

Exploring Career Success Among Women Engineers: The Malaysian Case

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Introduction

Since the beginning of the 1960's, women have increasingly entered into the career occupations and professions. However, those women that began their careers towards the mid-70's and the early 80's were considered as those set of women that tried to have it all in relation to their professional career success and family work balance (Gordon & Whelan, 1998; Auster & Ekstein, 2005). It should be noted that women workforce in Malaysia had increased tremendously. In terms of population, women account for about the half of the total number of Malaysian population (Ismail & Ibrahim, 2008). Hence they were found participating in many sectors of the economy such as agriculture, manufacturing, business and service organizations, in addition to their traditional or domestic un-paid sector of the economy. Thus over the years, the percentage of women in the workforce had continued to increase since the period of the year 2000 upward and is expected to continue.

Problem statement

The increase in the number of women workforce had contributed tremendously to Malaysia's development especially in the labour market. According to a report by the Department of Statistics, Malaysia (2011), the female labor force was reported at 47.3% of the total labor force as compared to 30.8% in the year 2000. The majority of the new female jobs were been clustered in the middle and lower income category i.e. clerical staff, service production workers, operators and labourers. Looking at the professional category, women were found to be employed as doctors, lawyers, dentist, architects and engineers. According to the Labour Force Survey by the Department of Statistics, Malaysia (2012), the labour force participation among persons between 15 and 24 years has increased from 56.6 percent in the 2nd quarter of 2011 to 59 percent in the 2nd quarter of 2012. The labour force participation increased for both men and women in that age group.

Presently, the roles of women are not only restricted to mothers and wives, but they also contribute significantly to the nation development in the labor market. The majority of new female jobs were clustered in the middle and lower income category job such as clerical staff, service and production workers, equipment operators and laborers. In this context, even though women make up more than 40 percent of the labor force today, not many of them are in the technical field such as engineering. Despite the increasing number of women in the professional and technical jobs, it was still lower than that of men (Ministry of Women, Family, and Community Development, Malaysia, 2010). Given the substantial contribution of the technical field in today's modern economy, the rapid expansion of employment opportunities and high wages in the engineering, the scarcity of women in these areas is still puzzling. From the policy maker's perspective, it may hinder the nation's

technical workforce by failing to capture the creative energies that are potentially available among women. Despite the increased rate of women in the technical jobs, about 70 percent of those women that have science, engineering and technology related degrees were not working in the sectors that use these skills (Ministry of Women, Family, and Community Development, Malaysia, 2010). As a result, this contributed to a significant loss to Malaysia's economy whereby this involved investment in training put forth by the government to educate female engineers, the inability of private organization to get qualified women to work with them and most importantly, the women lost out by not having well paid career in the sector. Hence this somehow caused women to experience direct and indirect, personal and professional barriers which finally hinder them from progressing in their careers. This problem is not only related to Malaysia alone as Ronen and Pines (2008) reported that the Canadian Committee on Women in Engineering published some possible barriers to women engineers career success or advancement. This has to do with i.e. lack of collaboration in women career development, lack of suitable policies that aid in balancing career and family responsibilities, workload, networking, role models and mentors, traditional attitudes to women professionals and other related matters.

From academic perspective, research that are relevant to women career success had been found in variety of fields i.e. business management, sociology, psychology and industrial relations (O'Neil, Hopkins & Bilmoria, 2008). These research covered several elements such as sexual harassment, personal development, networking, glass ceiling, leadership, turnover, work family balance and career mobility. Literature also shown that women in general are faced with numerous challenges in relation to their quest for success in their chosen careers, especially in rigid systems like engineering where they have to negotiate their presence based on a criteria weighted by men (Thurasamy, Lo, Amri and Noor, 2011). Those studies have shown that women engineers are clearly under-represented around the world (Ronen & Pines, 2008). Hence, the few women in the profession have continued to experience complex forms of gender disadvantage in various spares i.e. the social, cultural, economic and psychological aspects of their life career. Women usually find themselves having to swim within the context of prejudice, isolation and lack of support from partners as they are discriminated against.

Within the context of the engineering profession, up till this moment, both the men and women have considered the profession to be men's work (Ismail & Ibrahim, 2008). Thus those women that enter the engineering profession are seen as unusual. Another reason why women continued to be a minority in the engineering field can be attributed to various reasons i.e. career guidance as they enter the university, family support, professional mentors in the engineering field and the occupational and cultural barriers (Powell, Bagilhole & Dainty, 2006). The engineering profession is directly related with a culture of masculinity in terms of gender role which dictates a pattern of tough or behaviour that makes it difficult for women to be professionally integrated (Ronen & Pines, 2008). Women have to compete in proving their abilities which is found to be very tough for women working in the engineering field as it is male-dominated. This resulted in the fact that, among the women engineers in most countries around the world, there exist a small number of women senior engineers (Hersh, 2000). Little research had been conducted on the live experience of women engineers in relation to understand the meaning they attach to the 'male dominated' profession. Because of the educational investment and work experience accumulated by women in the workforce, Ng et al. (2005) also suggested for more research on women and their career success. In the same vein, Powell et al. (2006) recommended that it is important to consider their personal factors in relation to their career success.

This research has also considered personal factors, this is in recognition of the recommendation by Ismail and Ibrahim (2008) who observed that as far as money and energy is devoted to the training of women engineers, then it is of paramount importance to study what happen to them in terms of their advancement. It is based on the mangerial issues highlighted above and the literature gap that exist, this study was conducted to see whether personal factors like personality and career motivation) has a significant relationship with career success.

Research questions

- 1) Is there any relationship between career motivation and career success?
- 2) Is there any relationship between personality and career success?

Literature Review

In this chapter, related literatures on the variables under study i.e. women career success, personality and career motivation were discussed.

i. Career success

Based on Judge et al (1995), career success is defined as the positive psychological outcomes or achievements one has accumulated as a result of experiences over the span of working life. It consists of two main categories i.e. objective and subjective career success. Objective factors of career success are elements such as salary, promotions and status. Subjective career success has most often been operationalised as job satisfaction or career satisfaction.

ii. Personality and Career Success

Based on the related nature of careers, strong theoretical rationale have shown that personality is one of the most important variables that needs to be included in those models of career success (Seibert, Grant & Kraimer, 1999). Thus career success can be regarded as cumulative outcome or product of behaviors which are aggregated relatively over a period of time. In recent years, researchers have acknowledged and documented the fact that we all have personalities (Golbergm, 1993) and personality matters because it predicts and explains behavior at work. Over the years, personality has had at best a good reputation as a predictor of good outcomes.

One of the most compelling forms of evidence regarding the utility of personality is reported in the study by Judge, Higgins, Thoresen and Barren (1999). Results revealed that five personality traits predicted multiple facets of career success, whether assessed intrinsically (e.g. satisfaction) or extrinsically (e.g. occupational status), using either subjective reactions or objective indicators, over a span of 50 years or more. Specifically, the results demonstrated that there are enduring relations between personality traits e.g. consciousness and emotional stability assess in childhood and career success assessed in late adulthood with correlations ranging up to .49 (Judge et al, 1999). Thus over a long time, the cumulative benefits obtained through personality can be substantial at work. Thus this present study assess if relationships exist between women's personality traits and their career development with respect to their engineering profession. Thus, it is hypothesized that:

H1: Personality has a significant relationship with career success

iii. Career Motivation and Career Success

With respect to career, many studies define career motivation associated with wide range of decisions and behaviors related to one's career. Day and Allen (2004) described career motivation

as multidimensional, reflective of an individual's career identity, career insight and career resilience. Career identity is the extent that one defines oneself by one's work. It is associated with job, organizational and professional involvement, need for advancement and recognition. Career insight is the ability to be realistic about one's career and consists of establishing clear, feasible career goals and realizing one's strengths and weaknesses. Career resilience is the ability to adapt to changing circumstances, even when circumstances are discouraging or disruptive. It consists of characteristics such as belief in self, willingness to take risk and need for achievement.

To promote career motivation, employees should be given positive reinforcement for good performance, more opportunities for achievement and input, and receive support for skill development (London & Bay, 1984). Day and Allen (2004) found support that high career motivation may translate into higher performance level that leads to career success. Thus, it is hypothesized that:

H2: Career motivation has a significant relationship with career success

Research design

The research design employed was a survey-based design study. This study uses the simple random sampling as the sampling technique adopted in this study. The population of this study included all women engineers registered with the Institution of Engineers Malaysia (IEM). IEM is recognised as the main engineering organization in Malaysia that monitors all of its members. In 2008, it has about 16, 789 members. According to Sekaran and Bougie (2010), table of sample size for a given population size recommended that for a population of 15,000, the sample size would be 375. Thus, a total of 400 questionnaires has been distributed to get a higher response rate. The unit of analysis of this study is individual level, as such, the women engineers registered with this institution are considered to be the respondents of this study.

Measurements of variables

Career motivation was measured using the Day and Allen's (2004) 21-item scale which assess career resilience, career identity and career insight. As for Personality variables, these were measured using a 10 items of the shortened version of Bateman and Crant's (1993) proactive personality scale. While, another variable, that is career success, was measured using 5 items which were developed by Greenhaus, Parasuraman and Wormley (1990).

Data analysis method

The analysis and hypothesis testing of this study was conducted using the statistical software package SPSS version 16. One of the techniques used was regression analysis. After the factor analysis was conducted, the next step was the reliability test. The independent variables, the dependent variable were considered. Nunally (1978) suggested that a value of .70 is considered adequate in ensuring reliability of the internal consistency of the questionnaire. The alpha values of the variables under study were all found to have a value of above .70 and therefore acceptable to be used for further analysis.

Regression Analysis

In this study, regression analysis was conducted in order to test the hypothesis developed in this study. Regression analysis is normally conducted to test the relationship between the predictor and the criterion variable considered in the study. According to Hair et al (2010), there are four underlying assumptions to be met in a regression analysis. The assumptions include, the test for the

assumption of linearity, multicollinearity, normality and homoscedasticity were all checked and found to have met the assumptions.

i. Personality and career success

The first regression analysis was done to see the influence of personality on women engineers' career success. This was done to test the first research question of this study. In order to see the influence, career success was then regressed on personality and the summary of the result is seen from the table below:

Table 1

Result of regression analysis on Personality and Women Career Success

Predictors	Model 1
	Std. B
Personality	0.156
R ²	0.024
R ² Change	0.024
F-Change	3.077

Note: *p < 0.05; **p < 0.01; ***p < 0.001

The research question is whether personality is related to women career success. As can be seen from the table above, the result shows that personality explains 0.024% of the model ($R^2 = .024$, F-Change= 3.077.). It has a Beta value of $\beta = .156$. Based on the result, it shows that personality is not related to career success. As such, hypothesis 1 of this study is not supported and hereby rejected.

ii. Career Motivation and Career Success

The second regression analysis was conducted in other to see whether there is significant relationship between career motivation and career success. The result of this analysis is therefore presented summarily from the table below:

Table 2

Result of regression analysis on Career Motivation and Career Success

Predictors	Model 1
	Std. B
Career Motivation	0.374***
R ²	0.140
R ² Change	0.140
F-Change	20.000

Note: *p < 0.05; **p < 0.01; ***p < 0.001

Career motivation was regressed on career success and the result of the regression analysis showed that career motivation explains 14.0% of the model ($R^2 = .140$, F-Change= 20.000). It has a Beta

value of $\beta=.374$. The result therefore shows that career motivation is significantly related to career success. It can be concluded that the hypothesis 2 of this study is therefore supported and accepted.

Discussion of the study

As for personality, the result indicated that there is no significant relationship between personality and career success. This result is in concord with the contradictory results that were found in past studies. Some studies in the past have shown how personality trait to assist or derail their career (Lau & Schaffer, 1999; Seibert & Kraimer, 2001). The reason for insignificant relationship between personality and career success is even though the perception that engineering is a masculine dominant field with conventional attitudes concerning masculine stereotyping that still exist, these women professionals attribute their success to their self confident, hardworking, diligent and believed that they are capable to do the job. They have a strong belief that personality trait is not a barrier to their career success.

The result of this research indicated that career motivation has a significant relationship with career success is in concord with the findings of London and Bay (1984), Day and Allen (2004). In this context, more opportunities for achievement and input and support for skill development would promote employees career motivation. Day and Allen (2004) found support that high career motivation may translate into higher performance level that leads to career success. Thus, it is imperative that the organizations, regulators and the government should emphasize on the need for career motivation towards motivating the female population into the engineering profession. It is to be noted that not only that the profession is lacking the needed skills of the female engineers, but report have shown that around 70 percent of those women that have science, engineering and technology related degrees are not working in the sectors that use these skills. This has seriously leaded to the loss of both resources and skills to the organizations and the economy at large. On this, the government especially needs to focus more on the need for career motivation among women to stay in the profession and encourage other younger generation to join. Hence it is expected that the policy makers should do something in relation to career motivation so as to enrich the technical workforce of the economy by capturing the creative energies that are available within the female population.

In addition, organisation should impose the policy that 30% of decision makers are made up of women professionals. The importance of women participation in the work force specifically in the professional field like engineering should not be underestimated. Women engineers as decision maker are important in providing inputs that are significant for the organisation especially in formulating the policy that is prone to women's workplace friendly environment. Due to the perception that engineering is the male dominant field, organisation fails to identify the needs and develop policy regarding promotion, workplace, work structure and others that are workplace friendly to female workers.

In addition to increase the participation of women engineers as decision makers, the human resource policy developed in the organisation should also emphasized in fulfilling the needs and demand of women engineers. More effort should be enhanced to alert the organisation to come up with a new work structure and environment, for instance, allowing the women engineers to work through telecommuting or from home, working through flexi time. This initiative will help women workers to reduce and mitigate their dual career responsibilities and to help them balance work family life.

Conclusion

In conclusion, based on the foregoing research objectives, this study shows that personality is not related to women engineers' career success. The implication of this result shows that personality of the respondents which has to do with the characteristics of the respondents which influences their cognitions, motivations, and behaviors was found not to have influence their career success. This is not in concord with previous findings as past studies have found a link between personality and career success. However, this can be explained by the fact that there are not many women in the engineering profession due to the fact that the profession is already stereotyped to be male job. The next research question is whether career motivation is related to women engineers' career success. The result proves that a career motivation is significantly related to career success. Career motivation is highly needed especially as regards women engineers' career success. Such policies as to trying to encourage more women into the engineering profession should be encouraged i.e. critical mass which has to do with more training, recruitment and retention of women into the engineering profession.

References

- Auster, Ellen R. & Ekstein, Karen L. (2005). Professional women's mid-career satisfaction: An empirical exploration of female engineers. *Women in Management Review*, Vol. 20 No. 1, pp. 4-23.
- Bateman, T.S. and Crant, J.M. (1993). The proactive component of organizational behavior: A measure and correlates. *Journal of Organizational Behavior*, Vol 14, No 2, pp. 103-118.
- Day, R., and Allen, T.D. (2004). The relationship between career motivation and self-efficacy with protege career success. *Journal of Vocational Behavior*, Vol. 64, pp.72-91.
- Gordon, J.R. and Whelan, K.S. (1998). Successful professional women in mid-life: how organizations can more effectively understand and respond to the challenges, *Academy of Management Executive*, Vol. 12, pp. 8-27.
- Greenhaus, J.H., Parasuraman, S., & Wormley, W.M. (1990). Effects of race on organizational experiences, job performance evaluation, and career outcomes. *Academy of Management Journal*, Vol. 33, No 1, pp.64-86.
- Hair, J., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate data analysis (7th ed.). Upper saddle River, New Jersey: Pearson Education International.
- Hersh, M. (2000). The changing position of women in engineering world-wide, *IEEE Transactions on Engineering Management*, Vol. 47 No. 3, pp. 345-59.
- Ismail, M. & Ibrahim, M. (2008). Barriers to career progression faced by women: Evidence from a Malaysian multinational oil company. *Gender in Management: An International Journal*, Vol. 23, No. 1, pp. 51-66.
- Judge, T. A., Cable, D. M., Boudreau, J. W., & Bretz, R. D. (1995). An empirical investigation of the predictors of executive career success. *Personnel Psychology*, Vol.48, 485-519.

- Judge, T.A., Higgins, C.A., Thoresen, C.J. & Barrick, M.R. (1999). The big five personality traits, general mental ability, and career success across the life span. *Personnel Psychology*, Vol. 52, No 3, pp.621-652.
- Lau, Victor P. And Shaffer, Margaret A. (1999). Career success: the effects of personality. *Career Development International*, Vol. 44, pp. 225-230
- Ng, T.W.H., Eby, L.T., Sorensen, K.L. and Feldman, D.C. (2005). Predictors of objective and subjective career success: a meta-analysis. *Personnel Psychology*, Vol. 58, pp. 367-408.
- Nunnally, J. C. (1978). *Psychometric Theory* (2 ed.). New York: McGraw Hill.
- Powell, A., Bagilhole, Barbara M. & Dainty, Andrew R.J. (2006). The problem of women's assimilation into UK engineering cultures: can critical mass work?. *Equal Opportunities International*, Vol. 25 No. 8, pp. 688-699
- Ronen, S., Pines, Ayala M. (2008). Gender differences in engineers' burnout *Equal Opportunities International*, Vol. 27 No. 8, pp. 677-691
- Seibert, S.E., Crant, J.M. and Kraimer, M.L. (1999). Proactive personality and career success. *Journal of Applied Psychology*, Vol. 84, pp. 416-27.
- Seibert, S.E., Kraimer, M.L. and Liden, R.C. (2001). A social capital theory of career success. *The Academy of Management Journal*, Vol. 44 No. 2, pp. 219-37.
- Sekaran, U. & Bougie, R. (2010). *Research methods for business: A skill building approaches* (5th Ed.). Chichester: John Wiley & Sons Ltd.
- Thurasamy, R., Lo, May-Chiun, A., Adida Y. & Noor, N. (2011). An analysis of career advancement among engineers in manufacturing organizations. *International Journal of Commerce and Management*. Vol. 21 No. 2, pp. 143- 157.