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Chee Loong Teo, Huam Hon Tat

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The Study of Type of Biotechnology Industry Trend According its State in Malaysia: Part A

Chee Loong Teo

Southern University College, Faculty of Business and Management, Jalan Selatan Utama, Off
Jalan Skudai, 81300 Skudai, Johor, Malaysia.

Diamond Star Biotechnology Sdn. Bhd., 85, Jalan Serampang, Taman Sri Tebrau, 80050,
Johor Bahru, Johor, Malaysia.

Huam Hon Tat

Putra Business School, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia.

Abstract

Recently, biotechnology industry gradually develops into a major and highlight potential industry in worldwide which is believe that will form a new generation in these industry field. Started from year 2005, Malaysia was officially established the Malaysian Biotechnology Corporation (MBC) which is focusing in development biotechnology field. As up to-date, the numbers of biotechnology company continuously develop. In this paper, 282 biotechnology company are focused and classified according its bioindustry type and accordance with Malaysia respectively. Johor, Kedah Kelantan, Malacca, Negeri Sembilan, Pahang, Perak, Sabah and Sarawak are the major focus on agricultural biotechnology (60 - 100%), Penang and Selangor are developed more evenly in different biotechnology industry such as agricultural biotechnology (55 – 58%), medical biotechnology (27 – 35%) and industrial biotechnology (10 - 15%), Terengganu focus on agricultural biotechnology (50%) and industrial biotechnology (50%) while Wilayah Kuala Lumpur even more focusing on medical biotechnology (46%) compare with agricultural biotechnology (38%) and industrial biotechnology (16%).

Keywords: Biotechnology, States, AgBiotech, BioMedical, BioIndustrial.

Introduction

Biotechnology as an industry refers to the utilized of living organisms to improve the development of products for animal and human healthcare, food processing, agricultural production, renewable resources and environmental and industrial management (BIOTEK, 2001). The importance of the biotechnology industry as a key point of growth for the country economy, the Malaysian Government has invested in variety of biotechnology application such as human health, agriculture and related bioindustry field (BIOTEK, 2001). In 2001, Malaysia had propelled the transformation and biotechnology industry is one of the five core

strategies to a highly industrialized country by 2020 (Malaysia, 2001; Ahmed, Umrani, Qureshi, & Samad, (2018)Ahmed, Isa, Majid, Zin, & Amin, 2017).

In addition, since 1990s Malaysia already aspired to enactment bioeconomy and biotechnology as one of the core engines of economic growth to use the rich of biodiversity and natural resources in Malaysia (Arujanan and Singaram, 2018; Ahmed, Majid, & Zin, 2016). While, the government plays an important integral role in developing the industry and variety of incentives are in place for the private industry to be more actively involved to be collaborate with the government.

In 2005, Malaysia had launched the National Biotechnology Policy and lately launched the National Bioeconomy Programme in 2019. Malaysia has become the 1st country for the launched of National Bioeconomy in South East Asia and 2nd in Asia after China. Besides, Malaysia also very active in biosafety regulations and laws and major related legal instrument in place. Couple of success story has been recorded since the begin of the National Biotechnology Policy in term of contribution to Gross Domestic Product (GDP) via biotechnology industry and foreign companies' investment, job opportunity, however, this industry is not spared from challenges too (Arujanan and Singaram, 2018).

The biotechnology industries keep growing to be potential industry in the market. However, this is a valuable study in biotechnology industry unfortunately only minority of researchers contribute in this area. Thus, in this study an attempt was made to discuss about biotechnology company trend study according its states in Malaysia.

Methodology

Study Area

An emphasis of biotechnology company analysis is put 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 is 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)

The above categories are 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

These analyses 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. Then, all the data analysis via Microsoft Excel 365.

Results and Discussions

Figure 1 and Figure 2 showed the numbers of biotechnology companies and its percentage in Johor state according type of bioindustry. In Johor, AgBiotech (18 companies, 78%), BioIndustrial (5 companies, 22%) and BioMedical (0 company, 0%), which represents a nearly 4-fold compare AgBiotech than BioIndustrial. In Johor, from the data that showed that less BioMedical developed in this state.

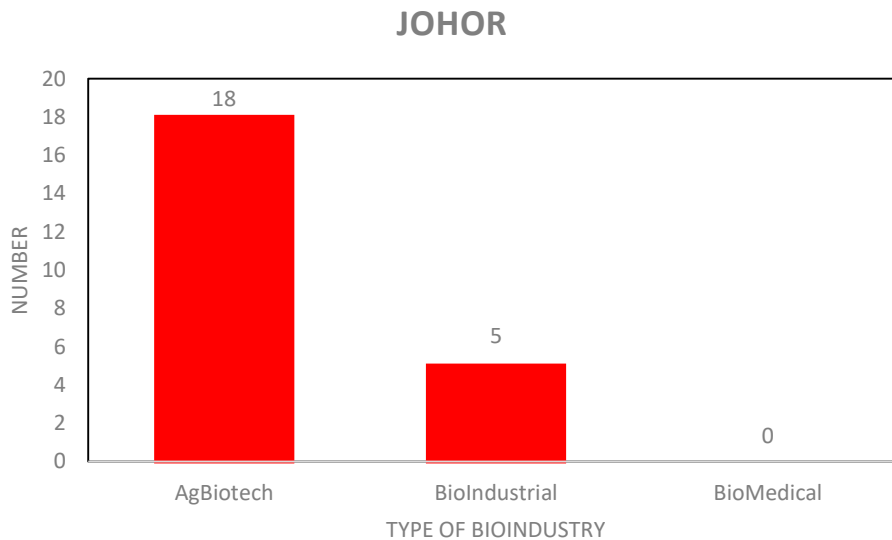


Figure 1 The number of biotechnology company according its bioindustry in Johor

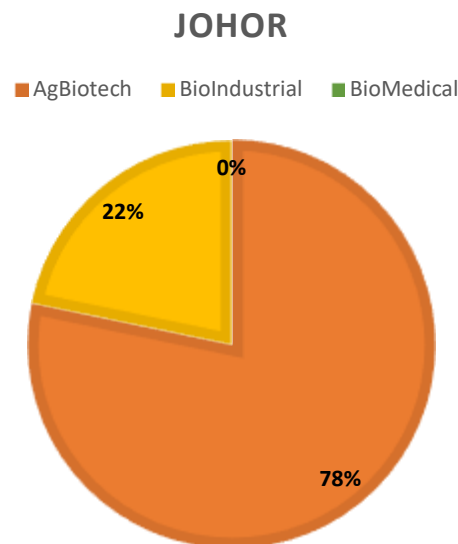


Figure 2 The percentage of biotechnology company according its bioindustry in Johor

Figure 3 and Figure 4 showed the numbers of biotechnology companies and its percentage in Kedah state according type of bioindustry. In Kedah, AgBiotech (1 company, 100%), BioIndustrial (0 company, 0%) and BioMedical (0 company, 0%) which only one company with

agricultural based biotechnology company registered. In Kedah, from the data that showed that less BioIndustrial and BioMedical developed in this state.

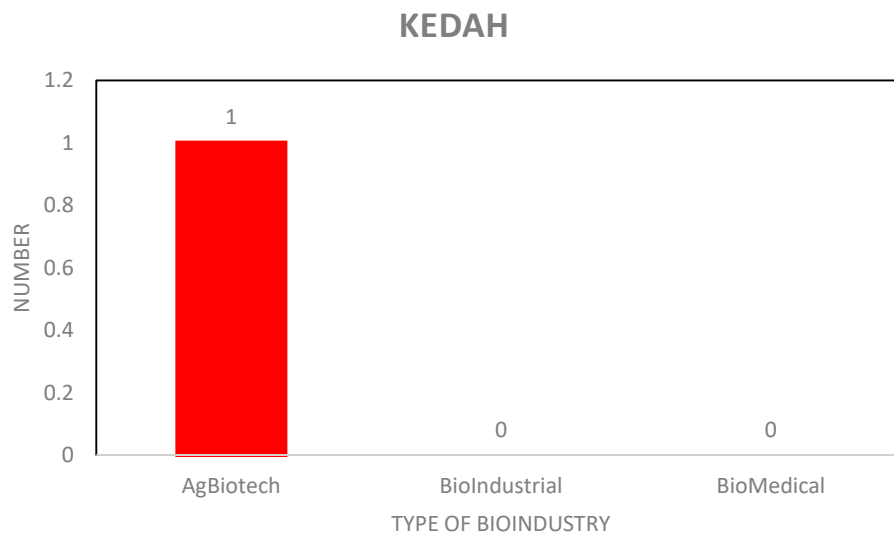


Figure 3 The number of biotechnology company according its bioindustry in Kedah

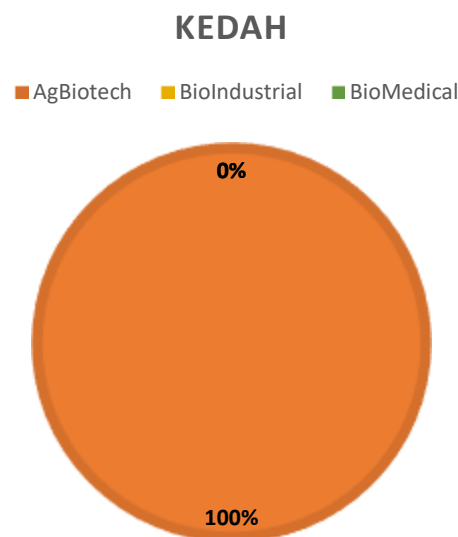


Figure 4 The percentage of biotechnology company according its bioindustry in Kedah

Figure 5 and Figure 6 showed the numbers of biotechnology companies and its percentage in Kelantan state according type of bioindustry. In Kelantan, AgBiotech (1 company, 100%), BioIndustrial (0 company, 0%) and BioMedical (0 company, 0%). In Kelantan, same situation as Kedah, found only 1 biotechnology company with registered under agricultural. In Kelantan, from the data that showed that less BioIndustrial and BioMedical developed in this state.

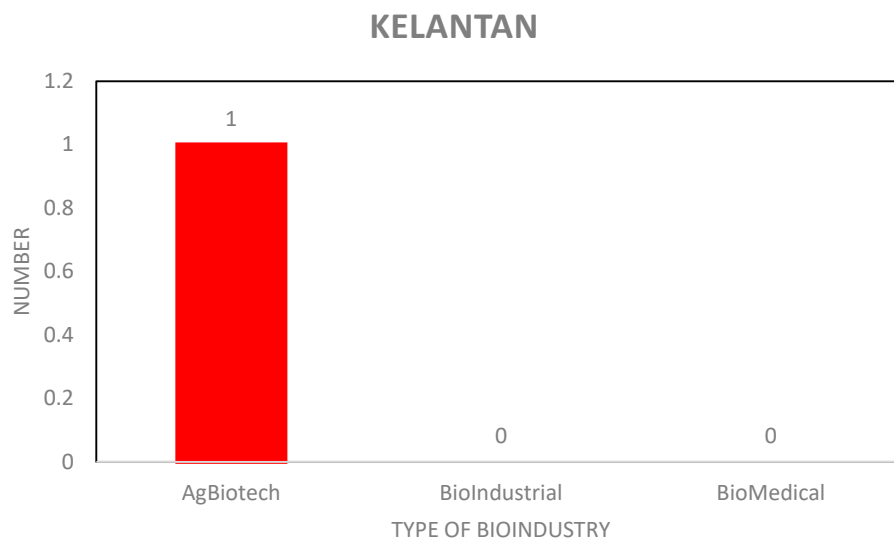


Figure 5 The number of biotechnology company according its bioindustry in Kelantan

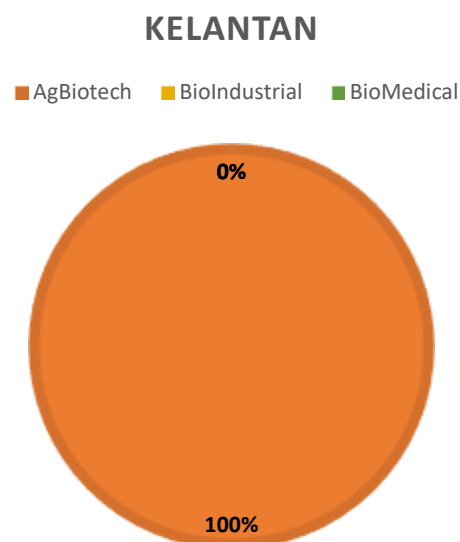


Figure 6 The percentage of biotechnology company according its bioindustry in Kelantan

Figure 7 and Figure 8 showed the numbers of biotechnology companies and its percentage in Malacca state according type of bioindustry. In Malacca, AgBiotech (3 companies, 60%), BioIndustrial (1 company, 20%) and BioMedical (1 company, 20%), which represents a 3-fold compare AgBiotech than BioIndustrial and BioMedical respectively. In Malacca, the data showed 3 major biotechnology industries developed in this state.

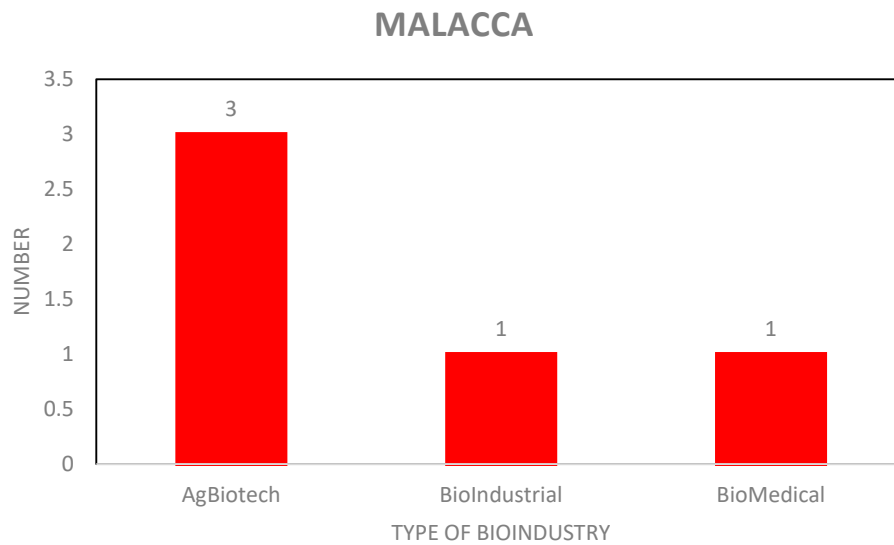


Figure 7 The number of biotechnology company according its bioindustry in Malacca

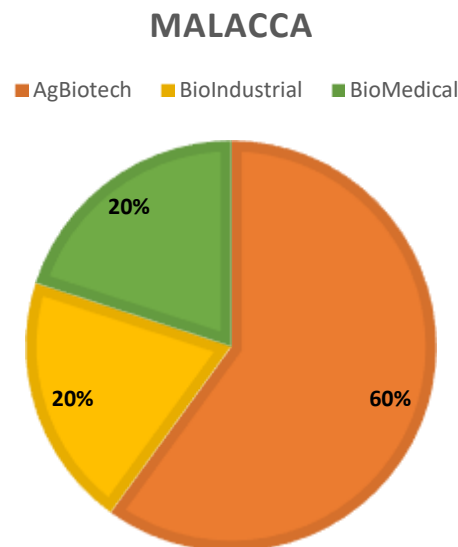


Figure 8 The percentage of biotechnology company according its bioindustry in Malacca

Figure 9 and Figure 10 showed the numbers of biotechnology companies and its percentage in Negeri Sembilan state according type of bioindustry. In Negeri Sembilan, AgBiotech (9 companies, 82%), BioIndustrial (0 companies, 0%) and BioMedical (2 companies, 18%) which represents a nearly 4.5-fold compare AgBiotech than BioMedical. In Negeri Sembilan, the data showed the less BioIndustrial developed in this state.

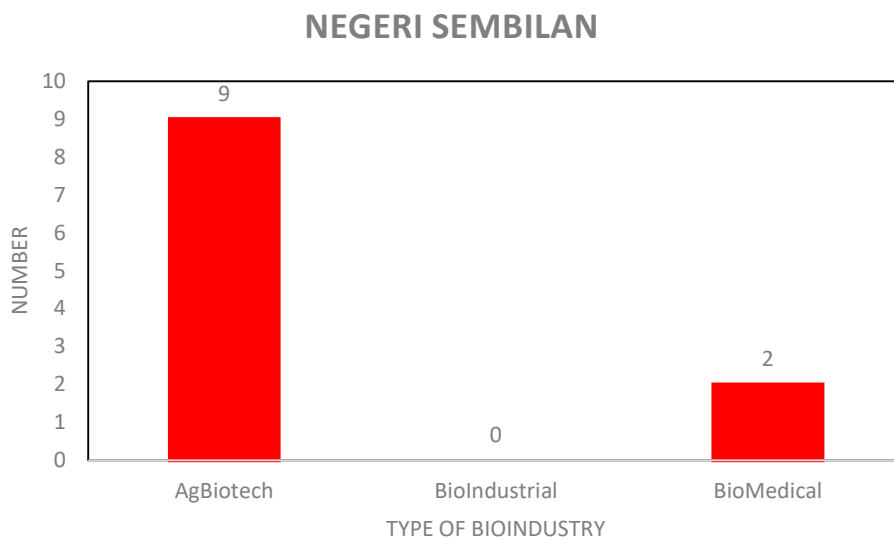


Figure 9 The number of biotechnology company according its bioindustry in Negeri Sembilan

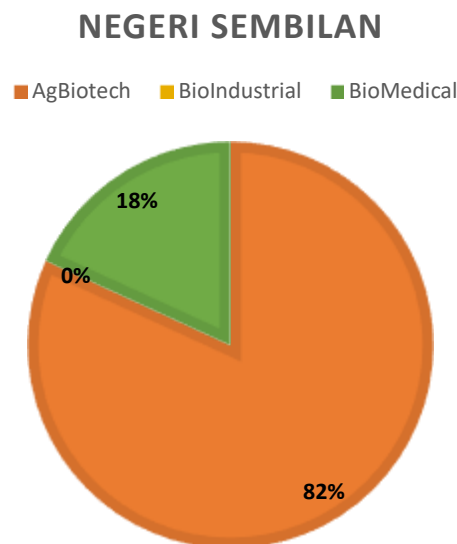


Figure 10 The percentage of biotechnology company according its bioindustry in Negeri Sembilan

Figure 11 and Figure 12 showed the numbers of biotechnology companies and its percentage in Pahang state according type of bioindustry. In Pahang, AgBiotech (2 companies, 67%), BioIndustrial (1 company, 33%) and BioMedical (0 company, 0%) which represents a 2-fold compare AgBiotech than BioIndustrial. In Pahang, the data showed the less BioMedical developed in this state.

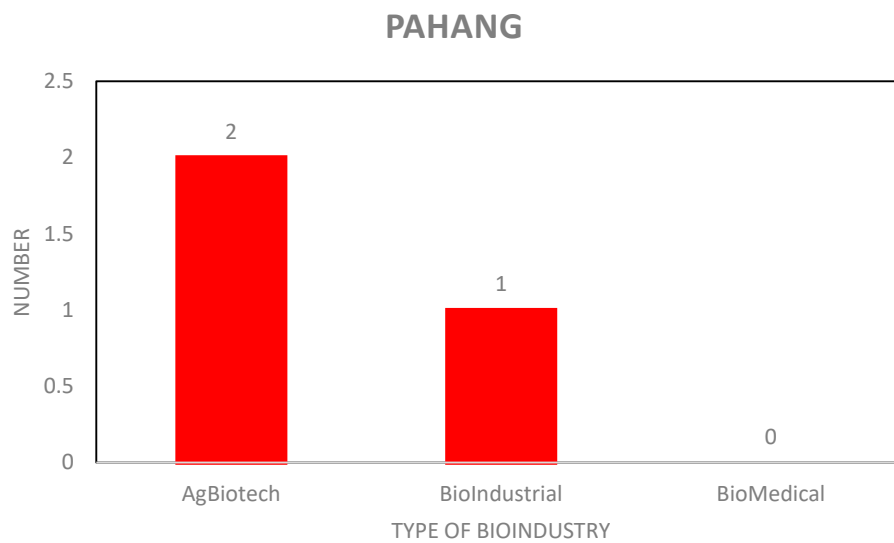


Figure 11 The number of biotechnology company according its bioindustry in Pahang

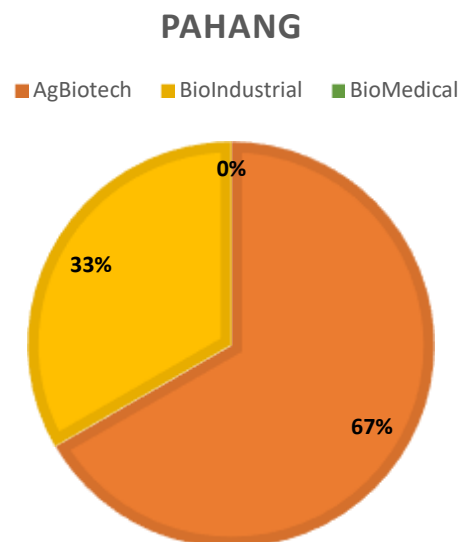


Figure 12 The percentage of biotechnology company according its bioindustry in Pahang

Figure 13 and Figure 14 showed the numbers of biotechnology companies and its percentage in Penang state according type of bioindustry. In Penang, AgBiotech (17 companies, 55%), BioIndustrial (3 companies, 10%) and BioMedical (11 companies, 35%) which represents a nearly 5-fold compare AgBiotech than BioIndustrial and nearly 1-fold than BioMedical respectively. In Penang, the data showed the 3 major biotechnology industries developed in this state especially AgBiotech.

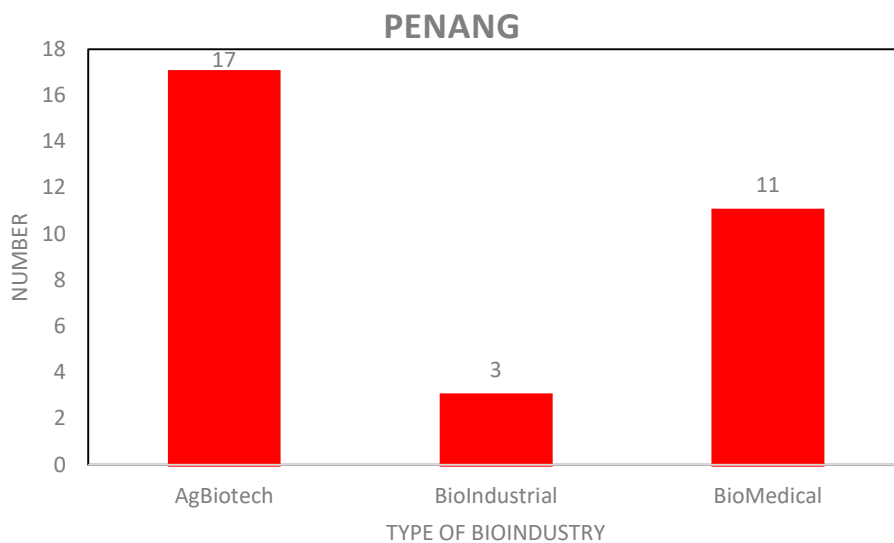


Figure 13 The number of biotechnology company according its bioindustry in Penang

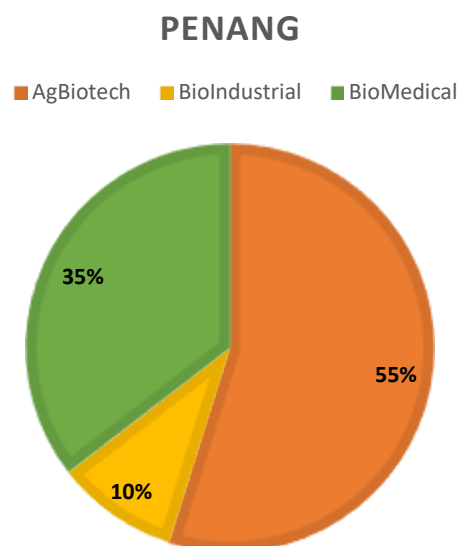


Figure 14 The percentage of biotechnology company according its bioindustry in Penang

Figure 15 and Figure 16 showed the numbers of biotechnology companies and its percentage in Perak state according type of bioindustry. In Perak, AgBiotech (7 companies, 70%), BioIndustrial (2 companies, 20%) and BioMedical (1 company, 10%) which represents a 3.5-fold compare AgBiotech than BioIndustrial and 7-fold than BioMedical respectively. In Perak, the data showed the 3 major biotechnology industries developed in this state especially AgBiotech developed more.

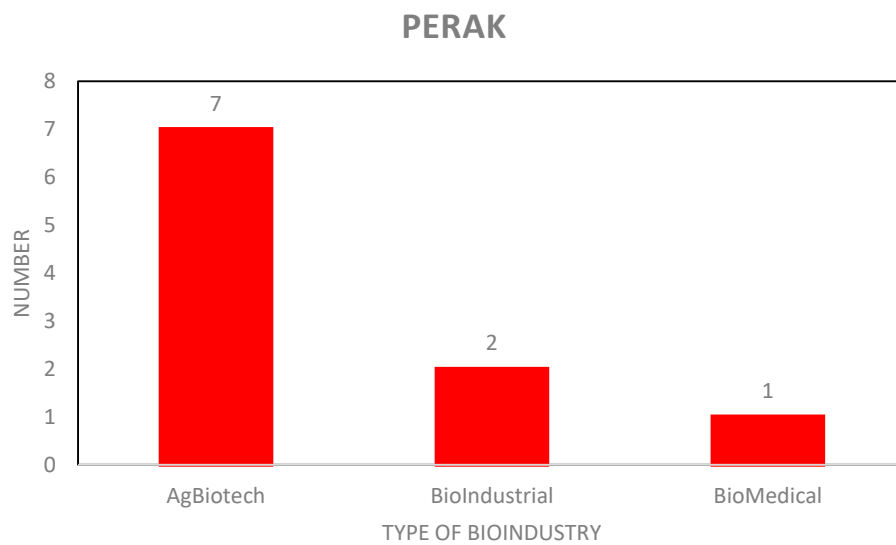


Figure 15 The number of biotechnology company according its bioindustry in Perak

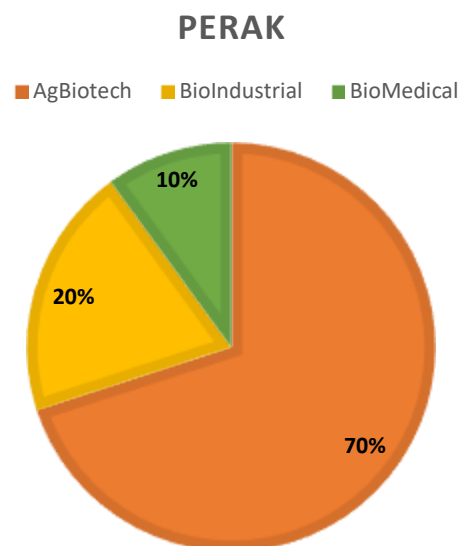


Figure 16 The percentage of biotechnology company according its bioindustry in Perak

Figure 17 and Figure 18 showed the numbers of biotechnology companies and its percentage in Sabah state according type of bioindustry. In Sabah, AgBiotech (10 companies, 91%), BioIndustrial (1 company, 9%) and BioMedical (0 company, 0%) which represents a 10-fold compare AgBiotech than BioIndustrial. In Sabah, the data showed the less BioMedical developed in this state.

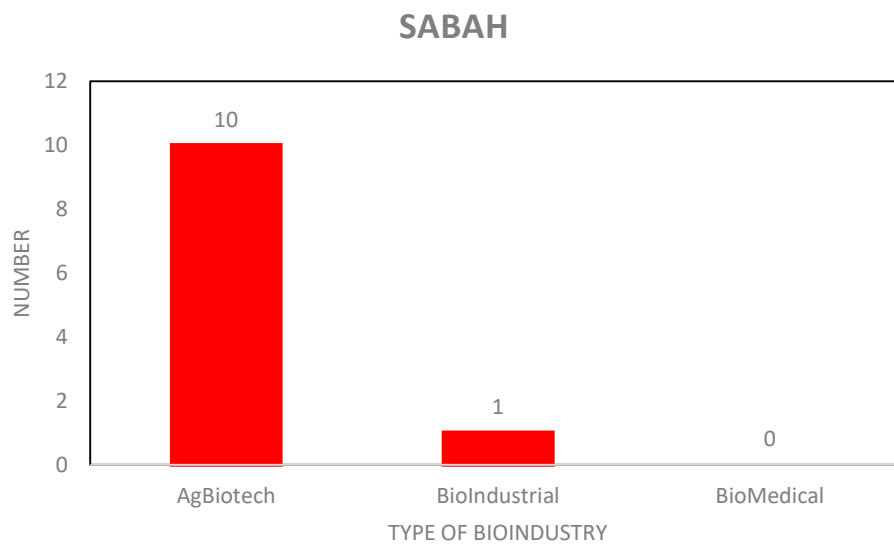


Figure 17 The number of biotechnology company according its bioindustry in Sabah

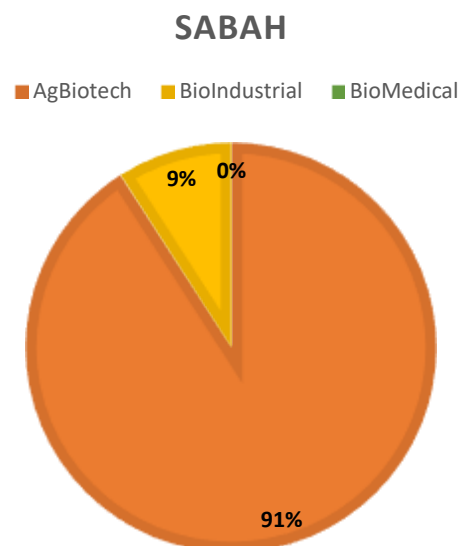


Figure 18 The percentage of biotechnology company according its bioindustry in Sabah

Figure 19 and Figure 20 showed the numbers of biotechnology companies and its percentage in Sarawak state according type of bioindustry. In Sarawak, AgBiotech (6 companies, 67%), BioIndustrial (2 companies, 22%) and BioMedical (1 company, 11%) which represents a 3-fold compare AgBiotech than BioIndustrial and 6-fold than BioMedical respectively. In Sarawak, the data showed the 3 major biotechnology industries developed in this state especially AgBiotech field.

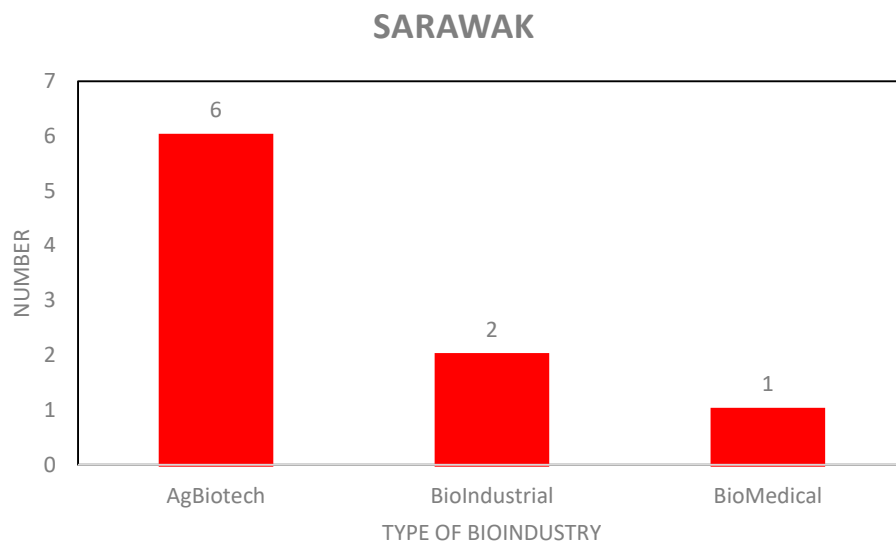


Figure 19 The number of biotechnology company according its bioindustry in Sarawak

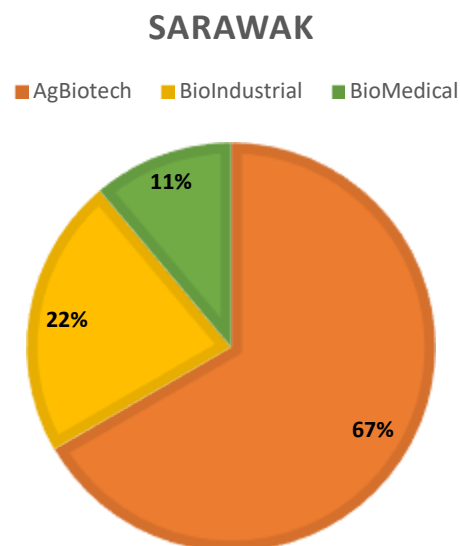


Figure 20 The percentage of biotechnology company according its bioindustry in Sarawak

Figure 21 and Figure 22 showed the numbers of biotechnology companies and its percentage in Selangor state according type of bioindustry. In Selangor, AgBiotech (59 companies, 58%), BioIndustrial (15 companies, 15%) and BioMedical (27 companies, 27%) which represents a nearly 4-fold compare AgBiotech than BioIndustrial and nearly 2-fold than BioMedical respectively. In Selangor, the data showed the 3 major biotechnology industries developed in this state especially AgBiotech and BioMedical.

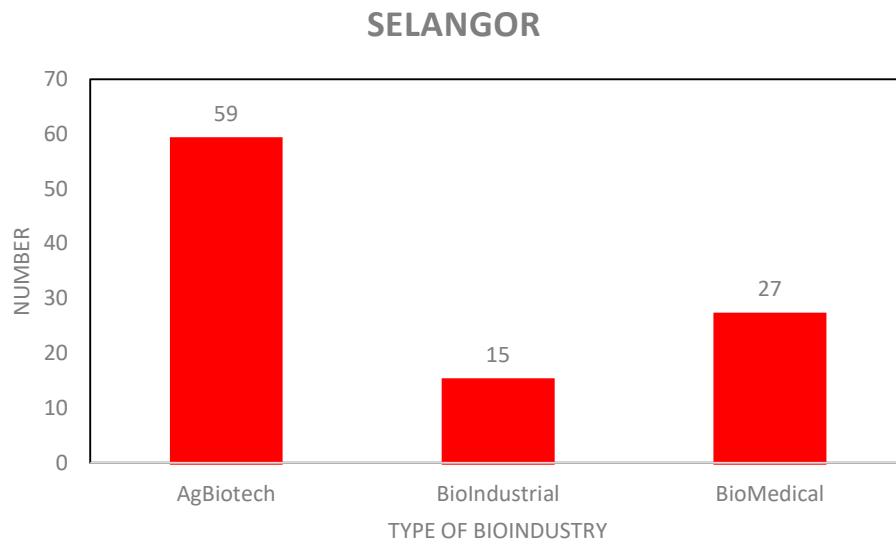


Figure 21 The number of biotechnology company according its bioindustry in Selangor

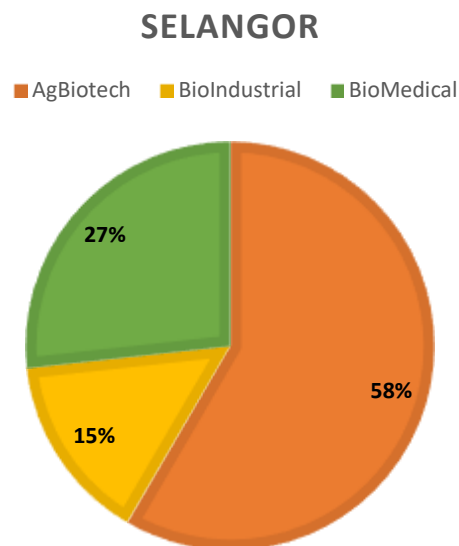


Figure 22 The percentage of biotechnology company according its bioindustry in Selangor

Figure 23 and Figure 24 showed the numbers of biotechnology companies and its percentage in Terengganu state according type of bioindustry. In Terengganu, AgBiotech (1 company, 50%), BioIndustrial (1 company, 50%) and BioMedical (0 company, 0%) which represents only developed AgBiotech and BioIndustrial field. In Terengganu, the data showed the less BioMedical developed in this state.

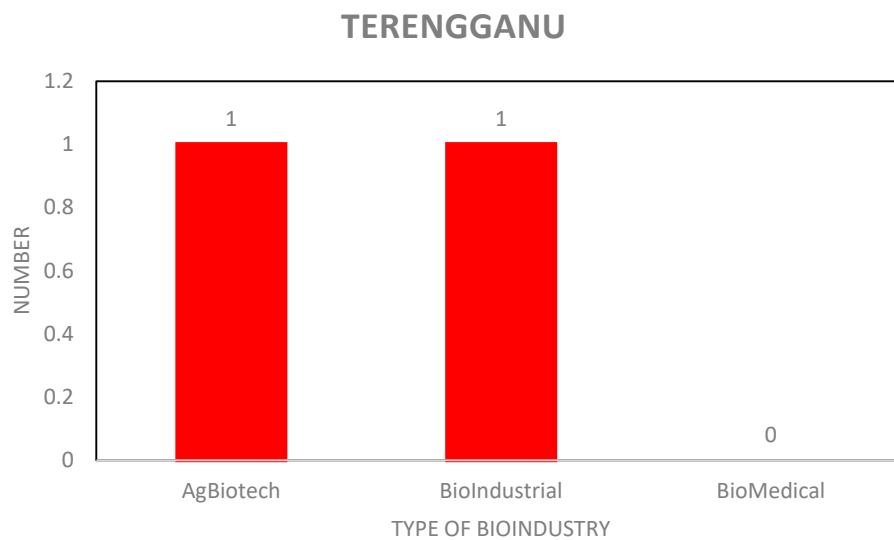


Figure 23 The number of biotechnology company according its bioindustry in Terengganu

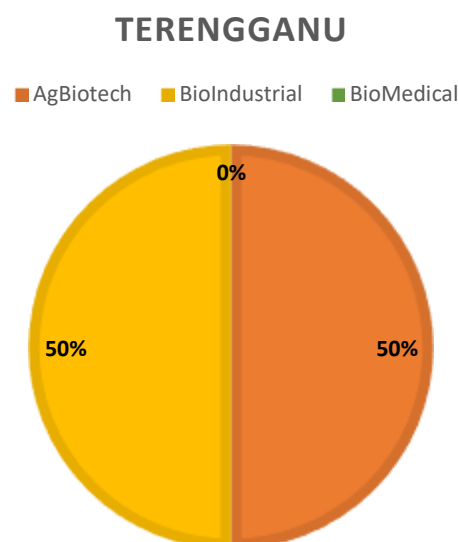


Figure 24 The percentage of biotechnology company according its bioindustry in Terengganu

Figure 25 and Figure 26 showed the numbers of biotechnology companies and its percentage in Wilayah Persekutuan Kuala Lumpur according type of bioindustry. In W. P. Kuala Lumpur, AgBiotech (28 companies, 38%), BioIndustrial (12 companies, 16%) and BioMedical (34 companies, 46%) which represents a nearly 1-fold compare BioMedical than AgBiotech and nearly 3-fold than BioIndustrial respectively. In Wilayah Persekutuan Kuala Lumpur, the data showed the 3 major biotechnology industries developed in this state especially BioMedical field.

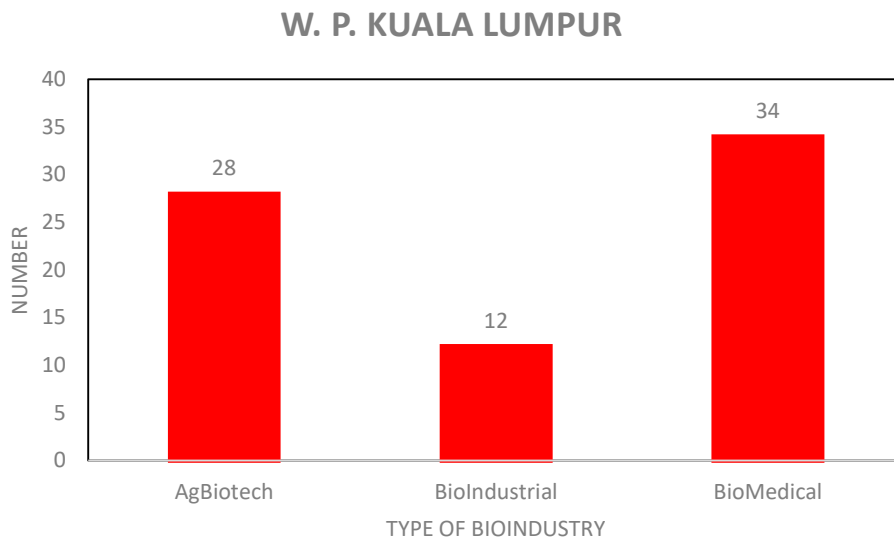


Figure 25 The number of biotechnology company according its bioindustry in W.P. Kuala Lumpur

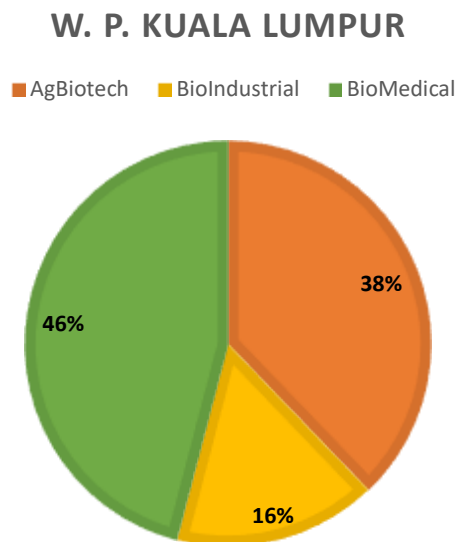


Figure 26 The percentage of biotechnology company according its bioindustry in W.P. Kuala Lumpur

Besides, from the data collection, three locations found that less biotechnology company developed and registered in Perlis, Wilayah Persekutuan Labuan and Putrajaya.

Conclusion

The distribution of biotechnology industries (AgBiotech, BioMedical and BioIndustrial) depend the location or states in Malaysia. In this research, AgBiotech (agricultural biotechnology) industry are the larger percentage in Malaysia due to rich of natural resources and its stable climate. However, this research only provided short discussion regard the distribution of types biotechnology companies in Malaysia according its states and even more

relationships between variety factors and variables will be discussed and studies in future papers.

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¹Southern University College, Faculty of Business and Management, Jalan Selatan Utama, Off JalanSkudai, 81300 Skudai, Johor, Malaysia.

²Diamond Star Biotechnology Sdn. Bhd., Jalan Serampang, Taman Sri Tebrau, 80050, Johor Bahru, Johor, Malaysia.

³Putra Business School, 43400 UPM Serdang, Selangor Darul Ehsan, Malaysia.

⁴Malaysian Bioeconomy Development Corporation Sdn. Bhd.

Corresponding Author

Teo Chee Loong, anthony1109@hotmail.my, ¹Southern University College, Faculty of Business and Management, Jalan Selatan Utama, Off JalanSkudai, 81300 Skudai, Johor, Malaysia. ²Diamond Star Biotechnology Sdn. Bhd., Jalan Serampang, Taman Sri Tebrau, 80050, Johor Bahru, Johor, Malaysia.

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