Human Capital and Organizational Performance: Moderating Effects of Dynamism, Uncertainty and Munificence

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Abstract

Heterogeneous performance of the firms is explained by several different theories. Following the notion of resource-based view, this conceptual study attempts to bring in the human capital theory to explain firm performance. Empirical researches studying human capital management are numerous in western countries. However, not much can be said about the deployment of Malaysian human capital especially in R&D firms since very little empirical studies have been done to understand this sector. Therefore, in general this paper intends to argue the role of human capital in influencing performance. In specific, it attempts to examine the relationship between human capital and organizational performance and whether environmental dynamism, uncertainty and munificence have moderating effects on this relationship.

Keywords *Human capital, Environment, Organizational Performance, R&D organization*

INTRODUCTION

The transformation of a global economy from industrial based to knowledge based has witnessed a shift in the Malaysian economic orientation. The shift towards the new economy underscores the importance of knowledge, creativity and innovation to the country's long term economic prosperity. Accordingly, several plans have been introduced to stimulate the development of the K-economy in the country mainly the Eight Malaysian Plan (EMP), the Nine Malaysian Plan (NMP), the Knowledge Economy Based Malaysian Plan (KEBMP), and soon to be released the National Innovation Model. The government also has recognized R&D as the main engine for the new economy (NMP, 2006-2010). Despite aggressive efforts that have been taken to boost the R&D sector, the R&D outputs are still very low by world standards. For example, the country's gross expenditure on R&D (Gross Expenditure on R&D: GERD) and the number of patents granted internationally are still behind China, India and Newly Industrializing Countries (NICs) (USPTO, 2008; National Survey of Research & Development, 2006, 2004 & 2002) (see Table 1 and 2).

Table 1: ***Patents Granted to China, India, NICs and Malaysia in the USPTO (2003-2007)***

	2003	**2004**	**2005**	**2006**	**2007**
China	1105	1238	1161	1723	1991
India	356	376	403	506	578
Australia	1049	1093	1032	1538	1546
Japan	37248	37032	31834	39411	35942
Korea	4132	4671	4591	6509	7264
Singapore	460	485	377	469	451
Taiwan	6676	7207	5993	7920	7491
Malaysia	63	93	98	131	173

Source: USPTO (2008)

Table 2: ***R&D Expenditure as a Percentage of GDP***

	China	India	Australia	Japan	Korea	Singapore	Taiwan	Malaysia
2004	1.23	0.84	1.69	3.2	2.63	2.24	2.42	0.63
2002	1.09	0.78	1.53	3.07	2.53	2.15	2.30	0.69
2000	1.00	0.66	1.68	2.80	*na*	1.89	2.05	0.50

na – data not available
Source: National Survey of Research & Development (2006, 2004, 2002)

The national R&D outcome indirectly reflects how knowledge is generated or utilized and human capital is deployed at the organizational level. Proponents of the resource-based view of the firm suggested that varieties in performance across firms can be attributed to the variance of the firm's resources. This is because only resources that are valuable, rare and hard to imitate can provide the basis for firm's competitive advantage (Barney, 1991; Youndt & Snell, 1996). Based on this premise, human capital has been recognized as an important resource in most firms due to its knowledge, skills and abilities which can make it imperfectly inimitable and unique (Pfeffer, 1994; Jackson, Hitt, & Denisi, 2003). Currently, human capital has become even more important because of the increasingly uncertain and dynamic environment. In this regard, to be ahead of competitors, human capital should be able to effectively facilitate firms to incorporate rapid technological development and knowledge revolution (Nonaka, 1994; Ireland & Hitt, 1999).

Empirical studies on human capital management are numerous in western countries. However, not much can be said about the deployment of Malaysian human capital especially in R&D firms since very little empirical studies have been done to understand this sector. Given the critical importance of the R&D sector as well as the growing intense of the country's business environment, more rigorous investigations need to be conducted to understand the sector and ultimately improve the R&D outcome. Therefore, this study intends to enhance the understanding of the impact of human capital on the performance of R&D organizations and whether environmental dynamism, uncertainty and munificence have moderating effects on this relationship. Even though a direct relationship between human capital and performance is well established in the literature (Lee, Wong, & Chong, 2005; Hitt, Bierman, Shimuzu, & Kochbar, 2001; Pennings, Lee, & Witteloostuijn, 1998; Youndt & Snell, 1996; Wright & McMahon, 1992), the moderating role of the environment on the human capital and performance relationship is a relatively unexplored area. Based on the notion of resource based view, it is expected that by having unique and hard to imitate human capital, optimum support for firms to exploit external opportunities as well as neutralize potential threats can be provided in order to obtain outstanding performance.

CONCEPTUAL BACKGROUND AND PROPOSITIONS DEVELOPMENT

Human Capital and Organizational Performance

Underlying the R&D activity is the innovative capability. Subramanian and Youndt (2005) refer innovative capability as the ability of generating innovations through either refining or significantly transforming existing products, services or technologies. The authors also assert that an organization's capability to innovate has commonly equated with its ability to utilize knowledge resources. Knowledge can be classified as tacit or explicit (Polanyi, 1966). Tacit knowledge refers to knowledge grounded in know-how, experience and skills. It is hard to be articulated and thus tacit knowledge is accumulated through learning or doing. On the other hand, explicit knowledge refers to the knowledge that is more easily transmitted to others such as in written document, contracts and formal presentations. Eventually, due to its unique and inarticulate nature, tacit knowledge is believed to have a high probability of creating competitive value (Jackson, Hitt, & DeNisi, 2003).

Schultz (1961) referred the knowledge, skills and abilities which reside with and utilized by individuals as human capital. Stewart (1997) defined human capital as knowledge, experience and skills that can be put to create wealth. Similarly, Bohlander, Snell, and Sherman (2001) described human capital as "the knowledge, skills and capabilities of individuals that have economic value to organizations", pg13. More importantly as noted by Dess and Pickens (1999), human capital is embedded in individuals. Therefore, this

study referred human capital as individuals who posses critical intellectual materials such as knowledge, skills and abilities that can add economic value to organization.

According to human capital theory, individuals who posses more human capital are expected to be more productive (Becker, 1964). In line with the basis of this theory is the contribution of resource based view of the firm which suggests that human capital is a critical source of a firm's competitive advantage. This is because in the process of creating performance differentials, individuals with different types of knowledge, skills and abilities (valuable) will be organized according to the unique culture or context of a given organization. The collective of all human capitals of an organization forms a unique resource that differentiates it from other organizations and thus makes them rare and difficult to imitate (Barney & Wright, 1997; Lengnick-Hall & Lengnick-Hall, 2003). Having known that the majority of critical knowledge resides in human capital and human capital can create competitive advantage, it is now important to identify attributes that could trigger human capital to achieve utmost performance.

Education and work experience have been commonly used as proxies to capture the knowledge stock of human capital in organizations (Smith et al., 2005; Boudreau, 2002). Knowledge stock indicates the existing level of knowledge at point of time (Boudreau, 2002). It reflects a human capital's absorptive capacity, or the ability to identify, assimilate and utilize new knowledge. Based on absorptive capacity theory, the higher the level of absorptive capacity of individuals, the more likely they will have the ability to innovate (Cohen & Levinthal, 1990). Human capital requires both the existing knowledge resides in them as well as the additional knowledge from external sources in order to be not only innovative but also competitive.

Education has been identified as a key component that underlies the concept of human capital theory. This is because education provides individuals with required explicit knowledge to carry out their work (Becker, 1975). Lee, Wong, and Chong (2005) found that an individual's educational level has a positive impact on R&D performance. They further assert that education provides the basis for individuals to enrich their existing knowledge base and it is exceptionally important for individuals who are involved in a complex and non-routine knowledge work such as scientists and engineers. Similarly, Smith et al.'s (2005) findings showed a positive relationship between knowledge workers' educational level and the firm's knowledge creating capability. According to them, education helps individuals to understand better what they know and utilize their understanding to enhance decision making skills. This is consistent with earlier research which posited that employees with higher level of education are more open to new ideas and change and thus increase the capability of firms to be innovative (Romijin & Albajajeyo, 2002; Boeker, 1997; Pelz & Andrews, 1962). Therefore, it is predicted in this study that human capital with higher educational level will have more stock of knowledge that will augment its innovation capabilities.

Work experience is another important component of human capital. Work experience refers to "events that are experienced by an individual that relate to the performance of some job" (Quinones, Ford, & Teachout, 1995, pg890). Several studies have indicated a positive support between work experience and performance. For example, Rothwell (1992) found that prior R&D experience helps to enhance individuals' innovative performance as the experience gained over the years build up their expertise in a particular research area and finally, contributes to their ability to innovate. Similar result was also highlighted by Lord and Maher (1990), who found that experts with larger knowledge bases which are developed through their experience in specific job areas have a better understanding to apply their knowledge than novices. Quinones, Ford, & Teachout's (1995) findings also indicated a positive relationship between work experience and job performance. In addition, their meta-analysis findings also revealed that amount of experience as well as task-level experience have stronger relationships with performance than experience based on tenure, type of job or experience at the organizational-level. Thus, it is expected that human capital with higher level of work experience will have more stock of knowledge and this will increase its abilities to innovate.

Based on the previous discussion, it is predicted that organization will gain advantage when human capital with the required knowledge stock grows as it will provide a stronger basis for organization to develop competitive advantage. However, Mayo (2001) argues that employees do not "belong" to any organization. They can leave the organization whenever they want without even diminishing their human capital value. Without human capital, organization will certainly not be able to create innovation, develop strategic

relationships and ultimately gain competitive advantage. Thus, it is important for organizations to manage their human capital effectively, in particular, for organizations that depend on highly specialized or technical human resource to compete. As noted by Parikh (2001), developing human capital of individuals involved in R&D activities is critically demanded due to continuous technological advancements in the present environment.

Therefore, it is expected that human capital with the required knowledge stock will have more ability to innovate and enhance the performance of the organization.

P1: Human capital will have a positive impact on organizational performance

Moderating effect of environmental factors on the relationship between Human Capital Effectiveness and Organizational Performance

Many studies have found a positive association between HC and firm performance (Bontis, Keow, & Richardson, 2000; Hitt et al., 2001; Lee, Wong, & Choong, 2005; Li & Wu, 2004; Hitt et al., 2001), yet the effect of HC on performance is dependent on its environmental condition. Based on the basic principle of contingency theory, given the same level of human capital, firms will experience different performance achievement when they operate in different environments. This is also in line with the view of Venkatraman (1989) as he noted that strategy can be effectively implemented depends on the context of the environment. This shows that being able to respond effectively to environmental forces is critically important for firms to succeed especially in dynamic business conditions.

In the literature, organizational environment has been studied as a multidimensional concept (Aldrich, 1979; Brown, Schmied, & Tarondeau, 2002 Dess & Beard, 1984; Keats & Hitts, 1988; Li, Nicholls, & Roslow, 1998; Miliken, 1987). In particular, the environmental dimensions identified include munificence, dynamism, uncertainty and intense competition. Proponents of resource based view suggest that people can be a source of competitive advantage when they are valuable, rare, difficult to substitute and difficult to imitate (Barney, 1991). In addition, human capital theory posits that individuals who possess more human capital in terms of having necessary education and work experience are expected to be more productive and have higher ability to accomplish tasks (Becker, 1964). Therefore, it is expected in this study that valuable and non-substitutable human capital will be able to neutralize threats and exploit opportunities imposed by various environmental conditions in order to achieve utmost performance.

According to Starbuck (1976), environmental munificence reflects the extent to which the environment is supportive of sustained growth. In a simpler description, environmental munificence refers to the availability of resources in an industry (Dess & Beard, 1984). It is generally expected that supportive environment will facilitate firms to prosper effectively (Starbuck, 1976). In a munificent environment, it is expected that firms will highly invest in human capital acquisition and development in order to increase the human capital's capability and effectiveness in enhancing innovation, exploiting opportunities and creating competitive advantage. Although the supportive environment may provide more opportunities for larger firms to exploit resources better than start-up firms (Juma & McGee, 2006), the latter are expected to double their efforts in enhancing their human capital effectiveness in order to be ahead of competitors. Hence, to be competitive in a munificent environment, firms of all sizes and ages are expected to strengthen their human capital capability to take advantage of available resources in the environment. Ultimately, human capital with the required knowledge stock will be more strongly associated with high organizational performance when environmental munificence is high than when it is low. Hence, the following proposition is offered:

P2: The more munificent the environment, the more positive the association between human capital effectiveness and organizational performance.

Dess and Beard (1984) defined environmental dynamism as environmental instability. Examples of characteristics of such environment are rapid changes in market trends, technology, industry innovation and R&D (Miller, 1987). The environmental surroundings in which firms in the R&D industry operate are often found to be tacit and dynamic. According to Brown, Schimed, and Tarondeau (2002), technological

changes may accelerate the absolution of R&D efforts; however at same time, they may also contribute to the success of R&D projects as certain needed technologies become available in time. To be competitive, high-tech firms are expected to engage in collaborative relationships with outside firms to get access to expertise, technology and financial resources. In this regard, HC (with high level of knowledge stock) is required not only to take advantage of this collaboration but also to protect itself from being taken advantage of opportunistic partners. The importance of human capital in determining organizational performance especially in the dynamic environment is supported in Wan Fadzilah et al.'s (2003) study. Particularly, the result of the study indicated that the moderating effect of dynamism in the environment is positively significant in the relationship between IC (human capital, structural capital and social capital) and performance. In this regard, it is expected that human capital with the required knowledge stock will be more strongly associated with high organizational performance when environmental dynamism is high than when it is low. Hence, the following proposition is offered:

P3: The more dynamic the environment, the more positive the association between human capital effectiveness and organizational performance.

Environmental uncertainty refers to a person' perceived inability to completely understand, to make sense out of, and to respond to conditions in the external environment (Miliken, 1987). The state of uncertainty occurs in the environment of R&D active firms is basically due to rapid technological breakthrough and market structure. This uncertain perception tends to generate a lack of confidence in managers and will likely to cause imperfect decision making (Bstieker, 2005). To avoid such mistake from happening, firms will probably have to pay high attention to knowledge acquisition and knowledge sharing activities. Firms are more likely to invest in building various forms of information systems such as internet to expose employees to on-line organizational information, and computer mediated communication to enhance ideas construction through virtual forum (Alavi & Leidner, 2001). In addition, firms will seek to form collaborative relationships with other partners who can facilitate with the needed knowledge. In a high uncertain environment, it is expected that firms will concentrate more on facilitating accurate and comprehensive information in order to increase human capital knowledge base. Therefore, it is expected that human capital with the required knowledge stock will be more strongly associated with high organizational performance when environmental uncertainty is high than when it is low. Hence, the following proposition is offered:

P4: The more uncertain the environment, the more positive the association between human capital and organizational performance.

CONCLUSIONS

This paper attempts to propose the role of human capital in influencing performance of organizations competing in R&D sector. It is well established in the literature that human capital has a significant positive influence on performance. Similarly, this paper intends to argue the potentially positive impact of human capital on firm performance yet within the context where very little of such study has been done, that is, the R&D sector in Malaysia. Given the increasing intensity of competition and technological changes in the current environment, the paper has also suggested the influence of environmental factors on this relationship, another relatively unexplored area.

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