

Dynamics of Public Policy-Making in Malaysia: The Formulation of National Biotechnology Policy

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Abstract: *Biotechnology is one of the major technologies of the twenty-first century and in fact is the fastest growing sectors in the world. It is a fascinating field that has been identified as the next engine of growth for Malaysia, one that will deliver economic gains through research and development, creation of entrepreneurial opportunities for industrial growth, improvement of food security, health and environmental sustainability. Realizing the important contributions of biotechnology to the country, this paper seeks to examine the policymaking process of National Biotechnology Policy, which is aimed to provide a structured guideline in developing the industry. The major findings of this paper can be classified into two. Firstly, policymakers in the developing countries like Malaysia often assume central roles in initiating, shaping and pursuing public policies. Secondly, a well mobilized policy consultants and policy network is important in ensuring a successful public policy development.*

Keywords: *biotechnology; National Biotechnology Policy; policy consultants; public policy development*

JEL: *L38; L65; L78.*

Introduction

The emergence of new technologies such as the Information and Communication Technology (ICT), biotechnology and new material sciences have successfully altered the dynamics, composition and production patterns in the industrialized as well as developing nations (Chaturvedi & Rao, 2004). Biotechnology, in particular, will undoubtedly be the major technology of the twenty-first century. In fact, biotechnology is one of the fastest growing sectors in the world and is seen as a major area of investment and target for support by government worldwide (MOSTI, 2006). Over the past 55 years, biotechnology has supported many scientific discoveries and has become an integral component of the economies of many industrialized countries (Glassman & Sun, 2004). There are significant potential benefits to the nations committed to participating in the biotechnology industry, for instance, in term of higher crop yields, better healthcare and better economic returns (Daar et al., 2007).

Recognizing the potential contribution of biotechnology to the economy, many Asian countries, including Malaysia have begun to invest in the biotechnology industry. Although biotechnology can be considered as relatively a new industry in Malaysia, yet it has been identified as a potential engine of

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economic growth for the nation. Following the lead given by the development of Multimedia Super Corridor (MSC) which represents a successful investment in the ICT industry, biotechnology is considered as the next growth area in the industrial development for Malaysia (MOSTI, 2006). Hence, with the necessary motivations and great opportunities, biotechnology becomes the subject of public policy aspiration in Malaysia. However, a structured policy is vital as it becomes the key for the implementation of activities in this sector. With a clear direction and indication, the progress and growth of this sector is not only immeasurable but the success will then be proven relative. The Malaysian cabinet then entrusted the Ministry of Science, Technology and Innovation (MOSTI) to lead the drafting of an effective policy for this industry.

This paper attempts to address the formulation of a public policy in Malaysia, in reference to the National Biotechnology Policy. The arguments are presented through the mapping out of the symbiotic relationship between research and policy in general. The paper aims to present the ideal logical sequence involved in the formulation of the policy. This analysis also will pave the way for an appraisal of both the general profile of the policy development and the intervention of political interest in Malaysia.

1. Rationale and importance of biotechnology to Malaysia

Biotechnology is a science and technology platform that provides a highly advanced multidisciplinary approach to develop a knowledge economy. According to the Organisation for Economic Corporation and Development (2005), biotechnology is highly multidisciplinary since it has the foundation in many disciplines such as microbiology, biology, molecular biology, chemistry, and process engineering. The Malaysian Biotechnology Corporation (2008) defines biotechnology in the two different ways. Firstly, it can mean any technique which uses living organisms to make or modify products, improve plant or animal productivity or to develop microorganisms for specific use. Secondly, it can be defined in a narrower scope as new high-end technology, involving recombinant deoxyribonucleic acid (DNA), cell fusion and novel bio-process engineering techniques such as gene transfer and embryo manipulation.

Malaysia, just like the rest of the developing countries, is not willing to miss the opportunities brought forth by the biotechnology revolution. The biotechnology industry in Malaysia can be considered relatively new even though food and additives produced by the conventional techniques such as fermentation have been in existence for decades in the country (Arjunan & Kelvin, 2004). By virtue of its nature, Malaysia has much to offer for the development of biotechnology industry. In fact, Malaysia is considered one of the most bio-diversified countries in the world (Badawi, 2007). The tropical rainforests, the oldest and most biologically diverse ecosystem on earth indicates that Malaysia has the rich gene pool comprising of an estimated 15500 known species of plants, 300 species of mammals, 150000 species of invertebrates with insects being the largest single group, 1200 species of butterflies, 12000 species of moths and over 8000

species of fishes (Latiff and Zakri, 2000). Like other natural resources available in the country, these assets require exploration and production activities in order to create values as well as wealth for the nation.

Besides, due to the increasing socio-economic importance of green chemistry or green technologies, biotechnology offers unmatched opportunities to take advantage of our rich biodiversity. There are unprecedented opportunities to utilize the countless new genes and metabolic pathways for the production of new bio-products, bio-chemicals and bio-materials, which carries a bright economic potential (Chatterji, 2007). According to the Global Bulk Drug Industry report in 2006, the industry that utilizes genetic resources to develop new and improved drugs was estimated to be worth RM276.5 billion in 2005 and was expected to rise at a compounded annual growth rate (CAGR) of 10.6 percent. Furthermore, it has been reported that 33 percent of drug products in the highly industrialized countries are derived directly from plants and most of these are tropical plants growing in equatorial countries such as Malaysia (Jusoh, 2006). Therefore, a crucial injection of high technology such as biotechnology would be able to transform these bio-resources to be more productive and at the same time efficiently conserved.

On top of that, there is a real need for Malaysia to engage biotechnology since it is originally an agricultural country. Prior to 1990, agriculture has been a major contributor to the economic growth of Malaysia. Even after Malaysia shifted its focus into manufacturing and heavy industries in the mid-1980s, agriculture continue to contribute a significant amount of shares in the economy (Ahmad et al., 2001; Asid, 2010). However, the agricultural sector in Malaysia is left with few major challenges. The major challenge facing the Malaysian agriculture and plantation industries is the need to increase food production, and value-added products and crops (Arjunan & Kelvin, 2004). According to the Consumers International Asia Pacific report on Malaysian Food Price Structure in 2000, local rice production was capable to cater approximately 60-65 percent of domestic requirements only and the shortfall is being supplemented by imported rice from the other countries like Thailand and Philippines. Besides, the emergence of new strains of pest and diseases, and introduction of new weeds also affected the economic returns of agricultural enterprises as well as the food security (Daud, 2002).

In consideration of these challenges and opportunities, Malaysia has certainly identified biotechnology as an appropriate vehicle that can deliver economic gains through research and development. With the strong support of natural resources, Malaysia is all set to venture into this high end technology that able to improve food security, create national wealth and at the same time promote a sustainable use of natural resources.

2. The six phases of national biotechnology policy formulation

In general, the formulation of the National Biotechnology Policy can be divided into six phases – Problem Recognition; Appointment of Policy Agent; The Emergence of Policy Network; Interaction; Evaluation and Policy Outcome.

2.1 Problem recognition

The policy initiation phase in the policy process can be extremely a complex one. It includes perceiving that a policy problem exists, identifying the problem context, determining the policy objectives and generating suitable policy agendas. According to Evans and Davies (1999), policy process begins with the recognition by policymakers of the existence problem which requires, due to contextual factors, pressing attention. The policy problems can be in the form of political interest, economic competition, or social need.

In this case study, there was a consensus that global and domestic economic factors constituted the main push for the Malaysian government to adopt a policy on biotechnology. The intense global competition as well as domestic economic crisis played an important role in pushing the government to look for alternate engine of economic growth and solving the country's economic problems. Besides, the new leadership that assumes office in 2003 was optimistic about the ability of biotechnology to participate constructively in the nation's economic building. This strengthened the decision to introduce initiatives for the formulation of biotechnology policy in Malaysia.

The Malaysian government identified three main objectives for adopting biotechnology, which were similar to the objectives set by other countries that opted for biotechnology programs and research activities. This includes promoting economic competition, increasing research and development (R&D) in various economic sectors such as agriculture, health, and industry, as well as accelerating growth through increased opportunities for private sector involvement (MOSTI, 2006, p. 5). In fact, there was general agreement that Malaysia largely followed policy objectives from successful exemplars such as United States and Singapore.¹

There were two specific reasons why Malaysia **recognized** biotechnology as the next engine of the nation's economic growth.² Firstly, biotechnology is regarded as a technology of the century which has the values and potential that one country cannot ignore. The revenue generated by the biotechnology sector in developed country like United States is estimated to be over USD 50 billion per year and providing employment to over 160,000 people (Ernst & Young, 2006). Hence, Malaysia with an ambition to be a developed nation by year 2020 could not afford to lose the race. The revenue generation from the biotechnology industry can further help improve the country's GDP, in order to meet the nation's vision 2020.

Secondly, since Malaysia is fundamentally an agricultural country, biotechnology should be regarded as a tool to further improving the national agriculture industry. Biotechnology can be used in improving the variety and productivity of crops, diseases and pesticides control, as well as in reducing the labour cost. Besides, Malaysia is less self-sufficient, unlike countries like India and China, spending millions of ringgit in importing food products.

2.2 Appointment of policy agent

During the search process, an organisation may come across a potential policy agent or policy consultant with specialist skills to develop the necessary political and knowledge resources to satisfy successful policy development (Khairiah, 2008). As MOSTI was entrusted to lead the drafting of the biotechnology policy, MOSTI engaged the Malaysian Industry-Government Group for High Technology (MIGHT) as the principle consultant to accomplish the given task in the best possible manner.

MIGHT is an independent and non-profit governmental organisation that is responsible to enable consensus building and coordination for industry-government partnership in high technology such as biotechnology. It is a prominent organisation and has strong international links.

Since the expertise of MIGHT is well known and reliable, the government had no qualms with the organisations reputation for preparing the proposal of a biotechnology policy. It can be concluded that the selection of consultant was a straight forward process. There are two possible explanations to describe the basis of selection by MOSTI. Firstly, there are very few organisations in Malaysia that was able to provide a comprehensive consultation on high end technologies like biotechnology, thus limiting the options for selection. Secondly, MIGHT is well known for its reliability and expertise in dealing with similar high end technologies like aerospace and automotive.

2.3 The emergence of policy network

This stage in the process of policy making identifies the emergence of an information feeder network which is developed by the appointed policy consultant (Khairiah, 2008). In this case, it was MIGHT. The curiosity of the Ministry of Science, Technology and Innovation (MOSTI) as a client was increased through preliminary processes of contact. Thereafter, it is crucial for MIGHT to increase the volume and the detail of information for MOSTI by demonstrating the quality of their access to communication and knowledge network in order to facilitate the formulation of National Biotechnology Policy proposal.

MIGHT's central objective of its feasibility studies in biotechnology was to formulate policy proposal that will provide a national platform and priority to facilitate the development of national biotechnology industry in a more structured manner. The feasibility study began by taking into consideration the important issues of policy making such as the nation's strengths, weaknesses, opportunities, and threats in the biotechnology endeavor. In specific, MIGHT began with a feasibility study, whereby the existing biotechnology activities in the industry were being accounted for together with what Malaysia as a nation has in terms of ownership of the sector.³

For this exercise, MIGHT has appointed Ernst & Young Malaysia and Burrill & Company as co-consultants.⁴ Ernst & Young Malaysia is a local based international company, which is well known for its role in analyzing and promoting

biotechnology. Ernst & Young was responsible for the benchmarking exercise. Benchmarking exercise is crucial for Malaysia since it is a tool for improvement that is achieved through comparison with other countries **recognized** as the best within the area of biotechnology.

On the other hand, Burrill & Company is an international company based in San Francisco, United States and was the main consultant for the BIO 2004 conference. The General Manager, Macro and Future Studies of MIGHT acknowledges that Burrill & Company was responsible to recommend strategies to accelerate the progress of the Malaysian biotechnology industry.⁵ To further facilitate the study, reports prepared by AT Kearney for Bio-Valley master plan in 2003 were used as reference.⁶ AT Kearney is an international based consultant engaged by the Ministry of Science, Technology and Environment (MOSTE) during the development of Bio Valley master plan. Besides, MIGHT also sought information from the Malaysian Development Corporations (MDC) for the lesson learnt during the development of Multimedia Super Corridor (MSC).

2.4 Interaction

In this stage, policy consultants will often be expected to organise forums for exchange of ideas between the client and knowledge elites as well as relevant policy stakeholders (Evans, 1999). This may take a form of representatives of relevant stakeholders who have similar professional beliefs and standards of judgment as well as share common policy concerns (Khairiah, 2008).

Various contexts of interaction can be identified in this case study through which MIGHT, MOSTI and representatives from academia, non-governmental organisations and industrial players discussed issues of central importance in the formulation of National Biotechnology Policy. At least nine important meetings were held starting from the appointment of MIGHT as the official consultant until the official launch of the National Biotechnology Policy.

**Table 1. Chronology of Meetings
between MIGHT, MOSTI, and Policy Stakeholders**

No.	Date	Meeting
1	23.10.04	Briefing to Secretary General of MOSTI
2	28-29.10.04	First Strategic Planning Session
3	2-3.12.04	Second Strategic Planning Session
4	9.12.04	Third Strategic Planning Session
5	30.12.04	National Biotechnology Policy Workshop
6	14.1.05	Industry Networking Session
7	21.2.05	Discussion with Heads of MOSTI Agencies
8	24.2.05	Discussion with Academia and Industry
9	26.2.05	Discussion with other Ministries and State Governments

Source: Malaysian Industry-Government Group for High Technology (2009)

It was through the series of interaction that MIGHT proved itself as the key policy consultant due to the strength of their knowledge and expertise in the policy process. Based on the outcome of the meetings, MIGHT began the drafting of National Biotechnology Policy proposal. The policy proposal was drafted based on the findings by Ernst & Young Malaysia and Burrill & Company as well as the feedbacks obtained from the meetings.

2.5 Evaluation

Once the client is satisfied with the degree of intelligence gathering that the consultants have engaged in, the process of evaluation will commence (Khairiah, 2008). The evaluation process is critical in determining that the elements such as policy objectives, structure, contents, and concepts are designed appropriately according to the needs of Malaysian setting. In this context, MOSTI as the client in the process was satisfied with the overall proposal outcome. According to the General Manager, Macro and Future Studies of MIGHT, the final draft of National Biotechnology Policy was prepared by MIGHT after few rounds of evaluation by MOSTI and various government agencies and non-governmental organisations like Ministry of Agriculture and Agro-Based Industries (MOA), Economic Planning Unit (EPU), Malaysian Agricultural Research and Development Institute (MARDI), Malaysian Biotechnology Information Centre (MABIC) and Malaysian Palm Oil Board (MPOB).

2.6 Outcome

After the National Biotechnology Policy draft has been evaluated by MOSTI and the various government agencies and non-governmental organisations, Jamaludin Jarjis, the former Minister of MOSTI presented the policy draft to the Malaysian Cabinet. According to the Principal Assistant Secretary, Finance and Corporate Section, BIOTEK, the cabinet approved the policy draft in the first presentation itself without any amendment since the proposal has been reviewed several times earlier by the various government agencies and was deemed complete.⁷

The National Biotechnology Policy was unveiled on the 28th April 2005 by the former Prime Minister, Abdullah Ahmad Badawi, during the opening ceremony of the BioMalaysia 2005 at the Putrajaya International Convention Centre. In order to implement the policy, the Malaysian Biotechnology Corporation (MBC) was created as an agency to lead the development of the industry, including the coordination of the regulatory policy among different governmental and non-governmental agencies. MBC was overseen by the Implementation Council and advised by the International Advisory Panel, both under the leadership of the Prime Minister of Malaysia.

Conclusion

Biotechnology has a critical role to play in the future and the Malaysian government needs to be the driver of a careful and deliberate advancement in this crucial area, specifically in developing and applying modern biotechnology. The sustainability of biotechnology as an engine of growth would be premised on the government's commitment to core values of safety and environmental stewardship. The National Biotechnology Policy (NBP) expected to provide an integrated approach to address the opportunities and challenges presented by this new wave economic platform and ensure that the development of biotechnology in Malaysia is undertaken in a structured, ethical and commercial framework which would generate the appropriate economic, commercial, health and social benefits for Malaysia.

This paper generates insights that may help develop better understanding of public policy making in Malaysia, in particular the NBP. Two observations that can be made from the NBP formulation process in Malaysia are highlighted here. Firstly, policymakers in developing countries like Malaysia often assume central roles in initiating, shaping and pursuing public policies. They are frequently the most important actors in propelling issues and problems into agenda for government action. Secondly, a well mobilized policy consultants and policy network may make a critical difference in ensuring a successful adoption and implementation of the policy proposal in a multiracial country like Malaysia.

References

1. **AHMAD, N.Z., MAJID, M.A. & ZAIDI, M.A.S.** (2001). Agricultural and Industrial Development in Malaysia: Policy Bias? *Humanomics*, 17(1), 61 – 76.
2. **ARUJANAN, M. & KELVIN, K.** (2004). Biotechnology & Religion: Are they compatible? *BiCnews*, 5, 1-24.
3. **ASID, R.** (2010). The Technical Efficiency Analyses of Manufacturing Sector in Malaysia: Evidence from the First Industrial Master Plan (1986-1995). *Asian Social Science*, 6(2), 99-106.
4. **BADAWI, A.H.A.** (2006). *The Official Launch of BioMalaysia 2006*. Retrieved July 13, 2009, from <http://abdullah.cdc.net.my/malaysia/speeches/2006/2006-12-06.php>
5. **CHATTERJI, A.K.** (2007). *Introduction to Environmental Biotechnology* (2nd ed.). New Delhi: Prentice Hall of India Pvt. Ltd.
6. **CHATURVEDI, S. AND RAO, S.R.** (2004). *Biotechnology and Development: Challenges and Opportunities for Asia*. New Delhi: Academic Foundation.
7. **DAAR, A.S., BERNDTSON, K., PERSAD, D.L. & SINGER, P.A.** (2007). How can developing countries harness biotechnology to improve health? *BMC Public Health*, 7, 346.
8. **DAUD, H.M.** (2002). The Current and Future Outlook of Agricultural Biotechnology in Malaysia. In S. Chaturvedi & S. R. Rao (Ed.), *Biotechnology and Development: Challenges and Opportunities for Asia* (pp. 85-100). New Delhi: Academic Foundation.
9. **EVANS, M. & DAVIES, J.** (1999). Understanding Policy Transfer: A Multi-level, Multi-Disciplinary Perceptive. *Public Administration*, 77, 361-386.

10. **GLASSMAN, R.H. & SUN, A.Y.** (2004). Biotechnology: Identifying advances from the hype. *Nature Reviews Drug Discovery*, 3, 177–183.
11. **JUSOH, S.** (2006). Is Intellectual Property a Catalyst for Development? The Case of Biotechnology Sector in Malaysia and Singapore. *ATDF Journal*, 3(3), 38-49.
12. **MOKHTAR, K.S.** (2008). *Privatising Malaysian Airlines: A Policy Transfer Approach*. Bangi: Penerbit Universiti Kebangsaan Malaysia.
13. **LATIFF, A. & ZAKRI, A.H.** (2000). Protection of Traditional Knowledge, Innovations and Practices: The Malaysian Experience. *Paper presented at UNCTAD Expert Meeting on Systems and National Experiences for Protecting Traditional Knowledge, Innovations and Practices*. Switzerland: Geneva.
14. **MOSTI.** (2006). *National Biotechnology Policy: Biotechnology for Wealth Creation and Social Well-being*. Malaysia: Ministry of Science, Technology and Innovation.

Endnotes

- ¹ The interview were conducted with the following personnel who confirmed this view: Mahaletchumy Arjunan, Executive Director, Malaysian Biotechnology Information Centre (MABIC), 02/04/2009; Assoc. Prof. Thiruchelvam, Senior Lecturer, Department of Science & Technology, Faculty of Science, Universiti Malaya, 02/04/2009; Prof. Asma Ismail, Deputy Vice Chancellor, Research & Innovation, Universiti Sains Malaysia, 08/04/2009; Yusof Radzuan Saad, Principal Assistant Secretary, Finance and Corporate Section, BIOTEK, MOSTI, 19/08/2009; Zakwan Md. Zabidi, General Manager, Macro & Future Studies, MIGHT, 20/08/2009; an BIOTEK senior personnel, 19/08/2009.
- ² Interview with Mahaletchumy Arjunan, Executive Director, Malaysian Biotechnology Information Centre (MABIC), 02/04/2009.
- ³ This information was provided in the interview with Zakwan Md. Zabidi, General Manager, Macro & Future Studies, MIGHT, 20/08/2009; an BIOTEK senior personnel, 19/08/2009.
- ⁴ This information was provided in the interview with Zakwan Md. Zabidi, General Manager, Macro & Future Studies, MIGHT, 20/08/2009.
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