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ONE PRESCRIPTION, ONE CURE FOR ALL DISEASES: THE CASE OF FINANCING MALAYSIAN BIOTECHNOLOGY COMPANIES.

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ABSTRACT

This paper examines the existing financing options that have been made available to the Malaysian biotechnology companies. The study is carried out to better understand the financing of the biotechnology industry, which has taken a much slower pace when compared to industrialized country such as Singapore. It discusses the 'cure for all' method of allocating funds across the different sectors identified. We show how the distinct information opacity profile of SMEs are even more acute in the case of biotechnology firms, and prescribing the same financing methods will not hasten the growth of biotechnology firms in the country. On the basis of interviews and primary information gathered from institutions and agencies, we discuss and suggest amidst the risky profile of SMEs, how biotechnology firms in Malaysia could benefit from a more varied financing sources that is in the form of venture capital, business angels, public debt and equity market.

Key words: biotechnology firms; SME profile; venture capital; public debt; public equity.

1. Introduction

In Malaysia, biotechnology is one of the emergent sectors whose development is largely based on the creation of research-intensive SMEs. The biotechnology sector in Malaysia is a relatively new sector. The sector is getting a great deal of attention lately because of its role in Malaysia's economic development. The sector, has been "knighted" as the engine of growth that will spur Malaysia to transit from the production-based to the knowledge-based economy. Its contribution to Malaysia's Gross Domestic Product (GDP) is expected to increase from 1 percent in 2008 to 5 percent by year 2020. The success of the biotechnology sector is heavily dependent on the interplay of various factors, particularly the quality of Research and Development (R&D), good regulatory and legislative framework, availability of infrastructure, human resource development, and financial support. Studies reveal that many SMEs faced problems related to low R&D, lack of skilled human resource, and financing. This paper, however, focuses on the issue of financing among biotechnology SMEs. The issue of financing is a critical issue in the development of the biotechnology sector because of the research-intensiveness and the heterogeneity of the SMEs in this sector.

The objective of this paper is twofold. *Firstly*, the paper identifies the key financing issues in the biotechnology sector. *Secondly*, this paper critically analyses the approach adopted by the Government of Malaysia to address the problems faced by SMEs in the biotechnology sector. For analytical purposes, the discussion in this paper will be framed the following questions: What are the key financing-related problems faced by Malaysian SMEs in the biotechnology sector? How does the Government address these finance-related problems? Did the Government adopt a "boutique-style" or a "one-size-fits-all" approach to address the financing needs of the biotechnology SMEs? The discussion in this paper relies on secondary information and data from journals and published report.

In this paper, the discussion is divided into five sections. Section 1 introduces the paper and outlines the format of the discussion. Section 2 discusses the issues related to financing of SMEs in the biotechnology sector. This section argues that the SMEs in the biotechnology sector are heterogeneous in nature. As such their financing needs are diverse. Section 3 highlights the financing support extended by the Government to the biotechnology sector to reflect the financing policy approaches. The discussion provides the basis for the argument that the financial support extended to the sector still rely on conventional methods of financing (loans, debts, equity), with very limited room for creative financing. The fourth section critically analyses the approach and forward some alternative forms of financing to supplement the ones commonly adopted by the Government. Section 5 concludes the discussion.

To start the discussion, this paper argues that policy makers has the tendency to develop (and treat) the biotechnology sector following the pathway of the manufacturing sector. This tendency is reflected in the approach adopted by the Government in developing and addressing the key problems faced by the sector. To develop the sector, the government instituted an agency, namely the Biotech Development Corporation which reminded us of its counterparts, namely the Malaysian Industrial Development Authority (MIDA) and Multimedia Development Corporation (MMDC) to charter the development of the industrial and ICT sector. This institutionalist approach is also a reminder of the Developmental State, which saw active involvement of the State in economic development.

In terms of financing, there is a tendency to view the problem from the supply side rather than the demand side (Shamshubaridah and Madeline, 2009). By focussing on the supply side, the tendency is to associate the problem of financing with that of lack of funds. Typically, the solution is for the Government to provide more funds. By giving little emphasis on the demand side, makes it difficult to understand that the financing problems is not only due to lack of fund, but also the high-risk and opaqueness of the SMEs. Providing the SMEs with more funds, only partially addresses the problem. In a lay person's term, this one-sided approach is akin to using one prescription to cure all diseases.

2. One Prescription, One Cure for All Diseases: The Case of Financing Biotechnology SMEs

These section discuses the critical issues related to financing in biotechnology sector. The discussion begins by outlining some of the key problems related to financing in the sector. In the biotechnology sector finance is a key issue given the fact that the sector has a strong R&D and capital intelligence component. Finance is also an issue due to the need for biotechnology firms to meet international standards and address regulatory and legislative requirements.

2.1 *Research and Development*

It is widely recognised that the biotechnology sector is one of the most research-intensive sector. Studies in the USA revealed that the average R&D intensity (R&D spending to total firm assets) for the biotechnology industries was 38 percent. Studies in the USA also revealed that only 1 out of 10,000 early stages of drug research in the pharmaceutical industry will be marketed making it one of the sectors with the most risk. In the biotechnology sector, this "technical risk", or "idiosyncratic risk" are not easy to diversify and they tend influence R&D decisions. The higher the cost of R&D finance, the more promising an R&D project will be for it to represent a good investment for the firm's investors. Vernon (2005a, 2005b) provided

us with some insights into the risk and financing of biotechnology industry in USA. He wrote that the pharmaceutical companies financed their R&D projects with cash flows generated from existing product sales. The financial health of most biotechnology firms is more fragile because they rely mostly on external funding (usually equity financing via the issuance of new shares of stock) to fund their new and ongoing R&D project.

The development of the biotechnology sector is highly dependent on intellectual capital. Biotech firms need higher investments to recruit talents (scientist, specialist, researchers), purchase capital outlay for equipments and research apparatus (laboratories, pilot plants,), and technology acquisition cost. In the biotechnology sector, the connection with the scientific network is a condition for growth. It is not sufficient, however, for firms must not only develop high-tech research, but also transfer and commercialise their results.

In Malaysia, the biotechnology industry is populated by small firms. The biotechnology SMEs' technological lead depends on the quality of their research, of which the launching of their activities rely on huge capital input for the development of the product or process. Biotechnology firms, in contrast to the manufacturing firms, had to focus on research without selling at the early stage of the business cycle. The fact that they spend more intensively on R&D means they face greater financial risk, and are vulnerable to policy shocks that affect expected future profitability - articularly with respect to government regulatory policies. It is important for Malaysian policy makers to be cognizant of the fact that this industry is heavily dependent on external capital and with heightened sensitivity to policy shocks and new regulations. Hence, making it more fragile with respect to its R&D projects and programs than the more established manufacturing industry. This is particular true for small biotechnology companies.

2.2 *Legislative and Regulatory Framework*

Funding will also be an issue as Malaysia enters a new phase in its biotechnology development. To survive and be competitive, the Malaysian biotechnology sector needs to pay serious attention to the subject of Intellectual Property Rights (IPRs). In the field of biotechnology IPR has long been dominated by multinational Western companies, which are continuously adapting to the changing global economic environment.

In advanced economies, the biotechnology has been identified as a key driver for their sustainable growth and development (see OECD Report, 2004). Today, some developing nations with enormous human and intellectual capital like India, China, Brazil, Singapore and South Korea have been able to demonstrate their capabilities and accomplishments through several biotechnology R&D activities. Many developing countries, including Malaysia are ready and eager to follow their example. However, the road ahead for Malaysia will prove to be a difficult one. Support for the development of the biotechnology sector requires the building of a sustainable infrastructure. Malaysia is still a newcomer in the field of biotechnology development. Being relatively new, it lacks the typical prerequisite elements for the development of such an industry that includes a pool of well educated and trained population, scientific excellence, a condusive business environment, a set of intellectual property rights, regulatory infrastructure and healthcare system. The lack of these essential building blocks presents enormous hurdles to the nascent biotechnology industry in Malaysia.

To address these problems, policy makers need to develop new initiatives to meet the changing phases in the biotechnology sector that extends beyond financing that typically entails the provision of loans and grants. One such new initiative is the public–private partnerships beyond the borders of Malaysia. Malaysia needs to strengthen its collaboration, cooperation and/or competition with international institutions and private foundations.

Malaysia needs to increase the number of links with world-renowned international organizations, as in the case of its links with MIT to train Malaysian scientist and researchers in the field of genomics, bio-informatics and bio-processing. Also, as Malaysia enters a new phase in biotechnology development, it needs to transfer biotechnologies internationally and thus encourage Malaysian firms to practice innovative entrepreneurship. Clearly, Malaysia does not only need to develop a pool of scientists and researchers, but also technology managers experienced in Intellectual Property Management (IPM) and other technology transfer-related matters such as IP policies, regulations, clinical trials capacity, intellectual property management (IPM) capabilities, and legislation influencing public–private sector partnerships (PPPs). Policy makers must recognised the fact that as the biotechnology sector matures, it becomes research-intensive, more expensive and will have to comply with ever-more stringent IPR, trademarks, licensing systems.

Huge financing is essential to strengthen Malaysia's access to advanced technologies and increase its capacity to identify technologies and pursue their development into products, through education and technical assistance. The government also needs to provide subsidized funding to biotechnology firms that invest in products which are not attractive enough for private investors, because of their low returns on investments and costly biomedical R and D, such as diseases which inflicted the poor (Trouiller et al., 2002).

This paper argues that the biotechnology SMEs are not homogenous, thus it is necessary to treat their financing needs based on their different characteristics. For example, Salicrup and Fedorkova (2006) highlighted the heterogeneous nature of the biotechnology sector. According to them, the biotechnology firms can be categorised into two. The *first* type are the fast growing ones, which will form the elite of a country's industrial biotech leaders on which the sector could grow and compete with that of international firms. The development of these firms is based on the quality of their research and innovation. Clearly, their capital needs are high. The *second* type is the large number of small firms mainly involved in services to biotech, and which are not expected to become worldwide leaders. The development of these firms is based on their activities. They sell products or services to clients. Their development depends on the size of the market; its expansion leads to a rapid development of the firms. Their capital needs are relatively small, and are often met by local venture capitalists linked to the public authorities.

A study by Salicrup and Fedorkova (2006) also show that biotechnology firms strategy to acquire and co-ordinate resources for development is not the same: during the years following start-up, the SME has no sales. As the firm approaches the marketing stage, the SME generates sales licence revenues for use of its product. In the case where heavy investments are needed to move into the industrial phase, the firm will tend to develop the product with outside partners.This is typically the case in the pharmaceutical industry, where the cost of developing a drug is very high, especially in the clinical testing phases prior to marketing. Studies show that most biotechnology-based drugs are developed by biotech SMEs and are commercialised by pharmaceutical groups.

2.3 *Access to Capital by Going Public*

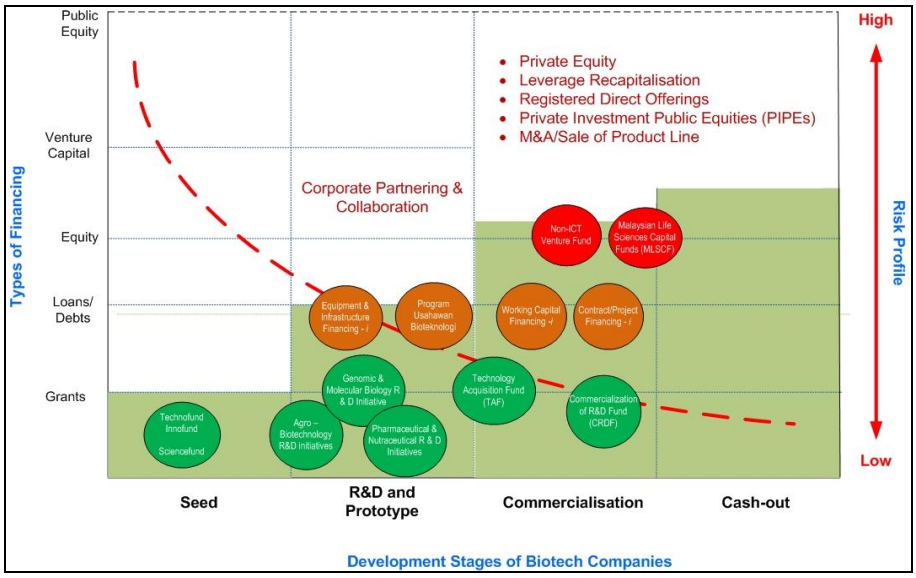
Another challenge is the raising of capital through the equity market. Typically, the biotechnology firms are years away from any significant revenue stream, have very few tangible assets, are usually sustaining significant accounting losses, and require large amounts of capital (Burill and Lee 1992). Exacerbating these problems, start-up biotechnology firms generally have no products in the marketplace. It is well documented that small businesses frequently fail because of insufficient funding and heavy debt loads. Biotechnology SMEs can

opt to access the public equities market by issuing an initial public offering (IPO) to raise the significant sums of capital required to pursue extensive R&D projects and to finance rapid growth and expansion. Issuing an initial public offering (IPO) allows entrepreneurial firms to overcome some of these pitfalls. Studies, however, revealed that biotechnology SMEs face difficulties when going public because of their high research components and risk. Potential investors face difficulty in valueing biotechnology SMES because of the high degree of uncertainty and riskiness of their R&D. Furthermore, traditional historical indicators of firms performance such as return on assets, sales growth, or profit margin have limited use because many biotechnology SMEs are in the early development stage. Given such a situation, the investor's assessment of the future value of the biotechnology SMEs had to be based on indicators other than accounting measures of past activities.

Like many SMES, biotechnology SMEs find it difficult to raise capital due to the information asymmetries that exist between themselves and potential investors.Due to the high investment cost of R&D and to stay competitive, biotechonology entrepreneurs are unwilling to fully disclose the details of their intangible assets and details of their firms R&D, for fear of expropriation of the firm's proprietary knowledge. Secrecy is clearly an issue for the biotechnology firm. Entrepreneurs in this industry needed to retain proprietary information to sustain a competitive edge. To overcome this presents a clear strategic challenge to the biotechnology entrepreneur who is trying to position its firm to go public.

3. Financing Support for Biotechnology SMEs

This section extends the above discussion by providing our interpretation and analysis of the approach adopted by the Malaysian government to solve some key financing problems, that is through the provision of loans, grants and equity financing channelled through various agencies created by the government such as MTDC, SMIDEC, MOSTE, BIOCORP. Graph 1 shows the distribution of funding facilities according to the stages of development. It is evident from Graph 1 that the most-common financing instruments are loans and grants, as reflected in all stages of business development.



Source: Authors' Conceptualization

Graph 1: Types of Financing available for the Malaysian Biotechnology Sector

3.1 *Grants*

This section highlights the different types of financing available to support the activities of biotechnology firms at its four stages of development; seed, R&D and Prototype, Commercialisation, and Cash-out. *Appendix* 1 outlines the types of financing, value and purpose of financing according to the agencies. The mechanisms for grants fall in the preview of the National Council for Scientific Research and Development (NCSRD) under Malaysia's Ministry of Science, Technology and Innovation (MOSTI). MOSTI provides the following funds to support firms at the seed and prototype stage of development:

(a) Science-fund
(b) Inno-fund

In addition to conditional grants, the government also introduced grants to support the development of the biotechnology sector. Malaysian Technology Development Corporation (MTDC) is the agency responsible for providing grants. MTDC was set up by the Government of Malaysia in 1992 to spearhead the development of technology businesses in Malaysia. Its initial role was to concentrate on the promotion and commercialisation of local research and invests in new ventures that can bring in new technologies from abroad. From those investment activities, MTDC has evolved to become a venture capital outfit and has been the leading venture capitalist in the country long before the concept became familiar and accepted in Malaysia. Funds offered by MTDC which are open to the biotechnology (see Appendix 1) are:

(a) Technology Acquisition Fund (TAF), and
(b) Commercialization of R&D Fund (CRDF)

3.2 *Loans and Debts*

Another common form of financing is through the provision of loans and debts. Most of these loans and debts are provided for the purpose of R&D and Prototype stage of development. Two main agencies involved are the SME Bank Bhd., and Malaysian Debt Venture Bhd.

The SME Bank or Bank Perusahaan Kecil & Sederhana Malaysia Berhad started its new function on October 3, 2005 as a development financial institution to nurture and meet the unique needs of small and medium enterprises (SMEs). As a one-stop financial centre responding to the funding and business growth needs of Malaysian SMEs, the Bank complements existing products and services offered by commercial banks through a comprehensive and integrated financial and business advisory services.

The Malaysia Debt Ventures Berhad (MDV) is an innovative financier and development facilitator for Biotechnology, ICT and other high-growth sectors in Malaysia. Incorporated on 23rd April 2002 as a wholly owned subsidiary of the Minister of Finance, Inc., MDV has been entrusted to manage funds of RM2.5 billion for the financing of projects in these industry sectors. MDV provides competitively priced financing products for all your needs, with financing amount up to RM120million. Table 1 shows loans and debts provided by MDV.

Table 1: Loans and Debts Provided by MDV

Product	Description
Equipment & Infrastructure Financing - *i*	Finance acquisition and construction of land/building, equipment and fittings for laboratory; and R&D and/or manufacturing facilities, including financing of interest accrued during construction
Working Capital Financing-*i*	Funding and assistance to purchase business assets, to meet business expenses, in particular to enable applicants to meet their operating expenses, purchase inventory, receivables financing.
Contract/Project Financing-*i*	Financing of purchase of project's major inputs for projects that are dependent on medium to long-term contracts from sponsors. The facility may also provide for short to long term financing to companies awarded contracts to construct and complete biotechnology infrastructure

*All MDV products are based on Shariah principles

3.3 *Equity Funds*

Equity financing for the biotechnology sector are also extended by the Malaysian Life Sciences Capital Funds (MLSCF) as per Table 1 above. The Malaysian Life Sciences Capital Fund (MLSCF) was founded in late 2006 and is a life sciences venture fund specializing in early stage investments in the areas of agriculture, industrial and healthcare biotechnology. Co-managed by Malaysian Technology Development Corporation Sdn. Bhd., (MTDC) and Burrill & Co., the fund has USD150 million in committed capital. Financing of 11 companies listed in the Bourses stood at RM2.008 billion for the biotechnology sector as at 31st August, 2008. This market capitalization represents 0.241% of the total market capitalization of RM833.5billion. (See *Appendix* II)

4. Analysis of Funding Initiatives in the Biotechnology Sector

The above section highlighted some of the key finance-related issues. One can draw several implications from the above discussion, namely:

(a) biotechnology SMEs face finance-related problems because of the research-intensiveness of the sector;
(b) biotechnology SMEs are heterogeneous and their financial needs are diverse;
(c) biotechnology SMEs only has their intellectual capital and research capabilities as their valuable assets;
(d) The uncertain and risky nature of the R&D process among biotechnology firms makes it difficult for investors to value these firms.

The provision of the above funding facilities is akin to that approach adopted in addressing the problems of financing in the agriculture, manufacturing and services sector. In lay person term: everytime there is a financing problem, the solution is through the creation of a government-subsidized fund. The adoption of such an approach on biotechnology reflects the thinking that SMEs are homogenous across sectors. In short, their strengths, weaknesses,

opportunities and threats are similar, regardless of their sect oral peculiarities. The heterogeneous nature and the high diversity of the biotechnology sector calls for new approaches to funding, rather than adopting a "one-size-fits-all" approach. Compared to SMEs in the manufacturing sector, the SMEs in the biotechnology sector need to seek financial support and raise huge funds from venture capitalist, business angels, private placements and stock-exchange.

The above types of financing available to finance the various stages of development are the most common practice among the various agencies in Malaysia. In spite of the various financing initiatives taken, financing accessibility will still be a problem among biotech firms. These are due to the peculiarities of biotechnology sector where the risks profiles of the firms are even more pronounced at the seed and R & D stage. More funds with flexible conditions are the essence for start-ups where investments on capital intelligence and R & D activities require financing institution to be more proactive and ready to assume more risks. Financing portfolios must, therefore, be more diversified and not only be restricted to grants, loans and debts.

Venture Capital (VC) as a source of financing is slowly being implemented and recognized in Malaysia. Up to date there are only eight VCCs that have funds for biotechnology investments. These VCCs, however, are using the traditional financing model to distribute funds using procedures and practices adopted by banks. To be more effective, VCC must operate beyond strict standard procedures instituted by main stream banking institutions. One way is to complement high reliance on tangible collateral requirement with intangible collateral found in capital intelligence and IPs within the biotechnology sector. In this new environment, banks and VCCs need to improve on their collateral requirement guidelines where the value of intangibles is adopted.

5. Conclusion

In summary this paper highlighted that Malaysia needs to move beyond formulating one cure for all diseases. Malaysia should consider the financing options via corporate partnering and collaboration at the research and development plus the prototype stage. Partnering should not be restricted to R & D activities but the involvement of multi disciplinary capital intelligence that will bring the sector forward to the commercialization and global presence stage. More creative financing should be provided as the Malaysian Biotech industry enters the second phase of development i.e. the commercialization and exit or cash-out stage.

Peculiarities, risk profiles and uniqueness of the members in the biotechnology sector as being a sector heavy on capital intelligence building and risky R & D nature of activities must be factored into the design of financing packages. Creative financing practice in the United States in the form of private equity or business angels, leverage recapitalization, registered direct offerings, Private Investments Public Equities and M & A/Sale of Product Lines are some of the possible creative financing that should be emulated. In the final analysis, efforts to develop the biotechnology sector should move beyond a *"One Prescription, One Cure for All Diseases"*.

Appendix I: Financing Facilities for the Development of the Biotechnology Sector in Malaysia

Agencies	Fund name	Fund size (RM)	Purpose of funding	Maximum amount per company	Instrument
MOSTI	Science Fund	550 million	Development of new products or processes up to proof-of-concept; enhancement of research capability	RM500,000	Conditional grant
	Inno Fund	80 million	To encourage participation from micro entrepreneurs / individual and groups from the community in the service and product	Enterprises– RM3,000,000 Community groups – RM1,000,000	Conditional grant
	Techno Fund	680 million	Pre-commercialization on activities comprises development and up-scaling of new and novel technologies from lab scale prototype up to commercial ready.	Up to a maximum of the total project cost or RM5 million whichever is lower	Conditional grant
	Agro – Biotechnology R&D initiatives	80 million	R & D in strategic areas of agro-biotech that will lead to modernization and transformation of the agricultural sector	Up to a maximum of the total project cost or RM2.5 million whichever is lower	Conditional grant
	Genomic & Molecular Biology R & D Initiatives	100 million	Generation of intellectual properties and technologies for application in modern bio-manufacturing of high value products such as biocatalyst, fine chemicals and diagnostics	Up to a maximum of the total project cost or RM5 million whichever is lower	Conditional grant
	Pharmaceutical & Nutraceutical R & D Initiatives	90 million	To develop 'proof of concept' products or service developed by local scientists to comply with the international standards imposed by the regulatory authorities such as good research practice (GRP) and good laboratory practice (GLP)	Up to a maximum of the total project cost or RM5 million whichever is lower	Conditional grant
MTDC	Technology Acquisition Fund (TAF)	100 million	Acquisition of foreign technology	RM2 million	Grant
	Commercialization of R&D Fund (CRDF)	115 million	Commercialization of local R&D	RM4 million or 70% of the project cost	Grant
SME Bank Bhd.	Biotech Entrepreneurship Program	15 million	Fixed assets financing • Working capital • Cost for technology transfer	RM5 million	Loan
MTDC and Burril and Co.	Malaysian Life Sciences Capital Funds (MLSCF)	USD 150 million	Investment in early to mid stage companies that are involved in healthcare, industrial and agricultural biotechnology	USD8 million	Equity
	Non-ICT Venture Fund	1 billion	Investment in venture capital	No specific limit, range from RM3 million to RM50 million	Equity

Source: http://www.biotechcorp.com.my/fund

Appendix II: Bursa Malaysia Market Capitalization

No	Name	Listed	Market Capitalisation	Business Description	Shares outstanding	Par value	Price @31/08/08 (RM)
1	Apex Healthcare Berhad	Main	123,706,275	Manufacturing, distribution, marketing and retailing of pharmaceutical products	74,973,500.00	1.00	1.65
2	CCM Duopharma Biotech Berhad	Main	334,707,600	Manufacturing, distribution, marketing and retailing of pharmaceutical products	139,461,500.00	0.50	2.40
3	Equator Life Science Berhad	Mesdaq	9,400,320	The group is involved in the horticulture business namely the propagation of various ornamental plants through the use of biotech application	235,008,000.00	0.10	0.04
4	Hovid Berhad	Main	194,330,423	An investment holding company. Subsidiaries are involved in the manufacturing, trading, marketing of pharmaceutical and herbal products	762,080,090.00	0.10	0.26
5	INS Bioscience Berhad	Mesdaq	64,503,005	An investment holding company. Subsidiaries are involved in the manufacturer, marketing, R&D and consultancy of Biotechnology products	286,680,020.00	0.10	0.23
6	Kotra Industries Berhad	Main	58,801,942	Development, manufacturer and trading of pharmaceutical and healthcare products	123,793,563.00	0.50	0.48
7	Pharmaniaga Berhad	Main	406,460,114	An investment holding company, Subsidiaries are involved in the trading, marketing, manufacturer, sales of pharmaceutical and medical products	106,963,188.00	1.00	3.80
8	Stemlife Berhad	Mesdaq	297,000,000	The Group is involved in the harvesting, testing, processing and preservation of blood stem cells, stem cells therapeutic transplant, consultation and also the collecting, testing, preservation of umbilical cords	165,000,000.00	0.10	1.80
9	TMC Life Sciences Berhad	Mesdaq	290,705,910	An investment holding company, subsidiary is involved in the gynaecological, fertility, consulting, R&D, provision of storage of cord, blood and adult stem cells, stem cells therapy products	185,163,000.00	0.10	1.57
10	Y.S.P Southeast Asia Holdings Berhad	Main	69,719,670	An investment holding company, subsidiaries are involved in the import/ export, trading of pharmaceuticals and veterinary products	67,689,000.00	1.00	1.03
11	Carotech Bhd	Mesdaq	159,650,400	Extraction and processing nutrients from palm oil for purposes of manufacturing and production of pharmaceutical, phytonutrient and oleochemical / biodiesel products	456,144,000	0.10	0.35
				2,008,985,659			

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