Career Aspirations of R&D Professionals in Malaysian Organizations

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ABSTRACT

R&D professionals play vital roles in work organizations, society and nation building in today’s scenario of development. Since research on R&D professionals’ career aspirations is context specific, there is yet limited empirical investigation on their career life in relations to career aspirations particularly based on Malaysian scenario. Specifically, this study aims to examine the relationship between self-efficacy, organizational socialization, and continuous improvement practices with career aspiration among R&D professionals. The framework of this study is based on Schein’s Career Anchor Theory and Social Cognitive Career Theory (SCCT). The former describes the components that make up career aspirations, while the latter explains the interaction of cognitive-person variables (e.g. self-efficacy), external environment factors (e.g. organizational socialization) and behavior (e.g. continuous improvement practices) with career aspirations. This study presents results based on pre-testing data involving 49 R&D professionals from two public organizations and four Multinational Corporations (MNCs) in Malaysia through a survey research design. The data were analysed using descriptive statistics and Pearson Product-Moment correlation. The results indicate that the three selected factors, namely, self-efficacy, organizational socialization and continuous improvement practices, show significant positive relationships with the respondents’ career aspirations. The study concludes that the variables seem to have the predictive potential to career aspiration of R&D professionals.

INTRODUCTION

Research is a basic experimental analysis to generate knowledge that will help to create products, process or services. On the other hand, development is the exploitation of the discoveries from research where it converts research findings into a new or improved product that can survive in a knowledge-intensive market. Therefore, research and development (R&D) is defined as an activity in science and technology which uses scientific investigation that explores the development of new goods and services, new inputs into production, new methods and formula of producing goods and services, or new procedures of operating and managing organizations.

R&D has also been recognized as a critical determinant of a country’s competitiveness worldwide including Malaysia (Mastic 2006). The indicators include budget allocation for R&D activities, the number of R&D professionals within a number of populations, and numbers of patents produced over a specified number of population. Since 1998, there has been a steady increase in the numbers of R&D personnel in the country (Yeh 1995). This upward trend is also evident for researcher headcount in Malaysia, for instance, from 6,249 in 1998 to 17,790 and 23,092 in 2002 and 2004, respectively. This number includes R&D personnel in government research institutions, institutions of higher learning and the private sector firms. These numbers show how the increased importance of R&D personnel in the
growth of work organizations and society for today’s opportunities and challenges. The total numbers of research personnel in Malaysia from 1994 to 2004 are shown in Figure 1.

**R&D Professionals**

R&D professionals refer to individuals who are responsible in the research line from the generation of knowledge to the point of its commercialization. They are the main assets in generating the R&D programs. According to Petroni (2000), R&D professionals are workers who are employed in high-technology firms that work in either the design or implementation of R&D innovations. These professionals are also known as scientists and engineers who are doing research and development of new idea or theory. The applied research by scientists involves the application of high level scientific reasoning focus on revealing an unknown, while engineers will apply the scientific reasoning to achieve practical, functional designs and then develop more efficient operational structures, machine and systems of value (Taji, Fujii, Tsukioka and Fujimura 2005).

**Figure 1: National headcount of R&D personnel**

Source: Malaysian Science and Technology Information Center, Mastic (2006), p.19

Kim and Cha (2000) argue that R&D professionals have a very distinctive nature in their career orientations, value systems and reward preferences. They further suggest five types of career orientation of R&D that include technical, managerial, project, technical transfer and entrepreneurial orientations. Petroni (2000) proposes four career orientations route, which are managerial, technical, from project to project and technical transfer route. Mallon, Duberly and Cohen (2005) on the other hand identify four different terms of career orientation among respondents of their study which are the impassioned scientist, the strategic opportunist, the balanced scientist, and the organizational careerist.

From the category of R&D professionals’ career orientation, it shows that they have various views on career options available to them. R&D professionals are one of the important workforces in today’s dynamic employment. However, as Malaysian R&D professionals are concerned, nothing much could be explained on their career aspirations and what affects their career aspirations. Therefore, there is a need to
study aspiration as this would affect their career orientations. Knowing this knowledge gap is important because it gives implications for their career management aligned to the three key career drivers which are science, self and the organization that drive career (Mallon, Duberly and Cohen 2005). Hence, it is clear that there should be an exploration on the implication of integration of these drivers in order to enhance R&D professionals’ career as the model of the R&D organizations might impact their personal desire and choice of the type of career path.

This paper generally aims to identify level of career aspiration of R&D professionals. Specifically it examines the relationship between self-efficacy, organizational socialization, and continuous improvement practices with the career aspirations of R&D professionals. The paper is organized in three sections. After this introductory section, a theoretical perspective on career aspiration is discussed, followed by factors affecting career aspirations. The paper then presents preliminary results of the study based on 49 respondents on the levels of career aspiration and its relationships with the three variables.

Theoretical Perspective of Career Aspirations of R&D Professionals

Career is not a newly developed term in the field of human resource development (HRD). It has traditionally been seen as a course of successive situations that makes up a person’s work life. McLagan (1989) conceptualizes that career development as one of the three areas of practice for Human Resource Development. The importance of adopting career development in organization is for the employees to be able to determine their specific jobs expectations, career route preferences and career aspirations.

One of the constructs of career development is career aspirations. Schoon and Parsons (2002) argue that occupational aspirations exert a major influence on the development of individuals’ careers. This is due to the motivation of the employees themselves that has an ambition and desire to perform the best in their work. Powell and Butterfield (2002) explain that career aspirations refer to individuals’ desires for future employment. Aspiration is one of the aspects of internal preference where it is the strong desire for high achievement or an ambition. Aspiration is a concept where individual can achieve what they want if they work directly towards it.

Career aspiration is an aspect of internal dimension of career that determines the success of a career. Career aspiration essentially emerges from an individual, which in turn influences one’s value, norms and beliefs. It is therefore influenced by the social context, i.e. where the person is, family, education and social institutions. Career aspiration is strongly related to an aspect of intelligent career (Baruch, 2004) and its underlying values such as ethics, attitudes, internal needs motivation, identity; and what motivates people to choose or remain in a certain career, job and lifestyle. Therefore, career aspiration should be analyzed as it will give impact to the professional’s performance and it is one of the criterions to be considered in their career management.

Schein’s (1975) theory on career anchor stated that individuals hold a variety of career interest. It is a set of self-perceptions pertaining to motives and needs, talents and skills, and personal values that is secured in intrinsic side of an individual. It also provides reasons for choices, as a person is likely to fulfill his/her self-image. The career anchor influences decisions to build career aspirations, where it determines an individual’s view of the future. Schein had identified eight preferences of career that guide employees’ career aspiration: technical or functional competence, managerial competence, autonomy/independence, security, sense of service, pure challenge, lifestyle integration, and entrepreneurial creativity. Studies have shown that compatibility between employees’ desires and aspirations produces high levels of job satisfaction, commitment and retention within an organization (Igbaria, Greenhaus, and Parasuraman 1991; Petroni 2000).
Another theory adopted in this analysis is the Social Cognitive Career Theory (SCCT) which has grown out of Albert Bandura’s social cognitive theory and developed later by Lent, Brown and Hackett (1994). This theory makes attempts to address issues of culture, gender, genetic endowment, social context and unexpected life events that may interact with and supersede the effects of career-related choices. SCCT describes career development as a complex interaction between an individual, his/her behavior and the environment.

It is argued that self-efficacy is an individual’s evaluation of her own abilities to plan and institute the correct action, which will lead to successful performance and goal attainment. They also emphasize that self-efficacy can determine individual’s choice of activities and environment, effort expenditure, persistence, thought patterns and emotional reactions when confronted by actions. The SCCT differs from the majority of existing career theories in its dynamic nature as it focuses upon the role of the self-system and the individual’s beliefs, the inherent influences of the social and economic contexts.

Another model that is believed to have compatibility with individuals’ career aspiration is the Continuous Improvement (CI) Capability Model. This model suits the current organizational management that gives priority to quality improvement behavior in R&D. CI is one of the quality practices which based on Deming’s philosophy that describes a process consisting of improvement initiatives to increase successes and reduce failures over duration of time. Bessant and Caffyn (1999) had developed the CI Capability Model which describes the essential behaviors for long-term success with quality improvement practices. This model describes the process of CI capability development as a five-stage process, namely, natural or background improvement, formal attempts to create and sustain, CI directed at company goals and objectives, CI largely self-driven by individuals and groups and finally CI capability where CI is dominant way of life.

The elements that build the CI Capability Model are enablers, behaviour, and core ability. Every organization will have its own enablers, depending on the organization’s history, structure, existing culture and environment (Caffyn 1999). These enablers are important as they will encourage the appropriate individuals’ key behaviours and also support the development of each core ability. The behaviours of individuals will become more deep-rooted when the CI practices are frequently used. As emphasized in CI Capability Model, when employees practice CI concept throughout work procedures, they will displayed the CI behaviour and at the highest level of this model, they might use CI as a dominant way of life. Therefore, the relationship between CI practices and career development in terms of their aspiration might be of significance based on this model. CI Capability Model is suitable to use in analyzing career aspiration of R&D professionals since the field of R&D highly emphasizes quality in the production of goods and services.

Studies on career aspirations show that there are many factors that influence individuals’ career aspiration. Three factors were considered in this paper to associate with R&D professionals’ career aspirations, namely, self-efficacy, organizational socialization and continuous improvement (CI) practices. The following section briefly explains each of these variables and its contributions to career aspiration.

**Self-efficacy**

One of the cognitive-person’s domains of SCCT is called self-efficacy. Self-efficacy refers to an individual’s belief about his or her abilities to mobilize cognitive resources and ways of action needed to successfully execute a specific task within a given context. In a simpler manner, self-efficacy is an individual’s belief that she or he can accomplish a task (Smith and Fouad 1999). It is a dynamic state of mind where it can be adjusted over time with new information, experience and learning. Hence, self-efficacy can be an antecedent in determining the R&D professionals’ career aspiration.
Organizational Socialization

Organizational socialization is defined as a process of individuals’ learning to identify organizational values, expectations on job-related behavior and social knowledge on roles as productive members in an organization (Bigliardi, Petroni and Ivo Dormio 2005). It is believed that rapidly changing work environments encourage R&D professionals to modify their career aspirations (Allen and Katz 1986). Taormina (1997) defines the organizational socialization of R&D professionals into four generalized construct, namely, training received, the R&D professionals’ understanding of their role and of the organization, co-worker support and future prospects within the employer.

Continuous Improvement (CI) Practices

Continuous Improvement (CI) is based on Deming’s philosophy that describes a process consisting of improvement initiatives to increase successes and reduce failures over a duration of time. Bhuiyan and Baghel (2005) defined CI more generally as a culture of sustained improvement targeting the elimination of waste in all systems and processes of an organization. It involves everyone working together to make improvements without necessarily making huge capital investment while Kerrin (1999) stated that CI program is one way of contributing to the productivity and efficiency within an R&D setting.

Ljungström (2005) argued that the development of CI capability is an organizational change process that is specifically on renewal and improvement. CI is used in the context of organizational renewal and change, innovation processes as well as a synonym for ad hoc improvement projects. From the various definitions, it can be concluded that CI is one of the quality approaches that focuses on production efficiency where there will be high production rate with lower cost consumption. Furthermore, CI is a process of eliminating unnecessary inventory, unnecessary transportation and material handling and rework. Organizations also consider the use of CI to improve employees’ morale, satisfaction, cooperation and career aspiration. Thus, CI can be defined as efficient-based activities that lead to organizational performance improvement and sustained incremental innovation.

Based on the above review, a model on R&D professionals’ career aspiration used in this study is depicted as in Figure 1. It predicts that, 1) R&D professionals who have high self-efficacy in performing their job will ultimately aspire more for it, 2) higher level of organizational socialization will create high aspiration among R&D professional to further intensify their role as researchers, and 3) R&D professionals who perform CI practices are more likely to have aspiration for advancement in their career. It is suggested that this model could be used among R&D professionals to find empirical results on the influence of the variables to career aspiration.

METHOD

The data for this pilot study were collected using a set of questionnaire. The questions on career aspirations were measured through the cumulative scores of nine dimensions as suggested by Schein (1985), while the questions on self-efficacy used 10-item scales based on Schwarzer and Jerusalem’s (1995) measurement. Organizational socialization was measured using 20-item Organizational Socialization Inventory by Taormina (1994). Continuous Improvement Practices were measured using 30-item CI capabilities survey by Jorgensen, Boar and Laugen (2006). A total of 49 respondents were obtained personally from two public R&D organizations and three MNCs. The data were analysed using SPSS.
Profile of the Respondents

Results indicate that 27 (55.1%) respondents were males and 22 (44.9%) were females. Their average age was 34 years, with 22 years as the youngest and 60 years as the oldest with a mode of 36 years. For their educational attainment, 22 (44.9%) of the respondents were with bachelor degree and master degree, respectively; and only 5 (10.2%) of the respondents were with doctoral degree. Only one (2.0%) respondent has worked as R&D professionals for more than 32 years, while the majority 36 (73.5%) have work tenure of less than 10 years.

Levels of Career Aspirations

Table 2 reveals the distribution of R&D professionals according to their responses to their level of career aspirations. The mean score of 3.65 with a standard deviation of 0.42 demonstrates that the majority of the respondents (75.5%) experienced a high level of career aspirations. The results also indicate that only 24.5% of the respondents had moderate level of career aspirations. This indicates that most of the R&D professionals were aspired to a higher level of career.

Relationship between Selected Variables and Career Aspirations

The variables of self-efficacy, organizational socialization and continuous improvement practices were analysed for their relationships with career aspirations. Table 3 indicates that all the variables correlated significantly with career aspirations. The magnitude of the coefficients range from .286 to .436 indicating a low to moderate strength of relationships between the self-efficacy ($r=.286, p=.047$), continuous improvement practices ($r=.431, p=.002$) and organizational socialization ($r=.435, p=.002$) with career aspirations. Therefore, this preliminary study confirms to past findings on the significant association of these variables with career aspirations.
Table 1: Background of Respondents

<table>
<thead>
<tr>
<th>Profile</th>
<th>Frequency</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Age group (years) (x = 34.02, S.D. = 7.03)</td>
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<td></td>
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<tr>
<td>&lt; 25</td>
<td>4</td>
<td>8.2</td>
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<tr>
<td>26 – 35</td>
<td>22</td>
<td>44.9</td>
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<tr>
<td>36 – 45</td>
<td>20</td>
<td>40.8</td>
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<tr>
<td>&gt; 46</td>
<td>3</td>
<td>6.1</td>
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<tr>
<td>Gender</td>
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<td></td>
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<tr>
<td>Male</td>
<td>27</td>
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<td>Female</td>
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<tr>
<td>Educational attainment</td>
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<tr>
<td>Master degree</td>
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<td>44.9</td>
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<tr>
<td>PhD</td>
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<td>10.2</td>
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<tr>
<td>Working experiences (years) (x = 8.12, S. D. = 6.70)</td>
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<td></td>
</tr>
<tr>
<td>&lt; 10</td>
<td>36</td>
<td>73.5</td>
</tr>
<tr>
<td>11 – 20</td>
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<td>20.4</td>
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<td>&gt;31</td>
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Table 2: The Levels of Career Aspirations

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<th>Variable</th>
<th>n (%)</th>
<th>Mean</th>
<th>SD</th>
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<tbody>
<tr>
<td>Career Aspirations</td>
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<td>.42</td>
<td></td>
</tr>
<tr>
<td>0 – 1.69 (Low)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>1.70 – 3.39 (Moderate)</td>
<td>12</td>
<td>24.5</td>
<td></td>
</tr>
<tr>
<td>3.40 – 5.00 (High)</td>
<td>37</td>
<td>75.5</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Relationship between Selected Variables and Career Aspirations

<table>
<thead>
<tr>
<th>Variables</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy</td>
<td>.286</td>
<td>.047*</td>
</tr>
<tr>
<td>Organizational Socialization</td>
<td>.435</td>
<td>.002*</td>
</tr>
<tr>
<td>Continuous Improvement Practices</td>
<td>.431</td>
<td>.002*</td>
</tr>
</tbody>
</table>

* Significant at 0.05 level

CONCLUSION

Analysis in this article is with two limitations. First, the data were from the pilot study, and second the scope of analysis was limited to examining relationship between self-efficacy, organizational socialization and continuous improvement practices with career aspiration. For further analysis on which factors contributing most to career aspiration is yet to be carried out. Based on the correlation results it is indicative that the three factors seem to have potential as predictors of career aspiration among Malaysian R&D professionals.

REFERENCES


