

# ENCOURAGING MORE WOMEN IN STEM ACADEMIC & RESEARCH



*Assoc. Prof. Dr Zahiraniza Mustaffa*

The topic of women under-representation in STEM fields in Malaysia has been of interest in the past few years. While the public should know the current status, the efforts being taken to deal with this issue may not have been explicitly discussed.

While facts and figures presented here are not fully comprehensive or exclusive enough to debate the details, this article serves as a platform for developing a preliminary understanding among young Malaysian engineers on the efforts made in the past, challenges that are being overseen at present and concerns over what may possibly impact the future.

## THE PAST

The changing landscape of foreign governance prior to Independence had helped paved the way for public awareness on the importance of and necessity for technology development and enhancement. Past experiences under the different colonial masters had provided us with valuable lessons that "knowledge and know-how" in technology were necessary.

While being under different colonial administrations may have had a negative impact on the country and its people at times, it did allow an indirect transfer of knowledge at other times.

Steps to bridge the shortfall of women's involvement in STEM in our education system started as early as 1949. Science and natural science subjects were included in the curriculum for primary and secondary schools from 1949 to 1956. After Independence in 1957, one of the earliest and main initiatives implemented by the government in 1970, was to align the school system as well as that of higher institutions to achieve a target of 60:40 ratio for students' enrolment in Science and Arts. However, in 2017, after almost 47 years of implementation, a ratio of 42:58 was reported, which was far from the targeted ratio.

From 1971 to 1975, the Second Malaysia Plan was introduced, enhancing new STEM school systems to be represented in the form of Residential Science Schools, Girl's Residential Science School and Girl's Schools.

For Residential Science Schools in particular, this was further expanded to another three categories: Science Secondary School, MARA Junior Science Colleges (MRSM) and Religious Integrated School. At the time of initiation, there were 10, 2 and 4 of these schools respectively. By 2017, when cross comparing to the Second Malaysia Plan, the number of these schools had increased to 69, 51 and 12 for Science Secondary Schools, MARA Junior Science Colleges and Religious Integrated Schools respectively. However, the number of Girl's Residential Science Schools had also only increased to 6.

## THE PRESENT

While governance and policies have been put in place to encourage young girls to be involved in STEM fields, moulding matured women leadership is still a challenge. Particularly in STEM fields, more women are needed in research to increase the range of inventions and breakthroughs that will come from looking at problems from a different perspective.

Does the lack of women in STEM related research make a difference? Definitely. For a start, women are usually more socially aware than men. Women foster good relations in building a community and creating an inclusive environment, while men tend to take on leadership and just make things happen. Adding a woman's emotional skills into the mix can compensate for this and allow research knowledge to expand further.

Therefore, accessibility to higher education is a prerequisite for women to make an impact in the research agenda. To achieve a leadership position, a woman has to overcome not only content (expertise in her discipline) but also her leadership styles.

A role model for Malaysian women, Malaysian astrophysicist Datuk Dr Mazlan Othman, once observed: "Women have two problems: One is the lateral glass, and the other, the glass ceiling. You must show your talents in different fields. You must not only be a good scientist but also a good administrator. Sometimes women are denied, not upwardly but laterally."

When women are under-represented in leadership positions, this becomes a problem because then, the collective opinions of women are less likely to be represented in the country's policies and in the decision-making process.

With greater accessibility to higher education today, women have made significant achievements in scientific disciplines. If women scientists are not visible or are not seen to succeed in their careers, they cannot serve as role models to attract young women to the scientific profession.

That women are under-represented is reflected in the small pool of women research icons. This results in a smaller pool of women moving to the top as role models and mentors, so young women will not have many female role models or mentors to give advice and motivate them with positive attitudes, to boost their self-confidence and self-efficiency and to teach them discipline in working smart. Without all these, young women scientists are not likely to venture into STEM or hard core type research.



Acknowledging this, the government has, for instance, proposed several initiatives to inculcate the culture of research and development (R&D) among academics through the Malaysian Budget 2010. Y.Bhg. Datuk Prof. Dr Asma Ismail, during a visit to Universiti Teknologi PETRONAS (UTP) in 2016, further shared the aspirations of the government which are aimed at:

- Intensifying Research, Development and Commercialisation.
- Developing Green Technology.
- Enhancing Highly Skilled Human Capital (to develop intellectuals in Science and Technology).

These, perhaps, will open more doors to allow more female researchers to kick-start their work in R&D.

The issues and challenges of women under-representation in leadership roles should be addressed and strategically planned. With all these and input from the Ministry of Women, Family & Community Development, the Malaysian Cabinet has approved a policy to ensure that 30% of decision-makers in the private sector are women and companies are given a five-year transition period to increase the number of women members in their board of directors and to hold top positions.

In Malaysia, most research institutions in public as well as private universities, have welcomed this agenda wholeheartedly. More women leaders holding higher management positions are being envisaged. Reports of such success stories, complete with statistics, should be made available to the public annually. Where and when necessary, challenges and grievances should also be discussed, in order to improve the system and the way forward, with strategic plans accounted for accordingly. TalentCorp Malaysia is one of the institutions which have been frequently reporting matters related to the women workforce since 2010.

The next question then, will be: "How do we measure the impact of women leaders vs women in lower positions?"

## THE FUTURE

The waves of The 4th Industrial Revolution have penetrated the country but are Malaysians ready to take up the challenges of the future? Different strategies and initiatives may be in place, coupled with the necessary potential measures, to gauge its success from time to time. Last year, the official portal of MASTIC (Malaysia Science & Technology Information Centre) released the five-year (2013-2018) Global Innovation Index (GII) for Malaysia.

Used to measure the innovation performance of approximately 127 countries and economies around the world, GI helps to create an environment in which

innovation factors are being continually evaluated. According to GII 2018, Malaysia ranked 35 (43.16%), an improvement from its ranking of 37 (42.72%) the previous year. This may be attributed to enhanced STEM research, which has led to the birth of many new science and technology innovations in the country.

A detailed statistical record showing population growth was compared for a random selection of years, i.e. 1980, 2016 and a projection for 2050 (See Figure 1).

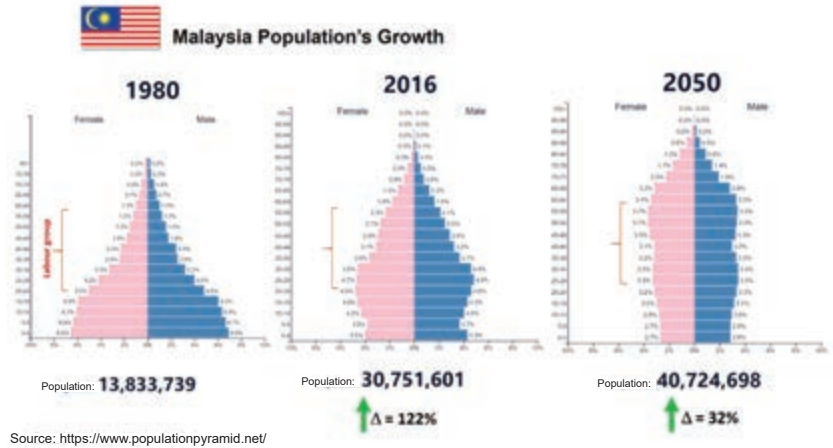


Figure 1: Population growth in Malaysia for years 1980, 2016 and 2050

Past efforts made by the government (as presented earlier) could be considerably taken by the labour group of 20 to 60 years of age. From Figure 1, there was a tremendous increment in population from 1980 to 2016, with a positive growth of 122%. However, the number has been forecasted to slow down with an increment of only 32% by 2050. This is worrisome in the context of STEM development and presents the following concerns:

- Will a decline in population lead to fewer technology innovations?
- Will lower numbers in future impact STEM strategic plans of the country?
- What will women representation in STEM be like in future?
- Will fewer children in a family mean better performance for women in STEM careers? ■

## Author's Biodata

**Assoc. Prof. Dr Zahiraniza Mustaffa** is a Committee Member of Women Engineers Section. She is an Associate Professor at the Department of Civil and Environmental Engineering, Universiti Teknologi PETRONAS.