Strategic Management of Human Capital in R&D Organizations in Malaysia

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ABSTRACT

While numerous empirical studies have been conducted in Western countries on human capital management, little empirical research has been done in Malaysia especially within the context of R&D organizations. Poor R&D outcome in the country demands rigorous investigation at the organizational level. The proposed study represents a contribution to a gap in the existing body of strategic management of R&D organisations. Basing on the contingency view, this study attempts to improve performance by addressing the problem of strategy misalignment. A Human Capital Management Strategy Choice is proposed as a basis to manage different human capitals in R&D organizations.

Keywords

Strategic Management, Strategy Fit, Human Resource Management, Knowledge Management, Make and Buy, R&D organization

1.0 INTRODUCTION

The EMP focused on managerial productivity (TFT) as the main impetus for continued economic growth. The KEBMP and NMP are set to stimulate the development of the K-economy. The soon to be release National Innovation Model will sharpen the focus on innovation within the k-economy. Underlying this new economy is the innovation or knowledge generation capacity of the country. The R&D outputs are dismal by world standards. For example, in 2004, Malaysia had a GERD of RM2.84billion, which is up from RM2.50billion in 2002. The figure is expected to increase to RM4.30 billion in 2005 (NMP 2006-2010).

Despite the critical importance of the R&D sector to the new economy, not much is known about this sector. There is a small but vibrant R&D industry upon whose shoulders much of the future fortunes of the country rests. Although the contribution of this industry is measured and discussed, the organisation, management and human capital deployment are still shrouded in mystery. The productivity of this sector, like others, will depend on the choice of business strategies and the alignment of the functional strategies to provide optimum support.

The studies investigating factors that influence the performance of organization have been widely done from two main views such as resource-based view (Li and Wu, 2004; Zahra and George, 2000) and contingency-based view (Prescott, 1986; Shih and Chiang, 2005; Sun and Hong, 2002). Most scholars in the field of strategic management believe that organizations perform differently depends on how they formulate and implement their strategies. This can be observed in many studies on organizational performance which have found that proper alignment between business strategy and other contingent factors will enhance the performance of the organization (Shih and Chiang, 2005; Hansen et al., 1999; Prescott, 1986). Lack of experience in R&D organization and lack of strategies tied with proven analytical techniques are among the main factors identified to limit the R&D capability in Malaysia (National Survey of Research and Development, 2006). Given no substantial empirical research has been conducted to explore the problem of strategy management in R&D organizations in the country, it can be inferred here the inability to strategize the R&D organization effectively leads to low organizational performance. Following the notion of the contingency view which has its basis on contingency theory (Hambrick, 1984; Pennings, 1987), it is highly expected that there is a misalignment between strategies in R&D organizations in Malaysia. Therefore, this study intends to examine the fit between the business strategy and other functional strategies in R&D organization; and the impact of the strategic fit on human capital effectiveness and organizational performance.

2.0 LITERATURE REVIEW AND PROPOSITIONS DEVELOPMENT

2.1 Strategic Management

Strategic management is important to R&D organizations especially to create innovative communities and allocates resources strategically (Judge et al., 1997; Harrison et al., 1993). Furthermore, according to Del Canto and Gonzalez

(1999), differences in R&D performance is determined by the effective management of the available resources in the organization. A strategy (to an organization) is a plan of how the organization can accomplish its goal and objectives (Mintzberg, 1996). Andrews (1971) described strategy as a rational decision making process considered from the alignment of organizational resources with environmental opportunities. Strategy can be formulated on three different levels : corporate-level strategy, business-level strategy and functional-level strategy.

2.2 Business -Level Strategy

There are several business typologies available for studying various aspects of organizational behavior in order to create competitive advantage (Chandler, 1962; Miles and Snow, 1978 and Porter, 1980). However, many strategic group researchers utilize typologies proposed by Miles and Snow (1978) and Porter (1980). Basically, Miles and Snow's work focuses on strategic pattern while Porter's work emphasizes on strategic positioning.

Make or buy is another important business -level strategy employed by most R&D organizations in order to compete (Veugelers and Cassiman, 2005; Kurokawa, 1997; Higgins, 1995 and Arora and Gambardella, 1994). Make strategy refers to organization which develops its own in-house R&D to compete while buy strategy refers to organization competes through engaging in external relationships for R&D development such as collaboration, licensing or acquisition. Among the common reasons why firms employ making strategy include based on a cost study it is cheaper to make than buy; making fits the firm's know how, equipment and tradition; the production operation is complex therefore requires close supervision; and the design of the part or its processing is confidential. On the other hand, the reasons for firms in favor of adopting buying strategy are because they do not have available space, equipment, time or skills to develop the production operation; they want to concentrate on their core specialties, and they seek platforms for commercialization purposes (Higgins, 1955; Farris and Cordero, 2002).
Some authors argued that firms' survival especially in high-technology industries relies very much on their ability to innovate or imitate new products. Thus, if they are unable to do so, they should leave the competition (Dasgupta and Stiglitz, 1981; and Reinganum, 1985). However, there are several studies that have shown leaving the competition due to inability to innovate on their own is not the final resorts as firm can acquire technology or expertise from external sources (Arora and Gambardela, 1990; and Veugelers and Cassiman, 2005). Firms in high-technology industry may have different strategies however, to some extent; they focus on internal R&D or external acquisition for growth and survival (Blonigen and Taylor, 2000).

2.3 Functional-level Strategy

Given that innovation is a product of human resource (also known as human capital), strategy related to manage human resource and knowledge is also important to look at (Jordan, 1992). This is because in order to leverage human capital as sustainable competitive advantage relies heavily on the firm's ability to exploit existing knowledge and to generate new knowledge (Levinthal and March, 1993; Mom, Van Den Bosch and Volberda, 2006).

2.3.1 HCM Strategy: An Integration of KM and HRM practices

According to Stewart (1997), human capitals are holders of tacit knowledge. Organizations will gain advantage when human capital grows as it may provide stronger basis for organization to develop competitive advantage. Without human capital, organization will certainly not be able to create innovation, develop strategic relationships and ultimately, gain competitive advantage (Mayo, 2001). Thus, it is important for organization to manage its human capital effectively in particular for organization that depends on highly specialized or technical human resource to compete.

Human resource management refers to the process of managing human resources through several main activities such as human resource planning, staffing, training and development, compensation, performance evaluation and employee separation (Bohlander, Snell and Sherman, 2001). Meanwhile, human resource management strategy is referred as "a firm deliberate use of human resources to help in gain or maintain an edge against its competitors in the market place" (Gomez Mejia, Balkin and Cardy, 2004). To be effective, the human resource practices need to align with what an organization attempts to achieve. Schuler (1987) proposed a "human resource practice menus" from which human resource practices can be chosen to link with competitive strategies.

Yahya and Goh (2002) defined KM as a process of leveraging knowledge as the means of achieving innovation in process and products/services, effective decision-making, and organization adaptation to the market. For Bassie (1997), KM is the process of creating, capturing and using knowledge to enhance organizational performance. KM strategy is a comprehensive approach an organization takes to align its knowledge resources and capabilities to support the direction of the organization in order to create its

competitive advantage (Zack, 1999). Hansen et al. (1999) argued that there are basically two strategies for managing knowledge: codification and personalization. Codification refers to the process of storing explicit knowledge in databases so that it can be reused by other people. On the other hand, personalization is the process of leveraging tacit knowledge through direct personal contacts.

There are several studies that have integrated HRM and KM approach especially in the perspective of managing HC. The link can be discussed based on four main functions: acquisition, motivation, assessment and development.

Acquisition, also commonly known as staffing, refers to the process of seeking, attracting and selecting qualified candidates for job vacancy (Bohlander, Snell and Sherman, 2001). Denisi, Hitt and Jackson (2003) noted that needed knowledge can be acquired by acquiring new employees or by facilitating existing employees to acquire new desired knowledge through training and development programs. Lasky (2003) posited that in order for organization to be able to tap knowledge from employees and create competitiveness out of it, the recruitment activity should focus on acquiring not only candidates with the right knowledge but also those who have spirit of sharing knowledge.

Performance appraisals are concerned with determining how well employees are doing their job and preparing for future performance improvement ((Bohlander, Snell and Sherman, 2001). Knowledge possessed by employees need to be regularly evaluated to ensure its relevance to organization. Measuring tacit knowledge and its use is quite difficult to execute. This is due to its nature, tacit knowledge is hidden and its use can only be inferred through observation of behavior. Consequently, it is important to recognize some observable criterions by which to evaluate an employee's contribution to knowledge creation, sharing and application (Lasky, 2003).

The reward systems play important role to attract and retain individuals with the right knowledge, motivate them to develop and use knowledge in ways that create competitive advantage (Jackson, Hitt and Denisi; 2003). Zárraga and Bonache (2003) proposed that organization should reward both employees who produce and share knowledge. This practice however, is lacking in the traditional reward systems whereby only those who produce knowledge are being rewarded. Through reward systems organization may be able to show the value appreciated and ultimately helps in shaping employees' behaviors in accordance with what organizations desire (Oltra, 2005).

Development is a process of enhancing employees' knowledge and skills for current and future needs (Gomez-Mejia, Balkin and Cardy (2004). Robertson and Hammesley (2000) pointed out that continuous professional development is considered to be essential to professional and knowledge workers in order to update them with the developments within their specific disciplines. Hansen *et al*. (1999) proposed that codification and personalization strategies require that organizations hire different kinds of people and train them differently. Codification approach is suitable for acquiring and developing employees to be implementers while personalization approach is appropriate for developing creative and innovative employees.

2.4 Types of R&D Professionals (Human Capital) in R&D Organizations

Organizations in the early days depend on in-house R&D activity because they do not want to lose innovative ideas to their competitors (Higgins, 1955). Kurokawa (1997) refererred this approach as "making strategy". Accordingly, R&D professionals are likely to depend highly on specialized technical knowledge in order to come up with innovative ideas for the development of new products. Knowledge on soft skills including interpersonal skills, communication skills and persuasion skills are important for developing effective group works (Rosenbaum, 1990). Networking for them, is more likely within organization as to gain cooperation and information from other units. Knowledge of technology or computer system is also critical for implementing research tasks such as data analysis, testing, and saving. Other important qualities of these R&D professionals include learning willingness, creativity, flexibility and determination (Araujo and Lezana, 2000). The present study will consider this type of R&D professional as pure researcher.

However recently, changes in both technology and customers' needs have become increasingly rapid and resulted in high cost of operation. This demands many present R&D organizations to search for new ways of tapping external resources such as engaging in alliance, outsourcing and partnership activities (Hitt, Hoskisson, Ireland and Harisson, 1991; Farris and Cordero, 2002) or also known as "buying strategy" (Kurokawa, 1997). Consequently, R&D professional under this situation is expected to rely significantly on knowledge of interpersonal skills, communication skills and negotiation skills rather than only on specialized technical (discipline) skills. Nonetheless, general knowledge on technical and other functional fields are still required for the negotiation process with their partners. Networking for this R&D professional is more likely to cover inter-organizational relationships and to

obtain important inputs such as information on technology, market situation, customers and competitors. Knowledge on how to use computer mediated communication system is important to ensure effective communication with business partners. This type of R&D professional will be considered as entrepreneur researcher in the present study.

Based on the above discussion, it shows that researchers are not only expected to have technical skills but also to have certain knowledge and skills that can assist organization acquiring resources from the environment as well as protecting from being taken advantage by their opportunistic partners. However, in the past, these important skills and knowledge have been mostly studied irrespective of the organization's strategic orientation. Consequently, the present study attempts to fill in the gap by integrating the way of managing different R&D professionals with the strategy employed by the organization.

Schuler (1986) argued that not all characteristics are equally relevant in executing all strategies. Therefore, this study focuses only on the management of two types or R&D professionals: pure researcher and entrepreneur researcher. The choices from which strategy to manage the two different types of researchers (human capital) can be articulated are proposed using Schuler's (1987) human resource practice menus. It is called as Human Capital Management Strategy Choices (Please refer figure 1).

Table 1: Human Capital Management Strategy Choices

Pure Researcher	*Entrepreneur Researcher*
Acquisition of Human Capital	
Specialized Knowledge Requirement • In-depth scientific task (vertical specialist) • Technology for research purposes only Limited Socialization • Within organization	General Knowledge Requirement • Eclectic tasks (horizontal specialist) • Technology for communication and networking purposes Extensive Socialization • Beyond organizational boundary
Assessment of Human Capital	
Behavioral Centered • Attitudes • Motivation	Result Centered • Number of contracts obtained Number of product commercialized
Individual Assessment • Top down approach (Superior)	Group Assessment • 360º Approach (Superior, customer, partner)
Motivation of Human Capital	
Intrinsic Incentive • Work Autonomy • Work Flexibility • Recognition (Promotion)	Extrinsic Incentive • Commission (from contract obtained) • Sales Incentive • Bonus
Long Term • Royalty (from patent) • Profit Sharing	Short Term • Commission (from contract obtained) • Sales Incentives
Development of Human Capital	
Narrow Application • Specialized-disciplinary path	Broad Application • Multi-disciplinary paths
Non-Managerial Training • Innovation and creativity Emphasis	Managerial/Business Training • Executives/Business/ Entrepreneurship Competency Emphasis

2.5 The strategic fit between Business strategy and HCM strategy

The concept of fit has always been applied in exploring how a company should align its strategy with organization structure, technology, practices and various environmental factors (Miller, 1986). Proper alignment between strategy and related contingent factors can help to enhance company's performance. If various related contingent factors are not aligned with strategy, the company cannot effectively organize available resources toward the planned direction, and its performance will suffer (Hambrick, 1984). There are several studies that have reported higher performance outcomes when organizations link their functional strategy such as HR or KM, to business strategy (Karami, Analoui, and Cusworth, 2004; Shih and Chiang; 2005)

In order to achieve organizational objectives and work within the organizational capacity, both types of researcher are required to have certain important attributes that will create the persons to be excellent researchers. In addition, the management through its practices should support the acquisition, development and retention of these researchers.

Acquisition

As have been mentioned in the early discussion, researcher in the making organization is expected to have technical knowledge on specialized research area, knowledge on how to work in cross-functional teams, knowledge on how to build intra-organizational relationships and knowledge on how to use technology to conduct research. Contrarily the entrepreneur researcher in the buying organization is more likely to need a broader type of knowledge such as knowledge related to scanning, monitoring and attracting potential opportunities to encourage competitive alliances or collaboration, knowledge on how to work in cross cultural teams and knowledge on how to build networking. In addition to that, the entrepreneur researcher is also expected to have basic knowledge on all research areas in the organization for the promotion purposes to the potential

strategic alliances. With respect to career path researcher in making organization is more likely to have a career opportunity that is limited to pursuing pure research career path. While researcher in buying organization is assumed to have broader opportunity which he/she has the options of pursuing either in entrepreneurial or pure research career path. This is in line with Teen's (2001) work which suggesting that pure researcher is a vertical specialist oriented while entrepreneur scientist is more towards a horizontal specialist oriented.

Motivation

Scientists (pure) and engineers are motivated when they are given the opportunity to pursue their research interests (James, 2002) particularly high quality and curiosity driven research (Snape and Snape (2006), and when the jobs provide new challenges and demand new skills (McKinnon, 1987). Consequently, in order to motivate pure researcher, making type of organization is expected to emphasize more on offering intrinsic such as providing autonomy and flexibility in their works. Also, it is expected that making type of organization will be offering long term incentives such as recognition and royalty from patent obtained in order to tie up researcher for longer period. Other rewards which are more likely to be offered include recognition and royalty from patent. Most of the time, organization adopts make strategy or invests in R&D when its product life cycle is long or technology change is slow (Zahra, 1996). Consequently, this kind of organizations does not have to consider replacing employees, due to obsolete knowledge, as frequent as possible. On the other hand, buying organization is expected to provide short term and extrinsic incentives such as high commission from sales and attractive compensation packages to those who succeed to bring in profitable research projects or manage to attract potential partners to collaborate in research development and/or commercialization purposes. One of the reasons why organization adopts buy strategy is to catch up with the rapid changes in customer needs (Zahra, 1996). Rapid changes in customer needs require quick response from organization to commercialize new products. Accordingly, organization cannot afford to always find new entrepreneur researcher should he/she leaves as it may delay in bringing new product into the market.

Assessment

In the function of performance assessment, making organization is predicted to employ behavioral based criteria to assess its researcher's performance. This criterion is essential to develop the appropriate behavior of researcher as valued by the organization in order to ensure effective research process and finally, manage to produce excellent research output. The criterions include researcher's ability to work in team or independently and his/her attitudes towards knowledge creation as well as knowledge sharing. Bohlander, Snell and Sherman (2001) noted that employers could be facilitated with specific behavioral information of employees and this information could be used to give feedback and develop them. In contrast buying organization is likely to emphasize on result based criteria for evaluating its researcher's performance. Examples of result based criteria include the number of research projects the researcher manage to obtain from external and the ability to engage in strategic alliance with other company for research development or commercialization purposes. Since working environment of entrepreneur researcher is more dynamic than pure researcher, the criterions used to assess entrepreneur researcher is assumed to be short term (Schuler, 1986).

Training and development

In the function of training and development, this study assumed that making organization is expected to offer specialized disciplinary path for their researchers. The training activities/programs the organization will probably have is very specialized depending on the type of research their researchers currently involve or develop. The training contents are expected to focus more on building innovation and creativity competency. However, the above practice is in contrast with the buying type of organization where the training and development activities are for a broader application not only for basic research requirement but also for entrepreneurial type of responsibility (Schuler, 1986). The content emphasis of the development programs is more likely on business knowledge particularly to enhance executives, business and entrepreneurship competency.

Based on the previous discussions, the following main propositions are postulated:

P1a: If a company adopts *making* strategy, its HCM strategy will tend to be closer to the acquisition, assessment, motivation and development of pure researcher

P1b: If a company adopts *buying* strategy, its HCM strategy will tend to be closer to the acquisition, assessment, motivation and development of entrepreneur researcher

2.6 The effect of strategic fit on human capital effectiveness and organizational performance

A fit between strategies is also expected to increase researcher's effectiveness especially in terms of productivity. Productivity measures how well an employee performs (Helms, 1996). Various HRM practices can be utilized to

facilitate in developing employees' attitude and belief towards knowledge creation and sharing activities in the organization (Soliman and Spooner, 2000). These positive attitudes will create supportive working environment for knowledge development among employees and thus, help them to improve their performance. Huselid (1995) found that human resource practices have significant impact on employee productivity. Similar result is also found in Ichniowski, Shaw and Prennushi's (1997) study. As human capital performance is improved, it is highly expected that the organizational performance will be enhanced as well. This is due to several findings which have shown that human capitals have a significant direct positive effect on firm's performance (Lee et al., 2005; Li and Wu, 2004; and Hitt et al., 2001). Therefore, the following propositions are submitted:

P2: Fit between business strategy and HCM strategy is positively related to better HC effectiveness

P3: HC effectiveness has a positive impact on firm performance

3.0 CONCLUSION

Based on previous discussion, two types of human capital have been identified: pure researcher and entrepreneur researcher. To manage the different types of human capital effectively, the study has identified different characteristics based on knowledge and skills of the two researchers, and proposed a human capital practices model from which strategy to manage the two human capitals can be developed. Few propositions are also presented in this paper to examine the strategic fit in R&D organizations.

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