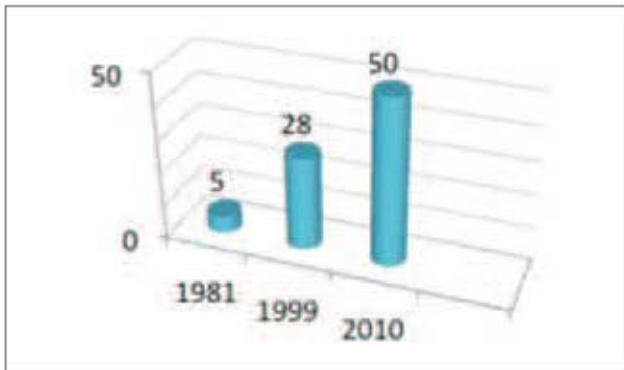


Women Engineers: Advocating Greater Representation

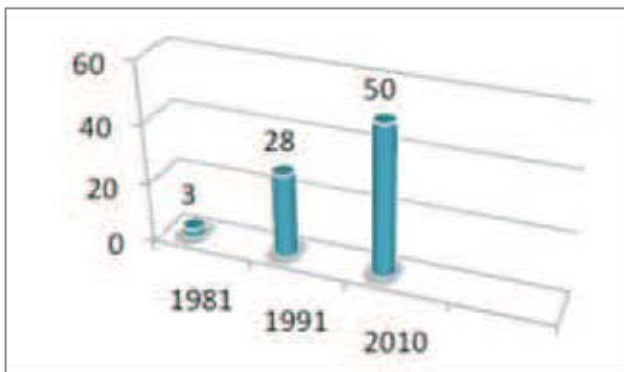


by H. Sharifah Azlina Raja Kamal Pasmah

WOMEN comprise more than 50% of engineering school graduates in Malaysia but only 20% of practicing engineers are women. Due to equal opportunity in education for both genders, the enrolment of female students in engineering increased from 5% in 1981 to 30% in 1999 and an astounding 50% in 2010. Females graduating with engineering degrees rose from 3% in 1981 to 28% in 1991 and 50% in 2010 (IEM, 2012).



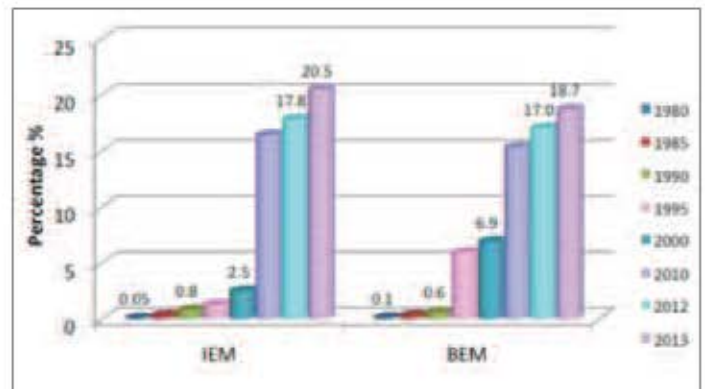
Female Engineering Students (%)



Females Graduating with Engineering Degree (%)

Although the number is commendable beyond 2010, we are not capturing the large number of these graduates in the workforce. It is clear that while our education system has been successful at attracting and graduating women from engineering programmes, women are still under-represented in the field of engineering at every level in the technical workforce, despite recent interventions to address this gender gap.

Moving forward, when the numbers are not there in the pipeline to begin with, there are simply not enough women



Women Engineers' Registration in IEM & BEM
(Source: IEM & BEM Websites, accessed 2013)

engineer resources, let alone women engineer leaders. This is a nagging concern and it is time to address this trend as the world, including Malaysia, moves towards technical innovation as the force behind economic prosperity.

There are significant personal and societal costs involved when women don't join the engineering profession after graduation. These losses are in terms of monetary investment in education expenses as well as personal time and effort invested towards achieving the degree. Significant resources are also deployed to educate, only to lose potentially trained technical talent within the workforce. Why do women not take up engineering? Why do they complete their degree but not pursue a career? Is the profession or the workplace climate the obstacle? Where do we go from here?

REASONS WOMEN LEAVE ENGINEERING

Research shows two scenarios contributing to the under-representation of women engineers:

1. Women who graduated with engineering degrees but never entered the engineering field.
2. Women who join the engineering field but leave sometime along their career path.

Issues that may have deterred female graduates from entering the workforce include not finding a suitable position, low starting salary and remunerations, too difficult job requirements, long hours with little flexibility in work arrangement, little advancement prospects and even simply a lack of interest in engineering, resulting in further pursuit of other post-graduate degree or business interests.

Generally, those who have never entered the industry after graduation have the perception (or misperception) that an engineering career is inflexible and the workplace culture is non-supportive of women (Fouad, 2011).

As for women who quit as working engineers, the following reasons have been cited:

- a. Inability to perform engineering tasks and perhaps even no longer enjoys the work.
- b. Inability to manage the organisational climate due to reasons such as limited opportunity for advancement, chilly organisational ambience, too much travelling required or simply adverse political landscape at the workplace.
- c. Excessive work responsibilities without commensurate resources and a lack of clarity with regards to work roles and expectations.
- d. Managing multiple work-life roles and leaving to spend time with the family.

Whether a woman decides to continue in the profession is clearly a combination of both personal expectations and support as well as organisational culture. Women engineers who work in organisations which value and recognise their efforts and contributions, have key-supportive people as their supervisors and co-workers and invests in their training and professional development, are likely to remain steadfast to such organisations.

WHY INCREASE THE PROPORTION OF WOMEN ENGINEERS?

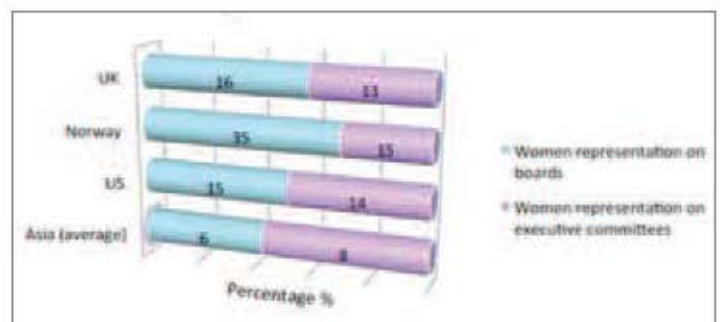
The focus to increase the number of women engineers within an organisation are supported by the following evidences:

1. Diversity within the workforce forges better business as diversity drives innovation and spurs economic growth. The estimated economic benefit in Australia that would arise from gender equity equates to an increase in economy of AU\$25 billion in tax restructuring due to increased economic activities (Thomson, 2013).
2. A diverse workforce captures a greater share of consumers addressing a market made up from an increasingly heterogeneous customer base. Bringing together individuals from different backgrounds enables business to be effectively marketed to similarly diverse background yielding increased profitability.
3. Recruiting from a diverse group means forming a more qualified workforce leveraging on each other's varying strength. Different groups of people contribute diverse viewpoints and opinions and, notably, innovation takes root in diverse views and experiences. A workforce with different qualifications, background and experiences is known to achieve the most effective problem-solving skills.

4. It has become increasingly significant for companies to have employees who reflect the people they serve and women are capable of spotting trends and looking for opportunities early which are essential to increase profitability.

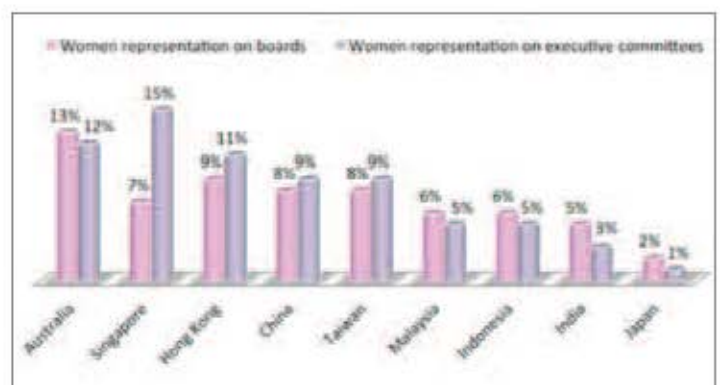
WOMEN ENGINEERS IN LEADERSHIP

In the upper tiers of organisations, women engineers are obviously scarce. The paltry representation of women sitting on corporate boards and executive committees in Asian companies is strikingly low when compared with Europe and the United States, even though women are under-represented in those regions too (McKinsey, 2012).



Women Representation in Asia vs Western Markets
(Source: McKinsey proprietary database, 2011; annual reports)

The survey by McKinsey in 2011 ranked Malaysia at par with Indonesia in the gender diversity "on board" and "on executive committee" within the workplace. Survey participants indicated that the greatest difficulty women face in moving into senior roles was the double burden affecting many working women in Asia: Holding a job while looking after the family – particularly in certain cultures and patriarchal societies where women are expected to be solely responsible for family and household duties.



Women in Top Positions Across Asia (%)
(Source: McKinsey proprietary database, 2011; annual reports; company websites)

Indeed, women breaking barriers was the conversation topic of the year in 2013. Their representation in leadership roles in business and the government in Malaysia has

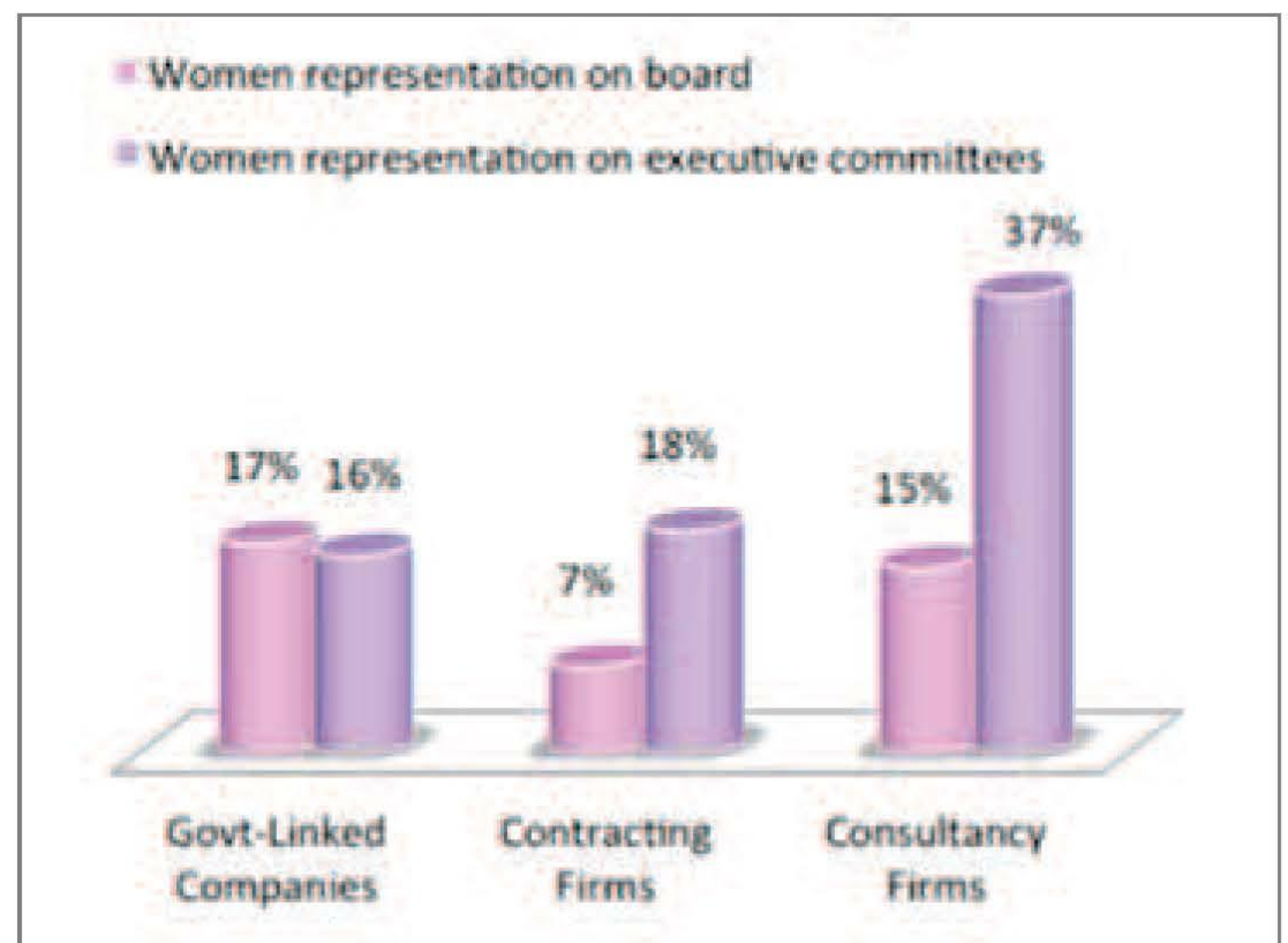
seen a marked growth due to the commendable efforts undertaken by the Government in advancing opportunities and access for women towards gender parity in the society. The percentage of women on board in Malaysia rose from 6% in 2011 to 13% in 2013 (Thornton, 2013).

Women representation in Malaysian companies within the construction and engineering industry stands at 17% on board, 16% on executive committees among government-linked companies, 7% and 18% respectively within contracting companies and 15% and 37% in engineering consultancy firms.

It is hoped that this upward trend will prevail in achieving the government's aspiration of 30% women representation on board and management level by 2016. Women engineers must persevere and those who stay ahead of the game amidst the rapid pace of technology change, are at an advantage when senior management positions open up.

WHAT CAN BE DONE FURTHER?

A research by Pamela Stone among female high-achievers, albeit not specific to women in engineering, indicated these statistics: 60% worked well past the birth of their second child; 90% left because of adverse workplace environment. In the absence of our own research, these numbers serve as a precaution to circumvent a similar situation if at all it has not already taken place. Efforts that can be deployed to attract and retain women to the workforce include:



*Women Representation in Malaysian Construction Industry
(Source: Research based on data from Annual Reports;
company websites (accessed December 2013))*

1. Communicate clear job tasks and work goals

Unclear and conflicting information on work tasks, goals and expectations have profound effect on women engineers' ability to deliver successfully. This is one obstacle that creates little or no job satisfaction, pushing women engineers to quit and often leave the profession. Organisations will be able to better retain women engineers if they take simple steps to define and clarify their expectations, including timeline and methodology, hence eliminating conflicting demands and under-performance.

2. Create clear and transparent path towards advancement

The attrition rate among women engineers within an organisation can be controlled by providing clear and transparent opportunities in moving up the ranks. Women often leave an organisation out of frustration at not finding clear and tangible opportunities for advancement, especially after strenuous efforts to keep on par with their male counterparts. An organisation will benefit by articulating its criteria for promotion and thereafter implementing a fair, performance-based assessment and relaying clear transparent feedback necessary for increasing awareness of one's impact on others.

3. Invest in training and professional development

Commitment from women engineers can be harnessed by exposing them to challenging assignments that help them develop new skills. This must be facilitated by formal training and development which should not be limited to the technical but should extend beyond to include management skills, strategic planning and leadership skills. Often women engineers must be taught the skills and styles that male counterparts acquire as a matter of course given the nature of engineering perceived as male-dominant.

4. Create supportive network and mentoring

The availability of supervisors and colleagues who can be relied on when the challenges become overwhelming, will boost morality and create positive attitudes towards work in women engineers. Equally important is having role models and mentors for professional growth. Organisations need to consider both a formal and informal mentoring relationship which is especially critical in the initial years of the women engineers' tenure. The aim is to facilitate adapting to the work environment as well building up organisational knowledge pertinent in job delivery. In addition, identifying common experiences encourages women's willingness to take risks and replicate similar endeavours. In later years, this is fundamental towards the progression into leadership roles.

5. Offer conducive work-life and family-supportive cultures

Organisations with an emphatic management benefit from having satisfied and committed employees. Motherhood should not be a penalty. Offering initiatives such as flexible working arrangements, flexibility to work from home or job-sharing options will induce lower work-family conflicts among women engineers. It is highly recommended that such initiatives be evaluated periodically on their effectiveness, given the constant shifts in a female employee's family commitments and priorities.

CONCLUSION

Understanding workplace climate helps to explain current women engineers' satisfaction and intention to stay in the engineering profession. Significant progress can be achieved with fundamental changes to the structure of organisations and society. Closing the persistent gender bias may be a formidable challenge but it's essential for our nation to prosper. One of the most resilient markets at present, and of the future, is technology. It is paramount to promote engineering as a career for men and women alike.

One of the hallmarks of any great organisation is its ability to continuously evolve and innovate to become even more relevant. Being a leader in the industry is more complicated than delivering superior engineering designs and solutions; it requires one to always remain relevant. To successfully retain women engineers, an organisation should harness the crowd as different individuals making different contributions to the team, place a fair amount of effort in developing and training its resources, provide the right tools to support the engineers, ensure engineering processes are sound, allow avenue for advancement and create a supportive climate for fulfilling multiple life role obligations.

It is particularly challenging for women engineers to establish credibility in a culture that is immensely conflicted about how they should exercise their roles as engineers and still remain within the cultural expectations of being women. Engineering is still an industry dominated by men.

The players must change from a culture of discrimination and fragmentation to integration and sharing despite gender diversity. Engineering at its heart should be a gender neutral industry. Bridges must be built across disciplines and diversities to engineer and solve challenges. It is, after all, not about statistics, but about making a difference in people's lives, collectively. ■

REFERENCES

- [1] Board of Engineers, Malaysia, 2013 [online].
- [2] Fouad, N.A. & R. Singh, 2011. Stemming the tide: Why women leave engineering. *Women in engineering 2011 report*, University of Wisconsin-Milwaukee.
- [3] Institution of Engineers, Malaysia, 2013 [online].
- [4] McKinsey & Co., 2012. Women Matter: An Asian perspective [online].
- [5] Mortimer Spinks, 2013. Women in Technology Survey 2013. *Computer Weekly* [online].
- [6] Stone, P., 2013. Opting out: Challenging stereotypes and creating real options for women in the profession. *Harvard Business Review*, September. p 87.
- [7] Thomson, M., 2013. Why "Women in Engineering"? *Engineers Australia, civil edition, vol 85, no. 7, July*. p 62.
- [8] Thornton, G., 2013. Women in senior management: setting the stage for growth. *Grant Thornton International Business Report 2013*.