

# **Technical versus Managerial Line: Career Route Preference of Senior Men and Women Engineers**

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## **ABSTRACT**

The study explores the interpretation of 31 senior men and women engineers on career route preference whether towards technical or managerial line. The career history data show that more of high-achieving male engineers would opt for managerial career ladder, and otherwise for the moderate-achieving ones. More women engineers would opt for technical ladder as their promotion in the managerial ladder is limited due to competitiveness of managerial positions. The study concludes that the dual ladder career is a gendered construction.

## **INTRODUCTION**

The purpose of this research is to explore career route preference of a group of senior men and women engineers. The rationale for this inquiry lies in several directions. The first reason is that the increased number of engineers including both men and women has added a new dimension to the study of careers in which gender has become an important variable. Second, the engineering profession has a high degree of mobility. Therefore, this occupation provides an excellent opportunity to examine the notion of self-perception of career in terms of career route preference. On a practical level, given the high status of engineering profession, it is an interesting area to look at the probable career route preference of engineers as a result of factors surrounding their decisions in making career choices. Lastly, engineers are a group of professionals who have experienced enormous career changes due to technological advances in their work and organizational processes as consequences of economic prioritization, rationalization in production and global competitiveness.

Engineers are defined as individuals who have their basic qualification in engineering fields (such as civil, mechanical, electrical, aerospace, and computer engineering). It is estimated that the number of engineers in Malaysia is 42, 607 in 2002 (BEM, 2003). This number is included in the group of professional and technical workers, which as a whole accounted for 10.6 percent of the total employed population in the country (Department of Statistics, 2000). It is also estimated that the ratio of male to female engineers presently in Malaysia is 4:1 which has increased from 10:1 in the early 1980s. Based on UNDP (2001), however, this group of women engineers is within the larger group of female professional and technical workers, who are accounted for 44 percent of the whole female labor force.

As such, a variable that is noted to appear parallel with the numerical increase of engineers is gender. Gender is said to affect experiences of engineers and the processes in organizations for which they work (Evetts, 1996; Igbaria, Kassicieh and Silver, 1999). In fact, the concept of career is a deeply gendered construction (Wilson, 1998). Due to rapid numerical increase of engineers, including men and women and the mobile nature of engineers compared to other non-technical professionals, it poses opportunities to study several aspects of careers in engineering profession. What is the perception of engineers on their career mobility i.e. the number of posts held in various specializations of engineering, and why is it so? How do men and women engineers perceive and experience their career orientation whether to be in managerial or technical line? This paper attempts to find answers to such research questions.

## LITERATURE REVIEW

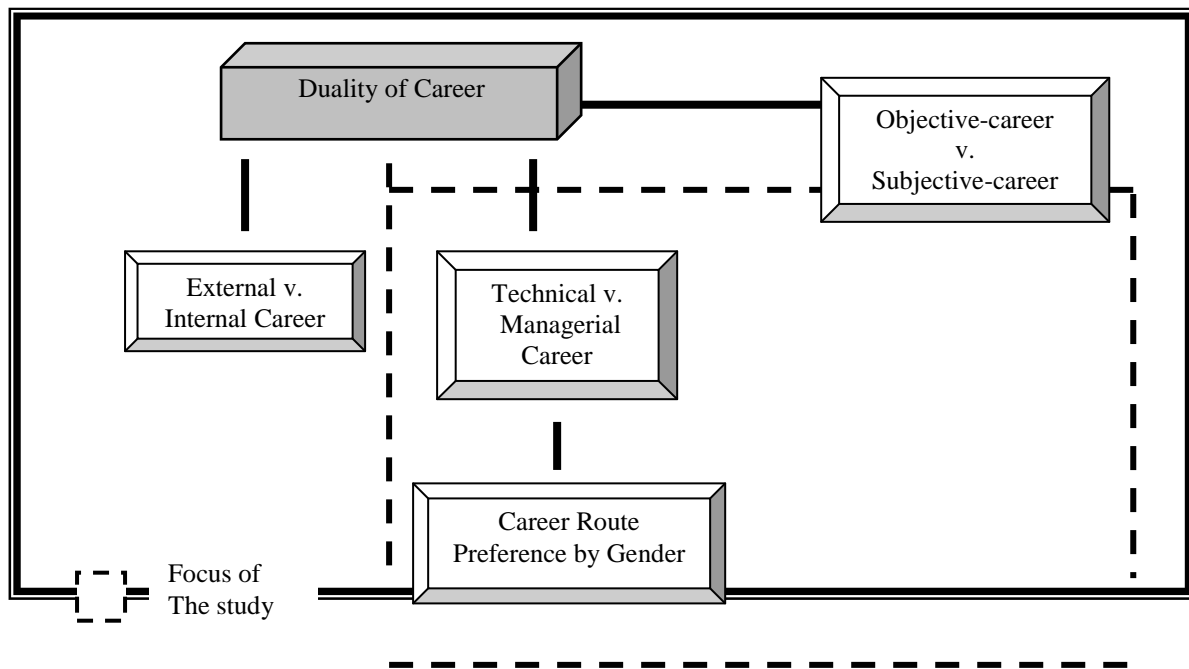
The growing body of literature on career indicates that career could be understood based on its dualistic perspective. The duality of career is referred to as the dimensions of careers through which various perspectives of careers are understood in a dichotomy. The dichotomic nature of careers also describes the career route preference of an employee. There are two types of career dichotomy, namely internal v. external career, and technical v. managerial career.

Individual v. institutional career as a concept is synonymous with that of internal versus external career. Individual career consists of objective individual career and subjective individual career. The former reflects the changing needs, values aspirations and attitudes towards his/her specific experiences of work (Northcutt, 1991; Bowden, 1997; Igbaria, Kassicieh & Silver, 1999). It also refers to the formal structure of posts, statuses and positions of the career ladder. The latter, on the other hand, refers to the personal perspective of career which may change over time, and the concept is important in researching the way women's versus men's career is viewed. Subjective career is related to individuals own changing perspectives towards their careers, how they actually experienced having a career. It is described as the moving perspective in which the person sees his/her life as a whole and interprets the meaning of his/her various characteristics actions and incidents that happen to the person.

Evetts (1996) and Pool and Langan-Fox (1997) further explained that the subjective career is a process in which change, adjustment and adaptation are implicit. This has particular relevance to the study of both adult men and women because career is the product of a dialectical relationship between self and circumstances. This is so because as an individual meets new circumstances, certain interests may be constructed or reconstructed. Certain aspects of the self changed or crystallized, and in consequence new direction and ambition developed. A number of studies have used the subjective career concepts as the methodology and it is often called career-history study or career analysis based on autobiography (Roworth-Stokes and Perren, 2000; Bowden, 1997; Subotnik and Arnold, 1998).

Technical v. managerial career is sometimes called patterns of career or career route preference (Bowden, 1997; Pool and Langan-Fox, 1997). Technical career route is a career pathway in which an employee progresses in his or her career while still remaining involved in technical specialization. The managerial route, which slowly moves a person away from technical work, is the path most usually described as successful. It is generally the most attractive because it carries with it the highest prestige and often provides employees such as engineers, with the possibility to have real influence on the technical growth of an organization. Yeh and Lai's (2001) study reports that promotion to technical management and transfer into general management such as sales or manufacturing are the two most common career development paths in engineering in many countries. Brown (1982) and later Evetts (1996) used the concept of career routes to distinguish between organizational careers in which advancement is achieved within a single employing organization, and occupational career in which employees move from employer to employer in developing their careers. Therefore, the determining factor here is number of positions held within one employing organization, or number of times the employee changed employer with the condition that later position is better than the earlier one.

Based on the literature review, therefore the scope of inquiry in this research is as depicted in Figure I. It takes into consideration the duality of career based on technical v. managerial career concept as the focus, using subjective-career experience as the methodology.



**Figure I: The Conceptual Framework of the Study**

## METHODOLOGY

The informants of the study consisted of senior engineers of a large industrial operation for which the pseudonym “Petromax” is used. The general function of Petromax is in the production and commercialization of a natural resource using high technologies in both upstream and downstream activities. The sample is illustrative rather than representative of the ways in which engineers explain about the career and career orientation at different operating units (OUs) in Petromax. This corporation consists of more than one hundred OUs in Malaysia and abroad.

As the study is concerned with career route preference, the sample was defined along the basis that only engineers with a minimum of eight years working experience, males and females of all ethnic backgrounds, from five separate OUs were chosen as the informants because the aim was to gain a more complete understanding of the dynamics of engineers’ careers by taking into consideration the influence of personal, organizational and environmental factors into their career route preference. This was to focus on mid-career status, taking a long-term view of the interaction between work and personal life. In Petromax, only 10 per cent of engineers are women and this percentage is even smaller considering those with more than eight years of working experience.

The informants were initially identified by contacting the human resources division of each selected OU of Petromax. The identification of the OUs was made at random through the Internet, and the respective Human Resources (HR) managers were contacted by telephones and e-mails. On knowing the criteria of sampling, the Human Resources managers helped in identifying the informants. The first and subsequent informants were taken based on their time of agreement on appointments made.

It was decided that an investigation of the career interpretation based on subjective career experiences among the engineers would best be conducted by interviewing them in depth. As mentioned earlier and also according to Evetts (1996), the interpretation of career based on experience is synonymous with a life story or career history. The guided questions used in this career-history study were designed to address issues across the entire life span in order to gain a broad picture of engineers’ careers, specifically the career route preference.

The interviews were conducted at the offices of the informants and each interview was audio taped. Issues discussed were childhood life, educational experience including that of primary, secondary and tertiary levels, reasons for choosing science or engineering in higher education, first job and subsequent jobs after attaining first degree, events that give impact to careers, perception on performance of male and female engineers. Career preference and informants' vision in the career path that they have undergone and are going to pursue especially in terms of choice for managerial and technical ladder was certainly asked. The audio taped interviews were then transcribed. The analysis was done based on constant comparative technique (Strauss and Corbin, 1990).

Based on the above procedural considerations, a total of 31 engineers were taken as the study informants, as this number was believed sufficient to provide data to answer the research questions. The group comprised 24 males and 7 females. Their ages were between 31 and 47 years with an average of 37.2 years, which included two males and three female informants who were unmarried. The unequal number of male and female informants becomes the major limitation of this study. However, the much smaller number of female informants compared to male informants is about in line with the overall ratio of male to female engineers of 4:1 as alluded to earlier. All of the married respondents were in two-career families. The average number of children among the married informants is 2.4. Only one informant had a bachelor degree in Applied Physics and one advanced diploma in engineering. Nine informants had a degree in mechanical engineering, seven chemical, five civil, three electrical and electronic, and two informants were in industrial engineering. The average number of jobs held including the present one is four.

## RESULTS AND DISCUSSION

Based on analysis of the data, three themes emerge related to informants' interpretation on their career mobility and the dual ladder career specifically on career route preference of technical v. managerial line. The themes are high career mobility of engineers; perception on dual ladder career system; and gender, performance and career route preference. The sections that follow present each theme according to the career-history data.

### 1. High Career Mobility of Engineers

The general perception of informants on their career has been the very mobile nature of engineering profession. Data from the informants showed that the average number of jobs they held was four. With an average age of 37.2 and considering that the average age admitted as an engineer was about at the age of 24, this means that within 13 years they have change job positions laterally or vertically as many as four times. This is considered as high compared to job mobility in other profession such as academician.

Almost all informants reported that they aspired to work from project to project in various capacities such as senior engineers (42.0%), heads of department (23.0%), managers (19.0%) and project executives (16.0%). In this instance mobility is strongly associated with working from project to project in different OUs within the corporation.

Relating to the mobile nature of engineering career, a male engineer with 11 years working experience expressed:

In 1994, I joined development division in Dulang, as a project engineer ... then in 1996 with an international project of Petromax in Iran.... and in 1997 was assigned to Sudan as a senior development officer. Later in 1999, I was promoted to turbomachinery engineer responsible for turbo generator at an exploration plant, working with another international oil corporation at offshore.

(Male, married, 36 years)

Another male engineer with 13 years working experience reported that:

A good engineer should have moved from one location to another location of engineering... because from different sites you gather different knowledge and practical skills. In other words an engineer should be very mobile in performing his or her task.

(Male, married, 47 years)

Similarly, a female engineer responded on the mobility of engineering profession:

During my 10-year working experience, I have been in several project teams. Every project seems new to me ... I always take the opportunity to be in a new task force ... because I feel there is where I learn new things and new skills. I admit now that my career growth was very fast during my early involvement in plant projects.

(Female, unmarried, 35 years)

## 2. Perception on Dual Ladder Career System.

Informants frequently mentioned the significance of the dual ladder system in relation to their career progression. Two categories emerged from their interpretations of dual ladder system in relation to their career route preference.

*i. Promotion should be parallel between the Technical and Managerial Ladders.* Informants are of the opinion that there should be more emphasis on adopting alternative models of career progression, other than solely on the ability and competence to manage technical professionals. In fact, Petromax has recently adopted the parallel mode of promotion between technical and managerial ladders. This opens up opportunities for every engineer to move up the career ladder, which was otherwise limited only to those who are competent in managing others.

A male engineer with 12 years working experience responded:

I still preferred the technical line... even now Petromax adopts managerial and technical paths... Right now I am in the middle of the technical line, Grade 24... I still need to learn a lot of technical skills... I have some technicians under me but they do not directly report to me... but then if I want them to help me I just ask them to do it... I preferred that way because it is not easy to control people ... and to manage people...

(Male, married, 35 years)

Similarly another informant revealed that Petromax needs to have parallel career progress in engineering:

Recently Petromax had developed another career progression path for technical specialists. That means after reaching Grade 24, we have choices whether to go to the managerial or specialist line with grade 25 ... the recent change was made because Petromax received complaints that there is no career growth for the specialists... Otherwise many engineers, probably including me, would leave the organization, looking for greener pastures...

(Male, married, 34 years)

*ii. Dual Ladder Career leads to better Vision in Career.* The data from this group of engineers show that the options between the technical and managerial career ladders help them in their career planning. One is the possibility of the engineers to make decision earlier in their careers whether to choose technical or managerial path. For instance, after two or three promotion levels they have to decide and let the management know of their decision after they have shown their capability of managing people. One of the male informants highlighted:

My vision is to go up to whatever level I could go in management because I still remember during my interview for my engineering post at Petromax... I was informed that there is no limit in management... Only sky is the limit... with that, I have made up my mind to be in the

management... furthermore I have vast experiences in engineering ... I was a technician before...

(Male, married, 40 years)

It is good to have choices in climbing up the job hierarchy. Not every body is born with leadership qualities ... Therefore, some could be leaders, and many could not ... By having the technical line, it will pave the way people like me to become specialist... this decision should be made when you are about in the middle career stage.

(Male, married, 37 years)

### 3. Gender, Performance and Career Route Preference

Data from this group of informants indicated that there is a difference between high-achieving and moderate-achieving male and female engineers, and their career route preference. For high-performing male engineers, they have clear intention in terms of career route choice that is they build career as they go into managerial positions. It is otherwise for the moderate performing male engineers who would stay as technical specialists. The following informants have these to say in terms of their career-route choices:

Before my present post as senior production manager, I have been at four different positions in Petromax ... I moved up as I had my new post ... My plant experience... and my offshore experience... actually pushed me up. And yes these various plant positions, helped in my career growth.

(Male, married, 39 years)

Two of the female informants are already in high-ranking positions in management. Data show that they became division managers after having quite a number of positions just like what other high-performing men engineers do. Both of them shared their experience:

This is my first non-technical position. I started with mechanical... then with process ... and instructional role ... and corporate ... and set strategy for the next corporate planning ... I find it interesting here and so far I am the first woman here ... and I know at that time Petromax wanted to find someone who knows corporate planning ... from the whole Carigali. During the corporate planning training in Kuala Lumpur, I was the only woman out of 52 participants...

(Female, married, 38 years)

I perceived myself as above average in terms of performance compared to my colleagues. However, It was a bit slow at the beginning probably the career was not so structured in the past ... But in the middle of my career time, it became faster for me to reach my present managerial level ... reasons because I have a lot of plant exposure... Until now I am doing both ... I strongly believe that all managers have to continuously learn the details of how things work ... Otherwise we cannot manage technically competent staff...

(Female, unmarried, 45 years)

However, more female engineers were still unclear which direction should they go ... Evidence strongly showed that most of them would opt for technical ladder due to their contention that female engineers' promotion in the managerial ladder goes with some limitations since they see clearly the competitiveness of managerial positions.

Two women informants regarded themselves as on average in terms of performance. They reported:

I think I will stay in the technical area. We are given the opportunities now that to move up the job hierarchy is not necessarily to transfer to the managerial side.

(Female, unmarried, 33 years)

Probably I will stay here in Petromax, since Petromax is now trying to promote a ladder for technical people... so currently I am preparing myself for that ladder... I am going to tell my boss that I want to pursue my career within this area...

(Female, married, 34 years)

Men engineers are of the opinion that only some areas of engineering specialization are suitable for women. In fact, many have gone well in their technical careers such as in areas of instrumentation, chemical, process and design engineering, and electrical and electronic engineering. The following responses from three male informants indicated:

Opportunities for women engineers are the same as that for men. Only there are limitations from lady engineers ... working extra hours in common for all engineers ... but some ladies if they work extra time, they have to take some of the family time...

(Male, married, 40 years)

Through my observations, female engineers here are good ... some of them have been transferred to other OUs because I think plant environments are not good for them ... Just like men engineers, some excel ... some do not ... In instrumentation I see they are performing ... some area are not suitable for ladies such as mechanical because you have to go to plant operation, to climb up the column ... but instrumentation, process and electrical are suitable for them...

(Male, married, 33 years)

... lady engineers have chances to go up the career ladder ... but to a certain level. If they are on maternity leave for two months, then they are not in the office for that long ... if for unmarried engineers are alright, I am sure they can go up the same as the men do ... but again it depends on their attitude...

(Male, married, 33 years)

The above data seem to agree with contemporary literature (Catalyst, 1999; Simpson, 1994; Wilson, 1998) which explains that the implementation of dual or multi-path career ladders is necessary especially in any industrial organization to meet the needs of the professionals. Performance of male and female engineers influence their decisions whether to go to managerial or technical path. The proliferation of new specialist and management posts has been Petromax response to its ever-increasing number of technical professionals. The data also indicative that variation in career orientation, to certain extent, goes according to gender in which the issue of marriage and lifestyle (Evetts, 1998; Tang, 1997) has affected women engineers' performance and career growth.

## CONCLUSION

At the outset of the results it shows that career mobility in the profession of engineering is very dynamic. This dynamism is primarily explained by the fact that the engineers moved from project to project according to the structural expansion and growth, and engineers' competence, resulting in the changing management in corporation. Such changes were perceived by the engineers to have a great impact on their career mobility as both technical specialists and managers.

The engineers are of the opinion that to go to higher position in their career, one has equal choice between technical and managerial ladder. These choices were made transparent to the engineers, and in fact it has improved their career vision. Some variations are however, noticeable between the genders in relation to the career-route preference. Highly technical competent male and female engineers have carved faster career, and after reaching the middle career ladder, there was a tendency for them to go into managerial ladder. However, the probability for male engineers to go into managerial line is higher than female because of the preponderance of the former compared to latter. Women engineers who have made up to top managerial positions experience similar fast-track performance in technical tasks as those of their male counterpart. As a whole more female engineers opted for technical career line as they were being more lifestyle-oriented than men.

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