and in particular the social health insurance funds often refuse to cover procedures that they do not consider to be standard medical practice, thereby delaying the potential medical and economic benefits of new technologies. But who decides what standard medical practice is and what are the criteria on which such decisions are based?

Although there is a general consensus in Malaysia on the need for increased efficiency in the health care system, there are currently few approaches for promoting the systematic analysis of the cost effectiveness of new medical devices. Even payers are reluctant in this respect, so that efforts to create a consensual basis for reimbursement decisions have had little impact on actual decision-making processes. Since the emergence of this sector in the 1980's, the medical and economic benefits of new diagnostic and therapeutic procedures must be documented and are subject to review at national level before the procedures can be subject to general coverage in the office-based sector. This review process and the ensuing decision making process are the responsibility of a committee ((Ministry of Health) and a committee for the valuation of medical procedures (e.g. creation of a "Fee Schedule Committee").

Unfortunately, in the present policy environment, the procedures for the review and pricing of innovative medical procedures have proven to be very long and resulted in many unwarranted negative decisions. To facilitate the introduction of the new procedures in the administrative sector, this paper would suggest the way forward:

- Transparency of the decision-making process should be increased.
- Review of new diagnostic and therapeutic procedures should be conducted as rapidly as possible and completed within specified time frames.
- The fusion of the two (Malaysia's Medical Device Regulatory Act & Ministry of Health) as means for expediting and rationalizing the review process for new and existing diagnostic and therapeutic procedures.
- The right to submit products and procedures for review and to participate in the review process should be extended to all affected interests, i.e. patients and manufacturers.



The legislation of this Regulatory Act would certainly call for the establishment of a similar procedure for the review of medical procedures in the hospital sector. A committee must be established as a means for cementing "command and control" measures in the hospital sector, then it is recommended that the committee be structured on the basis of the following principles:

- The evaluation procedure should be quick, transparent, flexible and based on objective criteria of technology assessment.
- Introduction of a clearly defined process for the review of new diagnostic and therapeutic procedures that allows for manufacturers' and patients' input and specifies time frames for the conclusion of decisions.
- Contracts at local/regional level (i.e. with individual hospitals and public funds) should remain possible.
- Local clinical studies should be covered on the basis of provisional reimbursement agreements.
- National and international experience in the application of the procedures in question should be taken into consideration in the review process.

Research, development, and improvements in technology, so vital the domestic players, are supported in large part by the state's hospitals and by suppliers of venture capital and public funding. In order to foster continued growth in medical devices and to keep Penang in the forefront of the industry, federal public policy should focus on providing quality public education, promote Penang as a place to do business, and develop a liaison with the industry.

**Private Funding:** By financing the development of new technologies in start-up firms, private funding probably through venture capital funding plays a crucial role in the growth of the medical device industry. In the third-quarter period ending in the third quarter of 2006, Malaysian's firms received an average total of RM 314 million in private capital financing and through the issuance of private debt securities (MIDA, 2006). One must understand that the medical device sector competes with other technology-related sectors for private capital funding, principally information technology (IT) and biotechnology. The total supply of private funds depends in part on investors' perceptions of the likelihood of successful "liquidity events" such as initial public offerings (IPO's) or acquisitions in which investors recoup their initial outlay plus a substantial profit.

The share of private capital funds going to medical device companies is roughly equivalent to that received by biotechnology firms, but well below that received by firms in the IT sector. The relative unattractiveness of medical device companies compared with IT is largely due to the longer time to a liquidity event, especially an IPO outcome, because the lack of approval to market a device and Health Care reimbursement approval needed to make the device profitable are time-consuming processes.

The time to profitability of IT ventures is perceived to be much shorter. Medical devices however could be compared favourably with biotechnology on this score, especially if a device can be registered with the Ministry of Health promptly if the Regulatory Act is implemented. The competition of venture capital funds is also affected by the size of the expected return and the risk of a return. By their nature, venture capital investments are risky. The expectation is that many, if not most, ventures will fail to be profitable, but those that are will be profitable enough to compensate for failed ventures. Relative to biotechnology, medical devices are perceived to be less risky, but successes are perceived to be less profitable. The risk advantage derives from the small probability, in pharmaceuticals, of discovering a safe and effective drug relative to the probability, in medical devices, of developing a safe and effective instrument. On the other hand, the payoff to a successful drug is enormous relative to the payoff to a successful device, because once the drug or device is approved for marketing; the marginal costs of producing a drug are typically very small relative to those of producing a medical device.

## 5.0 Opportunities under the Ninth Malaysian Plan

**Table 3: Development Expenditure and Allocation for Health Services, 2001-2010**

<b>Programme</b>	<b>8MP Expenditure (RM million)</b>	<b>9MP Allocation (RM million)</b>
<b>Patient Care Services</b>	<b>7,719.0</b>	<b>5,483.2</b>
New Hospitals	5,324.8	1,275.6
Upgrading and Renovation	2,394.2	4,207.6
<b>Public Health Services</b>	<b>1,329.3</b>	<b>3,311</b>
Urban Health	471.8	1,269.9
Rural Health	797.6	2,072.2
Environmental Health	59.9	14.5
<b>Other Health Services</b>	<b>451.7</b>	<b>1,481.2</b>
Training	364.5	1,052.2
Research and Development	28.9	250.0
Land Procurement	58.3	179.0
<b>Total</b>	<b>9,500.0</b>	<b>10,276.0</b>



Source: Economic Planning Unit

During the Ninth Malaysian Plan (9MP) a sum of RM 10.2 billion will be allocated for health sector development. A major portion of this allocation will be set aside for the implementation of public health programmes that include health promotion and disease prevention as well as enhancing R&D. Medical devices sector would benefit from public sector's initiative to intensify and develop new and improved advanced materials for applications in health related industries. Domestic players will in turn enjoy comparative advantage, where production will be geared towards the usage of advanced technologies, engineering, and processes to enhance competitiveness and create higher value added appliances. Local SME's would be able to support advanced medical device manufacturing, where grants for R&D in areas such as control technologies, flexible manufacturing system (FMS), computer integrated manufacturing (CIM) and advanced process engineering could be undertaken with the extra allocation of RM 250 million in R&D related activities.

## 6.0 CONCLUSION

### SWOT MATRIX FOR THE MEDICAL DEVICES INDUSTRY



<p style="text-align: center;"><b><u>Strength</u></b></p> <ul style="list-style-type: none"><li>• Good infrastructure</li><li>• Medical R&amp;D centres with MNC's already exist</li><li>• Due to the electronic era, there is a sizeable tooling, die and fabrication network</li><li>• Skilled and semi-skilled work force</li><li>• Sterilization facilities available</li></ul>	<p style="text-align: center;"><b><u>Weakness</u></b></p> <ul style="list-style-type: none"><li>• Open Market to all</li><li>• So far no regulatory requirement, and will only be ready to regulate by end 2008</li><li>• Very little exposure to high end medical/surgical devices</li><li>• Still a bias to everything foreign</li></ul>
<p style="text-align: center;"><b><u>Opportunity</u></b></p> <ul style="list-style-type: none"><li>• For SMI/SME's the home market itself is sizable</li><li>• With the advent of a Global Quality Standardization Malaysia already has a name through the MNCs' here</li><li>• SMI/SME schemes for support is probably the best in the world</li><li>• The Medical business itself</li></ul>	<p style="text-align: center;"><b><u>Threats</u></b></p> <ul style="list-style-type: none"><li>• Highly regulated business</li><li>• Low cost manufacturers from China, India, Taiwan, Turkey, etc.</li><li>• Absence of cluster type manufacturing hubs for medical devices</li><li>• Yet to be implemented, the Malaysian Medical Devices Regulatory Act.</li></ul>

Reflecting upon the SWOT Matrix, Penang stands a strong chance to continue and excel. Penang possesses similar strengths, if not better in some areas of core competency than other locations within Malaysia. In the last three decades, the technological capabilities of Penang home-grown backyard industries have garnered international standing. Apart from its strong MNC base, Penang has a significant amount of local industries involved in world-class automation systems, precision engineering, tooling and machine fabricating activities which supports and complements its E&E sector. These companies possess ample experience, capability and to a certain extent, capacity to venture into the manufacture of medical equipment and instruments in addition to its current activities.

Nevertheless the domestic players need to:

- Continue to seek intellectual property rights protection from generic substitutes emerging from low-cost nations. Protecting the medical device property rights will eliminate copy-cat products and lost in profits.
- Given the increase in life expectancy in Malaysia, firms must continue to pursue research in devices and instrumentation. This in turn would enhance the quality of life for the aging population.
- Expand awareness of Malaysian made medical devices and its benefits in less developed regions, such as South America, China and India. As of 2002, 96% of pharmaceutical global sales are concentrated in three main regions U.S., Europe and Japan. Global awareness of Malaysian made medical instrument will produce opportunities for the pharmaceutical industry to expand.



Despite the growth in sales, the medical device industry is having a hard time keeping operational, labour and overhead costs low to sustain profitability. At the moment, Penang's medical industry is still very much labour intensive, hence, it is fast losing out to lower cost countries and this may eventually lead companies to transfer their production lines to countries with better comparative advantage. Although Penang may have a cost advantage over countries like Taiwan and the US, both of these developed countries are perceived by many investors to have a better advantage in terms having skilled and experienced human resources and more advanced technology. Thus, many companies are now increasingly aware of the need for a certified quality management system to meet regulatory requirements in order to market medical devices globally. **Nawin Rajah**

# COMMUNITY COMPOSTING FOR TAMAN DUKU RESIDENTIAL AREA, JURU, MALAYSIA

## 1.0 RATIONALE

This project is intended as a demonstration project by the Canadian International Development Agency (CIDA) and the Asian Institute of Technology (AIT) under the Southeast Asia Urban Environmental Management Applications (SEA-UEMA) Project (2003-2008) involving the residents of Taman Duku in the state of Penang, Malaysia. The project took a community and bottom-up approach to encourage involvement from residents in contributing, running and managing composting activities. This means a self-empowerment approach in making decisions, planning, organizing and project implementation.



Taman Duku is a residential area built in 1998 located in the Middle District in Seberang Perai the State of Penang, Peninsular Malaysia. It is about 15 minutes drive from the Penang Bridge on the mainland. The residential area is about 20 acres with 780 houses and consists mainly of middle-income residents. The strength of this group lies in the cohesive social structure and cooperation of the community, which gives the project the commitment it needs. A committee and a chairman appointed to head the community. The racial composition is 80% Chinese, 15% Malays and 5% Indians.

This project demonstrated how a concerted effort can be made to organize the community with the view to gaining knowledge and expertise in composting. The compost have been applied to vegetable gardens and for landscaping and it helps in cost saving because there is no need for fertilizes when compost is being used.

The residents have been practicing recycling for their inorganic materials since 2003. The composting project is to complement the recycling project as 40-60% of waste generated is organic in nature. Organic waste can now be turned into useful fertilizers. The rationale of choosing Taman Duku to implement this project is due to its reputation as one of the most pro-active residential areas in northern peninsular Malaysia. The residential area has a well-organized leadership structure that oversees many of its activities. The residential area is also one of the most advanced residential areas in terms of entrepreneurial skills in that it has its own printing business, run by a cooperative team of local residents. Due to the above characteristics and the willingness to learn, it is thus far the best residential area to kick-start a demonstration project and to promote such initiatives to other similar residential areas around this district. The location of the project site is in a residential area with adequate space for community composting, agriculture and horticulture activities.

Taman Duku is a residential area similar to thousands of such residential area throughout Penang and in the country. Since the project is an indigenous project making use of local materials for construction and implementation, it can easily be replicated and up scaled to any size to suit another any local community. The Project itself is a showcase to other similar areas and will neatly tie up with the Government Programme to promote home and community composting amongst the community. The Seberang Perai Municipal Council and the Residents' Association are very keen to promote the project and to act as a resource centre to provide reference materials and information dissemination.

## 2.0 OBJECTIVES

The main objectives of this demonstration project are:

- To train the residents of Taman Duku on various techniques in community composting (e.g. use of effective microorganisms (EM));
- To implement a community composting programme as a mean to tackle the problem of solid waste as well as to increase the side-income of the participating residents; To build a **pool of resource experts** to play a **catalytic role** for skills dissemination to other communities.



## 3.0 SCOPE OF WORK

This project involves several components and activities outlined below such as:

- Training workshops
- Training material development
- Construction of composting pits
- Equipment acquisition
- Project implementation
- Project documentation

## 4.0 RESULTS

In Taman Duku Community Composting Project, the daily collection of food waste has increased from 20-40 kg per day to 80-100 kg a daily. A compartment of 3ft x 3 ft x 4 ft filled up in about a week, amounting to 350 kg to 400 kg.

At the beginning of the project, the participation rate has been estimated at around 5% (40 households) but has increased to 20-25% (150 households) depending whether there are festive seasons for the month. Each household contributes about 0.5 – 0.75 kg of kitchen waste whilst hawker stalls contribute 20-30 kg per day.

### Summary of Average Amount of Compost Obtained

	Amount (kg)
1 compartment = 7 days x 81.5kg	571
Compost produced 25%	143
Total Amount of Compost (4 compartments per month)	571
<b>Estimated Total Amount of Compost Produced (April – November 06)</b>	<b>1.1 tons</b>



Another important feature in this project is the diversion of organic food or kitchen waste from the Pulau Burung Sanitary Landfill. It is estimated about 100 kg or more daily (or > 3.1 tons per month) is diverted from the Landfill resulting in some cost savings for the MPSP's solid waste management bill; savings in transportation to convey household waste and less utilization of landfill space. In addition to this, the intangible benefits of the project include a more hygienic environment, savings in cost for the purchase of fertilisers for landscaping and increased cooperation and cohesiveness among the members of the Taman Duku community.

#### 5.0 LESSONS LEARNT

The Taman Duku Community Composting Project has provided much invaluable experience for all the stakeholders involved. It has shown the dynamics of residents and how various stakeholders operate. Valuable lessons learnt from this Project can now be imparted to other communities who want to replicate this project. The residents of Taman Duku have shown the way and they have proven that their model is replicable. The effort of the residents especially the Residents' Association (RA) Committee members have shown their ingenuity and resilience to carry through the project successfully. Having gain hands-on experience in running the project, they are now resource persons and they can impart their knowledge on how to run the project to neighbouring communities. Judging from the response and interest shown by neighbouring communities and visitors to the project, the RA can now proudly claim that they have achieved their objectives to be a pioneer and focal point for community composting in the country. Some of the lessons learnt and interventions undertaken by the Project are discussed in detail on the following page:

## 5.1 Community

The presence of a strong Residents' Association has been a boon to the project. The committee members are *cohesive and cooperative*. They have also been very *enthusiastic and proactive* in organizing events independently with minimum help from the Project Leader. The active and innovative Chairperson and committee members have proved to be very able *ground champions* for the Project. The Community as a whole possesses common goals and objectives and they know what they would like to achieve from the project.

The ability to *sustain and generate interest* through a series of events throughout the whole project period is a vital role that the community has played incorporating the project into different cultural programmes and celebrations to create awareness in the community. Some good examples are the inclusion of elements of the Project into their annual celebrations of the Chinese New Year and Lantern Festival activities. In doing this, the community becomes aware and exposed to the Project. This too provides an element of fun and festivity to the Project.



Several public launchings were planned for the Taman Duku community composting project. First, was the “soft launch” to introduce the Project; the official launch by the Chief Minister of Penang to bring about *greater publicity* and awareness; later, the official launching of Seberang Perai Composting Programme incorporating the launching of the Composting Manual by the State Executive Councillor in charge of Local Government. Through these events, closer ties and friendship as well as community spirit were built amongst the residents.

A *close rapport* has been built between of the RA Committee and the *Press* which resulted in extensive coverage of events in the local dailies. The community welcomes the publicity because they would like to see similar composting programmes.

## 5.2 Local Authority

The Seberang Perai Municipal council plays its role well in *providing basic infrastructures and facilities* e.g. land and transport. At the start of the project, they contributed land for the composting shed and distributed containers to hold kitchen waste to all the households in Taman Duku. The residents bring their kitchen waste to the composting shed with ease because the containers are user friendly. This gives and added boost to the Project.

They also sponsored publications, banners and refreshments, and then provided transportation to bring in “browns” (paddy husks and dried grass clippings) to the composting shed. All these have greatly helped the Project Leader in cutting down the costs of the project.

The local Councillor and others who are influential in decision making have been *supportive* and was *willing* to adopt project and implement policy on composting to *replicate* the Project to other interested residential areas.

### 5.3 Planning Team

An interesting aspect of this project was the involvement of women from the very beginning of the Project, the gender equality aspect was taken into consideration. The Chairperson of the LA21 Committee on Composting is headed by Ms Cecilia Wong. Another prominent female leader and also the patron of the Project; is the people’s political elected representative in the Penang State Legislative Assembly for the Bukit Tengah area; the Hon. Ms Ng Siew Lai. Having women involved in the decision-making and planning process has added new dimension to an otherwise male-dominated process.

Others members of the Planning Team comprise the Local Municipal Councillor, Officers of MPSP, SERI as ADP Project Leader, Waste Contractors, Chairperson and Committee Members of Taman Duku RA, Agriculture Department and leaders of other residential communities. This gives an *all round representation* including *different skills and perspectives* to the Project.

Capitalising on the objectives of the Project as well as the people’s aspirations of wanting to use the compost for their vegetable gardening and landscaping of the community pond at Taman Duku; *holistic training programmes* were formulated to include topics on how to prepare and use Indigenous Micro-organisms (IMOs) to enhance the composting, how to carry out vegetable gardening and landscaping. Half-day to full-day courses were conducted. Monitoring and evaluation the activities were also conducted. The project facilitator provided assistance to ensure the programme was conducted in a systematic manner thereby making the job of the Project Leader easier.

Team members also had *good rapport* with top management and *politicians* and were able to influence policy not only at the municipal level but also the State level. The Project Planning Team *met regularly* and was efficient in problem solving and trouble-shooting. Any decisions made during the meeting would be promptly executed to save time and maintain high morale.

## 5.4 Other Partners

The Ford Motor Company has also been supportive of the Project and has given their moral support and funding to the Project. The Penang State Agriculture Department and the Agriculture Training Institute provided the necessary technical expertise and their willingness to provide training *gratis* was an invaluable contribution to the Project.

## 5.5 Technology & Equipment

An essential component of the project was the readily available local materials used for the project. Local materials, such as paddy straw which are affordable and appropriate, were used in the Project. This makes it is affordable and replicable. The technology used is also simple and easy to follow. The only set back was the sourcing of the equipment for shredding. An appropriate shredding machine was not available locally and had to be bought from outside the country.



## 6.0 OUTCOMES

At the completion stage of Project, the following situation has prevailed in Taman Duku:

- The Seberang Perai Municipal Council adopted the Project concept and launched a Seberang Perai Community Composting Programme to cover the whole municipality comprising 3 districts.
- The State Executive Councillor in charge of Local Government affairs for the State of Penang wanted this model to be replicated elsewhere as well as in schools.
- Although there was overall general support and enthusiasm across all sections of society, more support and participation could be garnered from other residents who are currently not participating.
- This project attracted a great deal of attention from various other residential communities. It became a showcase and a source of reference to other Communities.
- The local authority was keen on promoting and supporting alternative models of composting and replicate the project to other residential areas. The Taman Duku residents developed new expertise and became hands on resource persons.
- They are positive on composting of kitchen waste because they see the benefits in turning compost into fertilizer instead of simply having kitchen waste discarded.
- Separation of organic waste from their domestic waste stream is an added boon to the recycling activities; which they have already been practicing and composting is only an extension to their solid waste management activities.

- The kitchen waste is not left in the common garbage bin and thus, the odour is removed. The Seberang Perai Municipal Council has provided every home in the Project area with a small plastic container with a lid for the kitchen waste. It has been reported that the residents now found less vermin and pests such as cockroaches, flies and rats around their houses.
- Dogs and cats have stopped rummaging garbage bins, as there is now no longer any food waste in them.
- The garbage collection contractor is now sending in smaller trucks to collect garbage in the area, as there is now less to collect. This in turn amounted to savings for waste diversion from the Pulau Burung Sanitary Landfill for the MPSP.
- Women have benefited from knowledge gained from the various training courses offered to supplement the composting project. The courses offered are very basic yet essential to the people and they started to take an interest in gardening, landscaping, composting and vegetable farming. The women were empowered by these courses and have given good feedback to the Project Leader. They are also requesting for more such follow-up courses. They felt that such courses have provided them with practical skills that they can use around their homes.
- Several houses have stopped contributing to the Project because they are now doing their own composting at home from the technical skills acquired.

It was also reported that the property price of houses in the Taman Duku area have appreciated because of the new facilities (pond, composting shed, landscaping and vegetable garden) installed. The Taman Duku Composting Project has been replicated in other residential areas at Taman Gemilang / Semarak comprising around 200 households; majority of which was landed property and also at Taman Pandan; a residential neighbourhood comprising mixed high-rise residential and landed property. The Penang State Government sponsored the composting sheds in these two replication projects after its residents were inspired by the success of the Taman Duku Composting Project.

Despite the absence of funding (unlike the Taman Duku Project which was initiated as a demonstration project); the residents' enthusiasm to opt for sustainable solid waste management in such replication projects shows a high level of civic consciousness and environmental awareness. The future on household waste management is promising!

**Khor Hung Teik**