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## Elucidating the Study of Type of Biotechnology Industry Trend According its State in Malaysia: Part B

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### Abstract

Modern biotechnology industry has been growing rapidly around the world especially in developing countries via the application of the technology in field of agriculture, industrial and medicine. Begin from year 2005, a lot of private biotechnology industries forming with the local government initiatives and the worldwide market potential. In this paper, follow the research from previous paper and continue to investigate the relationship among 282 biotechnology company according the type of biotechnology industry and its location. From the study from the selected location found that the highest number of AgBiotech company and BioIndustrial company in Selangor and BioMedical companies in Wilayah Persekutuan Kuala Lumpur. In addition, BioMedical (43.75%), BioIndustrial (62.5%), and AgBiotech (81.25%) occupied from selected location. Finally, in the majority states the numbers of agricultural biotechnology company higher than the total number of biotechnology companies in industrial biotechnology and medical biotechnology except Wilayah Persekutuan Kuala Lumpur.

**Keywords:** Biotechnology, Malaysia, AgBiotech, BioMedical, BioIndustrial.

### Introduction

Currently biotechnology is very popular and regard as one of key important industry of the technology field, a novel knowledge-based economy wave. It is considering a fast pace and innovation development, which is relates to the involvement of research centers, experts and specialists, investments, different information sources, as well as interrelated to guarantee the information flow. A bright future potential, biotechnology industry has a boarder range of application for instance genetically modified organism production, food industry, healthcare, pharmaceuticals, bioremediation, detergents, agriculture and forestry. This

industry is a potential variety in the world when it comes to the space and structure where the biotechnology industry development begins (Slawomir and Marta, 2013; Ahmed, U., Umrani, Qureshi, & Samad, 2018; Ahmed, Isa, Majid, Zin, & Amin, 2017).

In addition, the biotechnology industry has been considered and focused as a very crucial industry in assisting Malaysia to achieve its goal to become a highly industrialized nation by 2020. Advance biotechnology has been given priority by Malaysia's government to lead the country's economy and advance biotechnology related products and service from other countries are coming in phase by phase (Latifah et al., 2011; Ahmed, Majid, & Zin, 2016).

The industry of biotechnology keeps rising and this biotechnology industry is high potential to become an important industry in the market. However, due to the lack of study discusses about the type of biotechnology in Malaysia according by the states with its biotechnology industry type in detail.

Therefore, this study attempts to continue the previous research "The Study of Type of Biotechnology Industry Trends according its States in Malaysia: Part A" with discuss more about the relationship between the types of biotechnology industry, the relationship between different locations or states, the numbers of biotech companies between agricultural biotechnology and the total numbers of medical and industrial biotechnologies.

## Methodology

### Study Area



**Figure 1. Study area (Source from:**  
<https://www.thinglink.com/scene/905333474771075073>**)**

An emphasis of biotechnology company analysis is place on the following states in Malaysia: Johor, Kedah, Kelantan, Malacca, Negeri Sembilan, Pahang, Penang, Perak, Sabah, Sarawak, Selangor, Terengganu, Wilayah Persekutuan Kuala Lumpur, Perlis, Wilayah Persekutuan Labuan and Putrajaya.

### **Classification**

In this study, the sample size are 282 biotechnology companies and grouped in three categories:

- i) AgBiotech Based Biotechnology Company (agricultural biotechnology)
- ii) BioMedical Based Biotechnology Company (medical biotechnology)
- iii) BioIndustrial Based Biotechnology Company (industrial biotechnology)

Then these categorize again according its states: Johor, Kedah, Kelantan, Malacca, Negeri Sembilan, Pahang, Penang, Perak, Sabah, Sarawak, Selangor, Terengganu, Wilayah Persekutuan Kuala Lumpur, Perlis, Wilayah Persekutuan Labuan and Putrajaya.

### **Material and Data Collection**

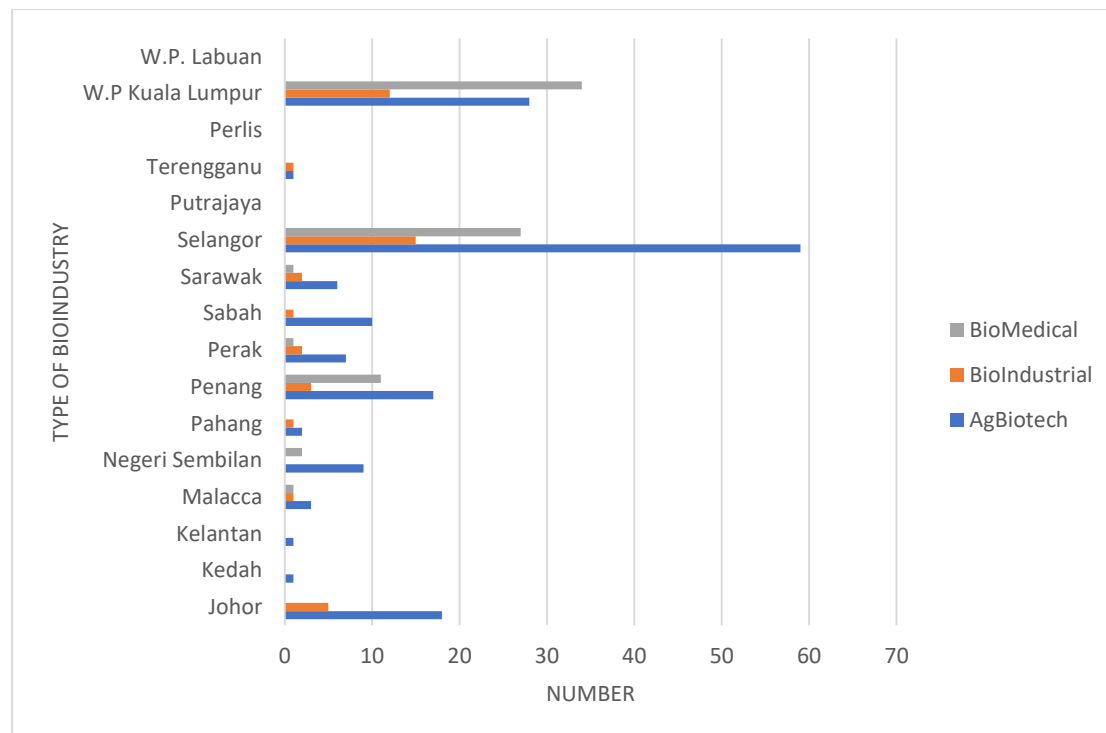
This analysis is mainly based on the data derived from Bioeconomy Corporation database, containing information on 282 biotechnology companies as well as AgBiotech, BioMedical and BioIndustrial in Malaysia. All the data analyzed via Microsoft Excel 365.

### **Results and Discussions**

With refer to the Figure 2, its showed the overall distribution biotechnology company in Malaysia according its states. In Figure 2, the highest number of AgBiotech company is Selangor (59 companies), the second is W.P Kuala Lumpur (28 companies) and the least is W.P. Labuan, Perlis and Putrajaya (0 company).

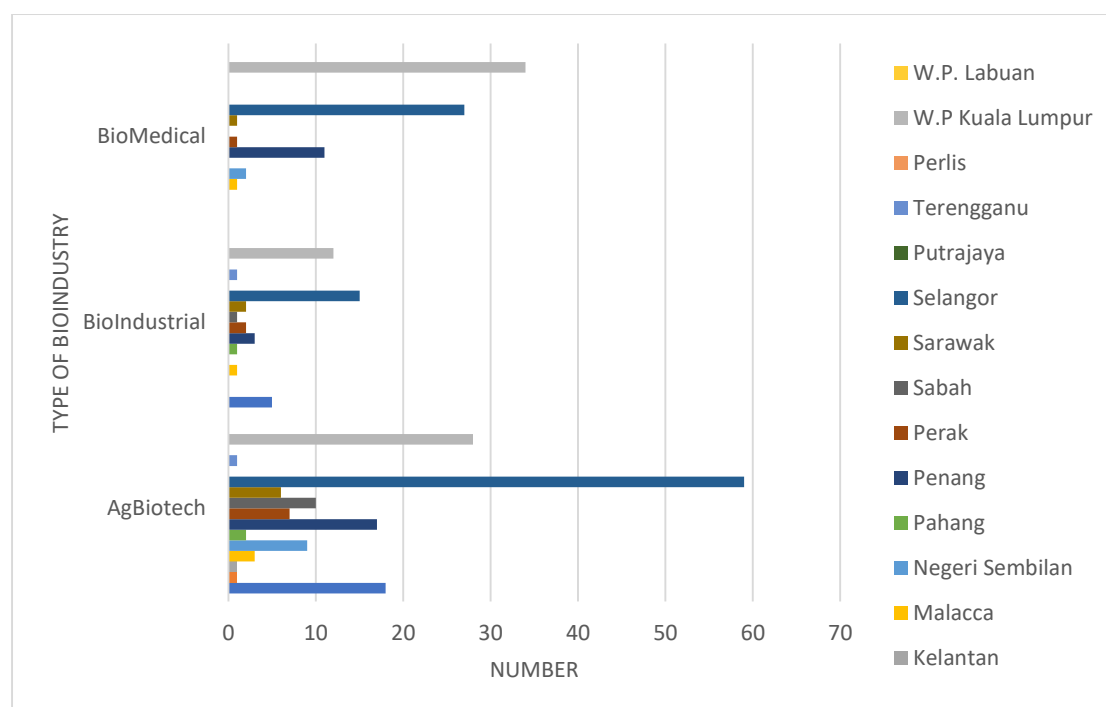
In addition, the highest number of BioIndustrial company is also Selangor (15 companies), the second is W.P. Kuala Lumpur (12 companies) and the least is W.P. Labuan, Perlis, Putrajaya, Negeri Sembilan, Kelantan and Kedah (0 company).

Last but not least, the highest number of BioMedical companies is W.P. Kuala Lumpur (34 companies), the second is Selangor (27 companies) and the least is W.P. Labuan, Perlis, Terengganu, Putrajaya, Sabah, Pahang, Kelantan, Kedah and Johor (0 company).



**Figure 2. The Overall Distribution Biotechnology Company in Malaysia According States**

In Figure 3, the data showed the overall of distribution biotechnology company in Malaysia according its bioindustry. From the Figure 3, BioMedical types company only found 7 places (43.75%) , BioIndustrial types company found 10 places (62.5%), and AgBiotech types company found 13 places (81.25%) In these data, AgBiotech (agricultural biotechnology industry) found the most popular biotechnology industry selected by entrepreneurs in Malaysia, the second is BioIndustrial (industrial biotechnology industry) and the least is BioMedial (medical biotechnology industry) these results reflect the medical biotechnology industry might need higher capital cost and higher risk compare to agricultural biotechnology industry and industrial biotechnology industry.

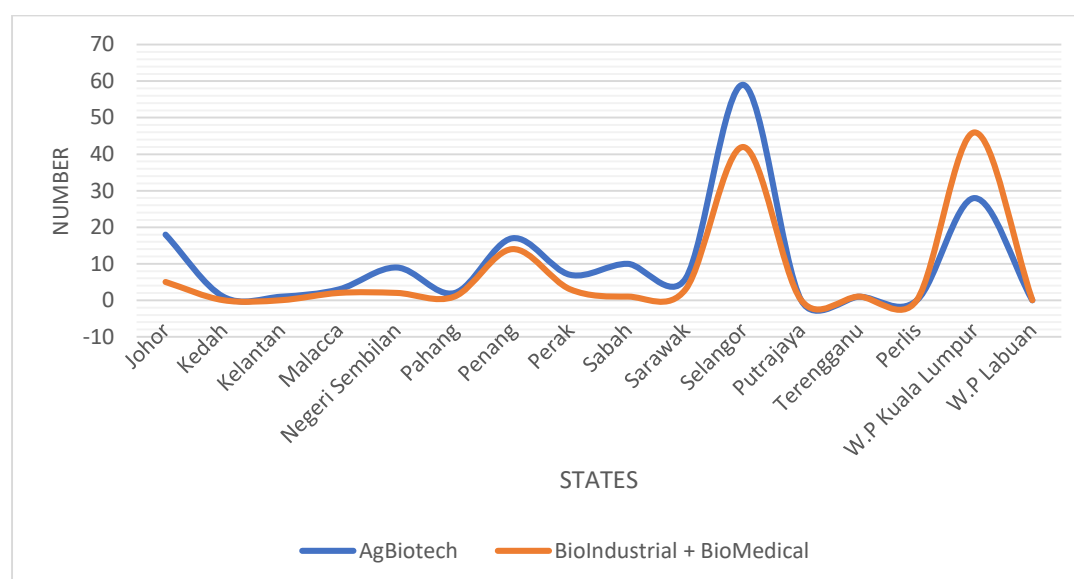


**Figure 3. The Overall Distribution Biotechnology Company in Malaysia According its Bioindustry**

Figure 4 showed the comparison between numbers of biotechnology company of AgBiotech and BioIndustrial + BioMedical. From the Figure 4, in the majority states the numbers of agricultural biotechnology company higher than the total number of biotechnology companies in industrial biotechnology and medical biotechnology except W.P. Kuala Lumpur. In addition, the data showed that the biotechnology industry and medical biotechnology industry have the larger potential to be developed since the demand from these biotechnology industries increasing.

Besides, the larger number of agricultural biotechnology company forming the huge, potential and ready resource supply platform to medical biotechnology and industrial biotechnology company. For example, agricultural biotechnology company promote the higher production rate and quality of oil palm, then these high productions and high-quality oil palm will be added value in industrial biotechnology industry such as converted into biodiesel as alternative fuel or value added in medical biotechnology industry to create the more health care product for human being and even for disease treatment.

With the strong resource supply platform (agricultural biotechnology industry), it will create a high possibility to be success in industrial biotechnology industry and medical biotechnology industry. Since the agriculture resources is produced by Malaysia the better control of the quality and quantity of resources in order to manufacture better and industrial and medical products.



**Figure 4. The Comparison between Number of Biotechnology Company of AgBiotech and BioIndustrial + BioMedical**

### Conclusion

The distribution of biotechnology industries (AgBiotech, BioMedical and BioIndustrial) are depend by the location or states in Malaysia. In this research, AgBiotech (agricultural biotechnology) industry are the major biotechnology industry in Malaysia and become the important platform and support the BioMedical and BioIndustrial development. However, this research only provided short discussion regard with the relationship of distribution of different types of biotechnology companies in Malaysia according its states and even more about the study of biotechnology industry's clusters in Malaysia. Finally, its relationships between variety factors and variables will be discussed and studied in future researches.

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