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Research paper



Assessment of Population Rate Evolutions in Malaysia and the Republic of China from 1990 Until 2016

Mohd Khairul Amri Kamarudin[1,2]*, Noorjima Abd Wahab[2], Mohd Ekhwan Toriman[3], Mohamad Razali Abdullah[1,2], Nurul Safaniza Che Ani[4], Aisyah Azria[1], Fatin Rahman[1], Shamira Azha[1], Nik Nur Aida Zaina[l], Fiza Kamaruzaman[1]

[1]*Faculty of Applied Social Science, Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Kuala Nerus, Terengganu, Malaysia*
[2]*East Coast Environmental Research Institute (ESERI), Universiti Sultan Zainal Abidin, Gong Badak Campus, 21300 Kuala Nerus, Terengganu, Malaysia*
[3]*Faculty of Social Sciences and Humanities, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
[4]*Office of the Vice Chancellor, Universiti Kebangsaan Malaysia, 43600 Bangi, Selangor, Malaysia*
**Corresponding author E-mail: mkhairulamri@unisza.edu.my*

Abstract

This study is more focus on identifying the factors that determine the difference of population rates in Malaysia and Republic of China from 1990 to 2016. All the secondary data acquired from the government agencies such as the distribution population, births and deaths in Malaysia and China. The determining factors were classified into two parts, which were the determinants of mortality and determinant of birth rates that at once determine the natural increase factor for the population of the country. Growth of a country will increase when birth rates exceed the death rates. These components are linked to the bases and situations that apply to both countries. The aim objectives are to analyzing the rate of changes of the population and identifying the determinants of population rates. The findings are expected to give a clear picture of the factors that cause the increase and decrease of the population for both countries. Poverty issues, low household income levels, limited employment opportunities and unstable economic conditions are the main reasons why the growth rate of the Malaysian population should be regulated and redesigned. The increasing of population levels that are not balanced with economic improvements will further highlight in the existing issues.

Keywords: *population rate; Malaysia; China; birth rate; death rate.*

1. Introduction

Population is a significant part of the development of a country, regardless of whether the country is a developed country or vice versa. Increasing or decreasing populations is a major part of a government in administering the country. This is because the administrative affairs and expenditure of the country are related with the number of their population. For example, China needs a bigger spending compared to Malaysia to manage the expense and welfare of its people as the large wall country is one of the world's most populated place. This clearly shows that the growing number of people in a country means that the government needs huge expenditures in managing the welfare of its people [1-5]. To understand more about population, we have outlined some definitions of the population. According to the fourth edition of *Kamus Dewan*, the population means a sum of all people inhabiting a place (district, state, country) or population of a certain geographical area. According to expert opinion, the population is a group of individuals with the quality and characteristics that have been set [6-7]. Population can also be defined as population changes in line with time changes and can be taken as a change in the number of individuals in the population using 'per unit of time' as a measurement. It can therefore be concluded that the population is a change in population over time, which can be calculated as the change in the number of individuals in a population through a measure within a certain period of time. According to Senator Maynihan's opinion, 127 human lives were born in this world at all times while 50 human lives died in the same period. So it is arguable that our world is experiencing a population increase of 77 people at all times. Therefore, the population of this world is increasing from year to year. However, there is a period of time indicating a decrease in the population in a country. This is because it is possible that a country runs certain policies to control the excessive population growth. This population change will affect every corner of life [8-9].

Most socio-economic development programs and projects planned and successfully implemented so far include effort the community in terms of distribution of wealth and economic opportunities and modernizing society has led to the transformation of the society. Transformation that occurred was evidenced by a pair of related behavior and family formation fertility behavior. This is the impact of development education, public participation in the modern economy and improvement in terms of people's income. In other words, structural assimilation that occurred as a result of the implementation of development programs organized by the government so far has been to intensify the process of modernizing culture. This impact on people's behavior, particularly related to the efforts of family formation and control fertility in line with national development planning [10-14]. In Malaysia, the population goal of 70 million has been recommended by the Honorable Prime Minister Seri Dr. Mahathir Mohammad during his speech at the

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UMNO General Assembly in September 1982. He said that Malaysia will be more successful with a population of 70 million [15-17].

According to the World Development Report (World Development Report) published by the World Bank in July 1983, Malaysia's population will be 33 million expected in 2120. Projections are made based on the population growth rate of 2.0% per year (1980-2000) on the assumption that fertility rates decreased moderately. This report shows the population of Malaysia will be further increased to 17 million in 1990 and reached number 21 million in 2000. The World Bank projection is not parallel with the goal of 70 million people are now expected to be achieved in the year 2100. This means that two major components of population and fertility rates, the gross birth rate should be increased accordingly [18-19].

There are three factors possibilities to population rate in Malaysia such as marriage at a young age, population policy and technological advances. Marriage among women in the younger age is the main contributor to the increase in births rate. The phenomenon also increased in births caused by cultural and religious factors. Level of fertility in Malaysia in general is still high, especially Malays compared to the Chinese and Indians who see the education system and career more important than the number of children. This situation will give a large impact on population growth in the birth of Malaysia. Besides that, the changes in population structure have long-term effects for the economy and social structure. In Malaysia, the population policy is considered as a factor affecting the population. Vision of the national policy emphasizes the development of energy resources and need to achieve the economic stability. The main purpose of population policy is to maintain a balanced population growth with resource and national development. At the end of the 1980s, the Malaysian Government has planned population growth to achieve 70 million people in the 21st century. Seeks to meet the needs of employment in 2020. To achieve that goal, the government has cut income tax liability until the fifth child. Other initiatives are to provide maternity leave for employees in the public sector. For male workers, they also granted special leave when his wife gave birth. Government also encourages employers to provide childcare places close to work for the career women. The emergence of technology assist in the daily human activities. With the emergence of technology health, populations are more secure. Birth rate is higher due to increasing energy experts. Infrastructure in facilities such as health clinics and hospitals increased. Various types of medication can be produced. Effects on the spread of disease can be prevented immediately. Diseases dangerous and easily spread, such as malaria, cholera and tetanus also reduced due to the emergence of technology in medicine. Besides death resulting from disease can be reduced due to the discovery of medicines in the treatment of the disease process [20-22].

China's 2018 population is 1.42 billion, based on United Nations projections. China, officially the People's Republic of China, is the largest country in the world today. In January 2013, the Chinese Government released data confirming that the population of China was an impressive 1,354,040,000, although this does not include Taiwan, Hong Kong and Macau. As of September 2013 that number had grown even further to 1,360,720,000. China has an estimated population density of 145 people per square kilometer, or 375 people per square mile. This ranks 81st, despite the country itself being one of the largest in terms of size and the largest in terms of population. The density figures change dramatically when you look at the largest urban areas, however. Shanghai, the largest city in the country and the world, has a population density of 3,800 people per square kilometer, or 9,900 people per square mile. A few of China's cities make the list of the top 30 most densely populated cities in the world, although most on the list are in India, the Philippines, France and other countries. Hong Kong is the 8th most densely populated city in the world, with 68,400 people per square mile. Macau follows behind as the 9th most densely populated, with a density of 65,400 people per square mile. Macau tops the list of sovereign states and dependent territories in terms of population density. Despite this tightly packed area, it still has the second highest life expectancy in the world and remains one of the few areas in Asia to receive a "very high Human Development Index" ranking [23-26].

Since 1980 the pace of urbanization has rapidly accelerated. In 1990 this was 20%, 1992, 27%, 1997 32%, 2002 39%, 2007 45% and expected to be 60% by 2020. This vast movement of people is the biggest mass migration in human history. In 1998 alone 120 million people left the countryside for the cities (that is twice U.K.'s entire population in one year). In many cases the migrant workers set up huge shanty towns on the fringes of cities in the hope of finding work. Shanghai and Beijing had about 3 million migrant workers at this time. This migration had the effect of reducing rural poverty as many migrants sent part of their salary back home to the village. The most urbanized provinces are Liaoning, Jilin, Ujian, Shanghai and then Guangxi, Guizhou, Shanxi, Hubei and Anhui; the least urbanized are Tibet and Sichuan. The numbers show that cities have grown greatly in numbers but the provinces of Guangdong, Guangxi, Jiangxi, Xinjiang and Yunnan have grown while the slowest growth had been in Shandong, Liaoning, Jiangsu, Tianjin and Zhejiang [27-29].

2. Material and Methods

Population, birth and death rate data were derived from various sources. The population data of Malaysia was obtained by using a bibliography study where the Malaysian Statistics Information books were collected. The rest of the data is derived from information provided by the website. Data collected were analysed using quantitative data analysis techniques. Due to the fact that population growth rate data is not disclosed in books or other sources, calculations were made. For example, in 1990, the rate of birth for every 1000 people in Malaysia was 27.9 and its death rate (per 1000 people) was 4.6. Thus, the rate of birth minus the mortality rate to obtain the natural increase rate (27.9 - 4.6 = 23.3). The same calculations were also made to obtain natural increase data for China but its population data was derived from the secondary data of the results of the previous study. This formula was referred based on the previous study which is *Estimasi Solusi Model Pertumbuhan Logistik dengan Metode Ensemble* Kalman Filter. For the side information, such as the factors and policies of the affected countries were all obtained through library research and the internet [30-31]. Table 1 and Table 2 were stated to show the results of data collected and classified. The statistical analysis methods applied in this study to describe the whole secondary data set for Malaysia and China population rate data using XLStat2014 software which covered descriptive analysis, regression and correlation to identify the relationship characteristics between all factors of population rate in Malaysia and Chi.

Table 1: Malaysia's Population Data

Year	Population	Rates (Per 1,000 Population)		
		Birth	Death	Natural Increase
1990	18,038,321	27.9	4.6	23.3
1991	18,529,454	27.6	4.5	23.1
1992	19,012,724	27.7	4.5	23.2
1993	19,494,967	27.6	4.5	23.1
1994	19,986,894	26.7	4.5	22.2
1995	20,495,597	26.1	4.6	21.5
1996	21,023,321	25.6	4.5	21.1
1997	21,565,325	24.8	4.5	20.3
1998	22,113,464	23.5	4.8	18.7
1999	22,656,286	22.8	4.9	17.9
2000	23,185,608	22.9	4.3	18.6
2001	23,698,907	21.0	4.3	16.7
2002	24,198,811	20.2	4.5	15.7
2003	24,688,703	19.2	4.5	14.7
2004	25,174,109	18.9	4.4	14.5
2005	25,659,393	18.2	4.4	13.8
2006	26,143,566	17.8	4.4	13.4
2007	26,625,845	17.7	4.5	13.2
2008	27,111,069	17.9	4.6	13.3

2009	27,605,383	17.9	4.7	13.2
2010	28,112,289	17.2	4.6	12.6
2011	28,635,128	17.6	4.7	12.9
2012	29,170,456	17.8	4.6	13.2
2013	29,706,724	16.3	4.7	11.6
2014	30,228,017	16.7	4.8	11.9
2015	30,723,155	16.7	5.0	11.7
2016	31,187,265	16.1	5.1	11.0

Table 2: China's Population Data

Year	Population	Rates (Per 1,000 Population)		
		Birth	Death	Natural Increase
1990	1,135,185,000	21.06	6.67	14.39
1991	1,150,780,000	19.68	6.70	12.98
1992	1,164,970,000	18.27	6.64	11.63
1993	1,178,440,000	18.09	6.64	11.45
1994	1,191,835,000	17.70	6.49	11.21
1995	1,204,855,000	17.12	6.57	10.55
1996	1,217,550,000	16.98	6.56	10.42
1997	1,230,075,000	16.57	6.51	10.06
1998	1,241,935,000	15.64	6.50	9.14
1999	1,252,735,000	14.64	6.46	8.18
2000	1,262,645,000	14.03	6.45	7.58
2001	1,271,850,000	13.38	6.43	6.95
2002	1,280,040,000	12.86	6.41	6.45
2003	1,288,400,000	12.41	6.40	6.01
2004	1,296,075,000	12.29	6.42	5.87
2005	1,303,720,000	12.40	6.51	5.89
2006	1,311,020,000	12.09	6.81	5.28
2007	1,317,885,000	12.10	6.93	5.17
2008	1,324,655,000	12.14	7.06	5.08
2009	1,331,260,000	12.13	7.08	5.05
2010	1,337,705,000	11.90	7.11	4.79
2011	1,344,130,000	11.93	7.14	4.79
2012	1,350,695,000	12.10	7.15	4.95
2013	1,357,380,000	12.08	7.16	4.92
2014	1,364,270,000	12.37	7.16	5.21
2015	1,371,220,000	12.10	7.10	5.0
2016	1,378,665,000	12.95	7.06	5.89

3. Results and Discussion

3.1. The Population of Malaysia

The results of the data analysis found that in 1990 the population of Malaysia was the lowest in 27 years, which was 18,038,321 people while the highest population rate was recorded in 2016, which was 31,187,265 people. Overall, the population of the Malaysian population was experiencing an increase of 13,148,944 people over a period of 27 years from 1990 to 2016. The increase in population rates experienced by Malaysia is consistent. For a period of 27 years (1990 - 2016), the gross birth rate in Malaysia showed a decline. In 2016, the gross birth rate per 1000 population had decreased to 16.1 compared to 27.9 reported in 1990. However, Malaysia's mortality rate experienced an inconsistent trend (decrease and increase) over the 27-year period. The highest rate of gross mortality was recorded in 2016 at 5.1 per 1000 population while the lowest rate was 4.3 for every 1000 population who took place in 2000 and 2001. The gross natural increase in Malaysia shows a decline in the 27-year period. In 1990, for every 1,000 residents was recorded at 23.3 while only 11.0 increases occurred in 2016 (Figure 1) [32-33].

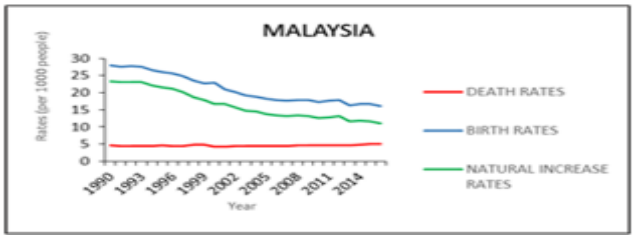


Fig. 1: The Trend Distribution of Birth Rate, Deaths and Natural Increase for Malaysia in 1990 until 2016

3.1.1. The Deciding Factors of Change in the Rate of Malaysia Population

3.1.1.1. Birth Rate

There are three factors seen in determining the rate of change in the Malaysian population, birth rate and mortality rate. According to the Ministry of Women, Family and Community Development, Malaysia has the family planning practices. This practice has been practiced in this country since 1979. This family planning practice is strongly influenced by the level of an individual's education. This can be seen when the government has upgraded the standard of living for women in a new economic policy by improving the quality of education and providing equal opportunities in terms of employment for men and women. This is why most married women are practicing this family planning practice. This practice is only concentrated in urban areas due to some factors especially in context of economy. The examples of family planning are the method of breaking, sterilization of men or women and the use of pills [34].

The second factor is the population ship policy of the government. This factor has been practiced in Malaysia since the 60's. The nation's population policy is the government's policy towards population growth in the present and future. The government has also strived to control birth rates in line with the rate of economic growth to be balanced. This can be said as a contributing component to the reduction in birth rates in Malaysia. Malaysia's inconsistent economic factors have caused the government to take a cautious approach to avoid any problems that may occur when the country has a surplus of population in the country's economic situation in this inconsistent state [35].

Furthermore, the policy of empowering women is one of the factors that causes the declining birth rates in Malaysia. The development of women in this century requires a paradigm shift. This policy of empowering women was introduced by the government so that all women in the country have the opportunity and the right to compete, make change and build new identity while serve the society and nation. With this policy implemented, more skilled, smart, educated, high-profile, visionary and professional women are born in Malaysia. Therefore, women who have such an image will get married at a later age and cause a birth rate in Malaysia to decline. In addition, fertility rate is also one of the factors in reducing birth rate in Malaysia. Fertility rates in 2016 in Malaysia recorded the lowest value throughout the record since 1963. According to statistics on fertility rates in Malaysia, fertility rates per woman between the ages of 15 and 49 showed a decrease in birth rates recorded in 2015 by 2.0 babies but decreased to 1.9 babies by 2016. According to statistical reports on the fertility rate, the number of fertility in Malaysia was at a low level of 2.1 babies born, where the average number of babies born per woman was not enough to set targets [36-38].

3.1.1.2. Death Rate

The rate of death in Malaysia experienced an inconsistent trend. According to the Information Department of Malaysia, initially the rate of death in Malaysia has declined as the government of the country has organized many programs that enhance the health and well-being of the people. Among the programs are the 'Klinik 1 Malaysia' program and the implementation of the Medicines Delivery Program via the Postal Service. Dato 'Sri Mohd Najib Tun Abdul Razak, the Prime Minister of Malaysia has launched the 'Klinik 1 Malaysia' program to promote healthcare for all residents of the country. Currently, Malaysians can enjoy the health services provided by the government for a fee of only 1MYR and the exception of payment is given to the senior citizens. There are over 50 'Klinik 1 Malaysia' that have been provided by the government throughout Malaysia. All the clinics have been placed in a residential area.

The clinics provides basic health services such as aiding wound, small surgery, sewing and treatment for diseases such as colds, coughs, fever, diabetes and hypertension to all residents in the country who need health services in an instant. The staff members of the 1 Malaysia Clinic set up by the government are the nurses and medical assistants who have experience and have served for five years in the field of medicine. Hence, it is arguable that with the implementation of this program, it can help the population in maintaining and improving their health.

Furthermore, the implementation of the Medicines Delivery Program through the Postal Service can also be regarded as a factor in reducing mortality in Malaysia. The Department of Malaysia Ministry is concerning the problems faced by some of the sick people in the country, especially those who have to commute from home to hospital to take the medicines they need. Therefore, in 2010, the Malaysian government launched a postal service that enabled these medicines to be post by using Pos Laju services from the main hospitals with low fees. Hence, this program really help in reducing the mortality rate in Malaysia as well as prosper the people's health.

However, there has been an increase in mortality rates in certain years, particularly in 2013 to 2016. This may be attributed to the concept of 'Population Aging'. 'Population Aging' is an increase in median age in a country or region of a population due to a decrease in fertility rate or the lifespan of the population. Most countries are experiencing an increase in mortality rates each year due to the situation where the majority of the population is older than the younger population [39-40].

3.2. The Population of China

Overall, the population of China reached the highest number of 1,378,665,000 in 2016 while the lowest population was in 1990 at 1,135,185,000. This shows that the population of China was experiencing an increase of 243,480,000 over a period of 27 years. For the gross birth rate, the highest number was achieved in 1990 at 21.06 per 1000 people while in 2010 the lowest birth rate was 11.90 per 1000 people. Overall, the gross birth rate of China shows a decline from 1990 to 2016. The gross mortality rates for the Chinese population showed an incredible increase and decrease from 1990 to 2016. The data show that the highest mortality rates were 2013 and 2014 at 7.16 for every 1000 people while the lowest mortality rate was in 2003 as much as 6.40 for every 1000 people. The gross natural increase rate showed a decline in the 27-year period. In 1990, a total of 14.39 (per 1000 people) increased, but in 2016 only 5.89 (per 1000 people) increased. The overall trend for the 27 years for China (Figure 2).

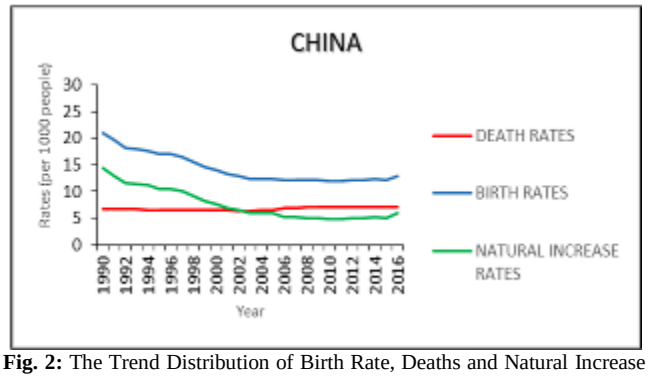


Fig. 2: The Trend Distribution of Birth Rate, Deaths and Natural Increase for China in 1990 until 2016

3.2.1. The Deciding Factors of Change in the Rate of China Population

3.2.1.1. Birth Rate

There are several factors that cause a change in the population in China. These factors have to do with one another with an increase or decrease in birth rates or death rates in that country. Among the factors that can be attributed to the birth rate in China is the family planning policy practiced by the country while the factors associated with mortality are related to the aging population in China. Based on Figure 2, China's birth rate trends declined. This is because the Chinese government has taken some steps to control the ever-increasing population since the last century. One of the efforts taken by their government to control the birth rate in the country is by introduced the One Child Policy or also known as a Family Planning Policy. This policy was introduced by their government since 1979 for the purpose of controlling population growth in the country. It is common knowledge that China is one of the most populated countries in the world aside from India and the United States. Although this policy was set as a 'temporary measure' to reduce the population in China, it has remained in power for more than 35 years [41-42].

In addition, China also has a strict control over the birth rate, interfering with pregnancy-related matters, by determining the number of births, estimating the duration time of each pregnancy and setting out the pregnancy control method in the country. The most criticized thing in our view is that the China government also allows mothers with more than one pregnancy to undergo the abortion to minimize the number of its population from rising. However, there is an impact experienced by the Chinese government with the implementation of the One Child Policy. Among the consequences is that with the rule and law of one child, it is estimated that China has reduced population growth in the country nearly 1.4 billion, which is 300 million people since the first 20 years of the One-Child policy was introduced. Additionally, the number of children in China has experienced a decline which resulting in the closure of several schools in due to lack of students. China was one of the countries with the lowest percentage of children in the world at that time. Furthermore, the problem of elderly care was also faced by the Chinese government. This is because children do not have enough time and money to care for and pay for their parents and this is increasingly critical when couples in China only have one child. According to the BBC Report, only 38% of the elderly in China live with their children and the rest of which 62% of them only live in a Senior Care Centre. This has led the China government to open more of these care centres to accommodate the huge amount of it, while protecting and safeguarding the welfare of their elderly.

Therefore, in order to solve the problem, by the end of 2010, their government has abolished the One Child Policy and replaced it with the Two Children Policy. The Two Child Policy has been phased in China from the end of 2010 to this day. This is because they want to increase the rate of births in China, thus increasing its population which has declined over the last 27 years. However, China is also experiencing fertility problems in its population. A study conducted in China shows that the overall 'fertility expectancy' in the country is about 1.6 to 1.8 infants, much lower than the sub-replacement fertility rate. In fact, the real fertility level is also much lower than the expected fertility rate. According to the fifth national census in 2000, China's total fertility was only 1.22 infants and it declined further to 1.18 infants in the sixth national census in 2010 [43].

3.2.1.2. Death Rate

The average annual number of deaths during a year per 1,000 population at midyear; also known as crude death rate. The death rate, while only a rough indicator of the mortality situation in a country, accurately indicates the current mortality impact on population growth. This indicator is significantly affected by age distribution, and most countries will eventually show a rise in the overall death rate, in spite of continued decline in mortality at all ages, as declining fertility results in an aging population. Statistics on the mortality rate in China shows that the rate of death in China is inconsistent with the increase and the decrease is not very significant. The factors that influence the death rate in the country are the Population Aging process. This process means an increase in median age in the population of China's population due to a de-

crease in fertility or lifespan. As a proof, in the 13th Five-Year Plan implemented in China, the number of fertile women is expected to be reduced by 5 million a year, and it will result in birth rates in China as well as decreased as previously described. The reasons why China have a low death rate because China is becoming more modernized and industrialized. Also, scientists and doctors have discovered higher quality medicines and cures for keeping the human population alive longer. The birth and death rate important because these parameters help keep our population as balanced as possible. If there wasn't a birth rate we couldn't survive as a species, if there wasn't a death rate we also couldn't survive because we would run out of resources. We use these rates to find populations and also to estimate how resources will hold out in different situations [44].

3.3. The Statistical Analysis

The statistical showed the population growth have the strong relationship with development factors such as birth rate and natural increase in Malaysia and Republic of China. Table 3 showed the inputs importance variables in linear relationship for Malaysia and Republic of China from 1990 until 2016. The economic activity factor greatly influenced the population development and urban growth in Peninsular Malaysia. The value of R^2 for both countries showed the factors of birth rate and natural increase factors higher significantly ($R^2 > 0.70$) compared the death rate factors. The diversity of economic activities such as business, manufacturing, services and others as well as natural population growth and internal migration assisted by the level of health and health facilities and basic community facilities as well as improved infrastructure such as roads have helped to further the growth of urban population and consequently growth of new towns and development of existing towns. These urbanization and urban population growth trends indicates the existence of dispersion effects on the economic and social development outside the major growth areas. The contribution of human resources to development, including chapters on population, labour, education and health triggered applies the ideas developed in earlier sections to the major sectors of the economy: agriculture, natural resources and industry [45-47].

Table 3: Input Importance Variables (Factors of Population Growth) In Linear Relationship (Linear Regression) For Malaysia and Republic of China from 1990 until 2016

	Death Rate	Birth Rate	Natural Increase
R^2 (Malaysia)	0.145	0.998	0.992
R^2 (Republic China)	0.472	0.868	0.911

4. Conclusion

The analysis of both data for Malaysia and china, both showed an increase in the population over the 27-year period, but both also showed a reduction in birth rates as well as reducing natural increase rates from 1990 to 2016. The increase in mortality occurring in both countries also contributed to the reduction in the number of individuals (natural increase) from year to year. This condition clearly demonstrates the concept contained in logistic population growth (LPG). LPG occurs when the rate of population growth (natural increase) decreases but at the same time increases the number of individuals (population). This is because the human population will continue to increase as long as the needs especially the food is adequate and still capable in accommodating the existing population. However, the study states that there will be a reduction in the need for human beings and this condition will indirectly cause the rate of human natural increase to decline and at one time it will eventually stop. It can be suggested that Malaysia can emulate the strategies implemented by the government of china in controlling the population growth rate to balance the current economic situation and ensure the well-being of the people.

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