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A Biotechnology Industry Trend Study in Malaysia

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Abstract
Biotechnology industry considers as important bright and high potential industry which able create new era for economy and industry field. Malaysia as a developing country also emphasis the biotechnology industry development. Since 2005 Malaysia officially established Malaysian Biotechnology Corporation (MBC) with focusing three biotechnology area: AgBiotech, BioMedical and BioIndustrial, the number of biotechnology status company keep increasing until today. In this study, the discussion focused on Malaysia biotechnology company, according i) Biotechnology industry type ii) The region and iii) The states in Malaysia.
Keywords: Biotechnology, Industry, AgBiotech, BioMedical, BioIndustrial.

Introduction

Malaysia recognized that biotechnology industry is the growth core for life sciences in the twenty-one century, by generating stages for novel markets and products on a lot of field (Ernst & Young, 2000). Although still relatively novel opportunity, biotechnology industry has been known as one of the core drivers of future of Malaysia economy. As highlighted by the former Malaysia Prime Minister, Abdullah Badawi stated that Malaysia enjoys the richest biodiversity on the earth. It is a present; a competitive benefit that is God-given and people must find method to harvest it to the best of our capability (Badawi 2003, p. 3).

Gomez have been recognized that 5 competitive biotechnology industry benefits in Malaysia (Gomez, 2005): Malaysia rich of fauna, flora and manpower; the already present agriculture-based biotechnology industry; the growing number of venture capital funding and government grants; the existence of an Information and Communication Technology infrastructure and high-technology industry; and consistence commitment from government to biotechnology industry.

The government of Malaysia has recognized the Malaysian Biotechnology Corporation (MBC), to manage government policies, advance the commercialization of biotechnology industry initiatives, and helping potential investors and companies. Malaysian Biotechnology Corporation as an agency was recognized at 13/5/2005, under the purview of the former Ministry of Science, Technology and Innovation. Here, the establishment of the Malaysian Biotechnology Corporation is to classify value propositions in both research and development and to involve active participations of the public into entrepreneurial initiatives hence to stimulate the biotechnology industry, such as agricultural biotechnology, healthcare biotechnology, bioinformatics and industrial biotechnology.

The biotechnology industries keep growing and this industry will be potential industry in the market. However, the lack of study discusses about the growing of biotechnology in Malaysia according the regions, the states and biotechnology industry type. Thus, in this study an attempt was made to discuss about as biotechnology company trend study in Malaysia.

Methodology

Classification

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

i) AgBiotech Based Biotechnology Company
ii) BioMedical Based Biotechnology Company
iii) BioIndustrial Based Biotechnology Company

i) AgBiotech

In the AgBiotech included that high value ingredients (fragrances, natural products, flavours, functional foods), high value food varieties (high technology aquaculture, genetically modified organisms and crops, novel plant breeding techniques and high technology livestock breeding) and bio-based farm inputs (biofertilizers and biopestcides, animal vaccines, and feed additives and livestock and aquaculture biofeed).

In among AgBiotech, “Functional food” as a product comprising the essential nutrients as well as vitamins for survival, while “nutraceuticals”, according with the definitions, not only are corresponding to the diet, but also aid in the prevention, treatment of disease and health disorder (Kalra, 2003). The functional food market has reached US$54 billion in 2014 and the players are mainly from United States of America, Japan and Germany. In the South East Asian region, Indonesia, Thailand, Philippines, Malaysia, Vietnam and Singapore the trend in functional food is also growing rapidly (Nor, 2016). In 2014, Malaysia, market in functional food has reached US$2.205 billion, Thailand US$3.27 billion, Philippines US$4.25 billion and Indonesia reached US$6.9 billion (Euromonitor International, 2014).

ii) BioMedical

In the BioMedical included that regenerative medicine and stem cells (stem cells therapy), molecular screening (early disease detection, personalized medicine and mitigation), biosimilars (improved versions of original drug and cheaper medical treatment), drug discovery (higher efficiency in drug discovery, drug discovery for neglected or tropical diseases).

In among of BioMedical, stem cell research and development marketplace in the world has grown-up exponentially over the last decade and in India with investment is projected to be about five hundred fourty million dollar (2010) with a yearly growth rate of fifteen percent (Singh, 2007). An important interest of Physicians in the stem cells clinical application in areas for example cardiology, diabetes, ophthalmology, spinal cord repair prompted research in this track. Consequently, the marketplace in China, Singapore and India showed a rising trend with Taiwan- three hundred and twenty million dollar, India boasting of five hundred and forty million dollar, Thailand- two hundred and thirty million dollar, Singapore- one hundred million dollar and Malaysia- one hundred and fifty-seven million-dollar investments (Winston, 2010).

iii) BioIndustrial

In the BioIndustrial included that biomaterials (palm oil based industrial bioproduct, bioplastics, biodegradable based packaging, biodegradable and compostable based materials), production of biobased chemical from renewable sources (bio-petrochemical substitute and production of industrial sugar), biobased raw material for industrial input (feedstock plantation for industrial application and biogas).

In among of BioIndustrial, palm oil-based bio-product such biodiesel from palm, has been used as an alternative fuel. 35.19 million tonnes in 2017 of the global biodiesel productions, thirty-point six percent was biodiesel from palm (Oil World, 2018). To Malaysia, seven hundred twenty thousand and four hundred and ten tonne of palm biodiesel were produced at 2016 of which two hundred and thirty-five thousand two hundred and ninety one tonne were exported mainly to the Europe, three hundred and fifty eight thousand five hundred and eighty six tonne used for local B7 blending and the remaining oe hundred and twenty six thousand five hundred and thirty three tonne used as oleochemicals (MPOB, 2018; Unnithan, 2018). The production technologies of biodiesel from palm continue in research and development.

Data Collection

The 282 biotechnology company's data collected and extracted from the Bioeconomy Corporation, Malaysia and then all the data analysis via Microsoft Excel 365.

Results and Discussions

Table 1 and Figure 1 showed that the distribution of biotechnology company in Malaysia according region. In this research, the number of biotechnology company in Malaysia is 282. The highest number of biotechnology company is central region (186 companies), this is might because the central region nearer federal government office and majority the private company headquarter located at central region. The second is northern region (41 companies), the third is southern region (28 companies), the forth is east Malaysia (22 companies) and the least is eastern region only 5 biotechnology company in Malaysia.

Table 1. The distribution of Malaysia Biotechnology Company According Their Region

Region	Number of Company
Southern	28
Northern	41
Central	186
East Malaysia	22
Eastern Region	5
Total	282

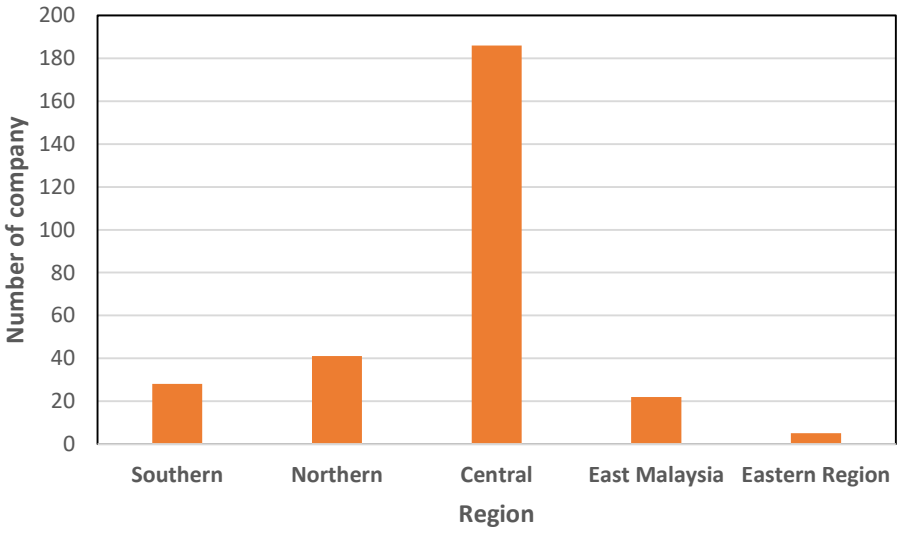

Figure 1. The distribution of Malaysia Biotechnology Company According Region

Table 2 and Figure 2 showed that the distribution of biotechnology company in Malaysia according states. In this research, the number of biotechnology company in Malaysia is 282. The highest number of biotechnology company is Selangor (101 companies), the following are W.P. Kuala Lumpur (74 companies), Penang (31 companies), Johor (23 companies), Negeri Sembilan and Sabah (11 companies respectively), Perak (10 companies), Sarawak (9 companies), Malacca (5 companies), Pahang (3 companies), Terengganu (2 companies), Kedah (1 companies). And found four states no biotechnology company are Perlis, W.P. Labuan, Putrajaya and Kelantan. Majority biotechnology company located in Selangor due to Selangor, Malaysia's most progressive and developed state. It is the country's main port of entry and strategically located around the capital city, KL. As Malaysia's major economy, Selangor enjoys a highly developed infrastructure for main industry clusters and is a well-recognized investment haven backed by an advanced commercial ecosystem and excellent state government support. Known for its innovative knowledge-workforce and highly skilled as well as an attractive cosmopolitan living standard, Selangor is an ideal of wealth and prosperity (http://www.investselangor.my/Why-Selangor/).

Table 2. The distribution of Malaysia Biotechnology Company According States

States	Number of Company
W.P. Kuala Lumpur	74
Perak	10
Selangor	101
Johor	23
Malacca	5
Kedah	1
Perlis	0
Negeri Sembilan	11
Penang	31
Sabah	11
Sarawak	9
W.P. Labuan	0
Putrajaya	0
Pahang	3
Terengganu	2
Kelantan	0
Total	282

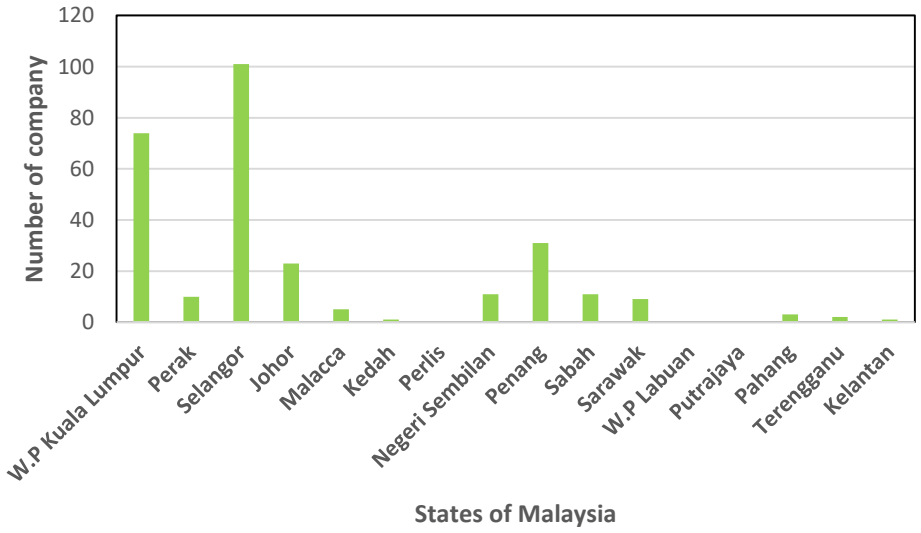

Figure 2. The distribution of Malaysia Biotechnology Company According States

Table 3 and Figure 3 showed that the distribution of biotechnology company in Malaysia according type of industry. In this research, the number of biotechnology company in Malaysia is 282. The highest number of biotechnology company is AgBiotech (162 companies), second is BioMedical (77 companies) and the least is BioIndustrial (43 companies). The highest number is AgBiotech because Malaysia weather and its geographical condition suitable for agriculture development. In addition, agriculture is a significant field in Malaysia. A lot of years, this field has been the support of Malaysian economy by manufacturing agricultural based products for domestic consumption. Agriculture field also

contributes to the national Gross Domestic Products. It provides main employment for the people, especially from the rural areas. In 2013, this field employs more than one point six million people or ten-point nine percent of the total employment, contributed more than twenty three percent of the total export earnings and adds around seven point two percent of Malaysia's Gross Domestic Products (Rozhan, 2015).

Table 3. The distribution of Malaysia Biotechnology Company According Type of Industry

Industry	Number of Company
AgBiotech	162
BioMedical	77
BioIndustrial	43
Total	282

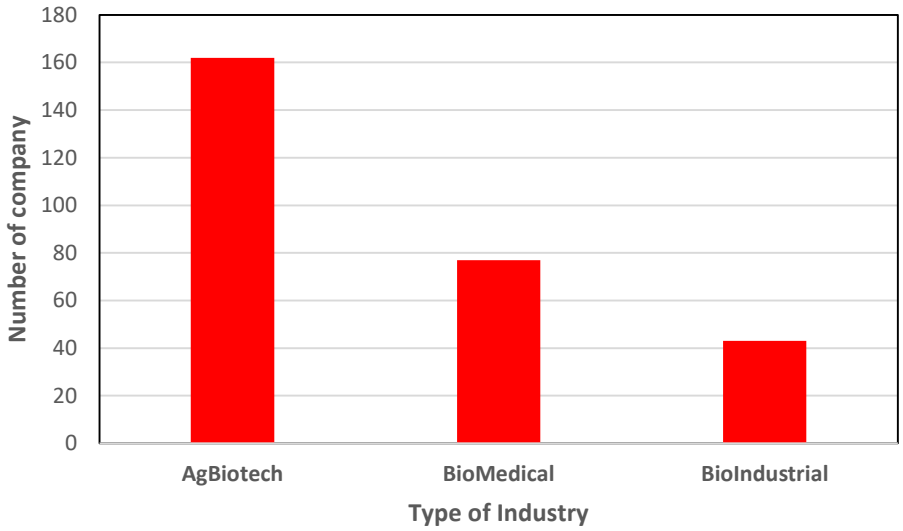

Figure 3. The distribution of Malaysia Biotechnology Company According Type of Industry

Conclusion

This paper discusses the recent trend of biotechnology company in Malaysia with 282 biotechnology company as study sample space. Most of the biotechnology company located at central region (186 companies) especially Selangor states (101 companies). In addition, major of biotechnology industry type is AgBiotech (162 from 282 biotechnology companies). However, this paper only provided short discussion regard the current trend of biotechnology companies in Malaysia and the more relationships between variety factors and variables will be discussed and studies in future papers.

Acknowledgement

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