KM Initiatives, Innovation & GLC Performance

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ABSTRACT

A model of knowledge management initiatives, innovation and performance is developed and tested for the listed Malaysian Government-Linked companies (GLC). Data collected from 273 employees representing the three different levels of management is subjected to structural equation modelling analysis. The proposed model fits the data well. Results indicate that employees perceived knowledge management initiatives as important antecedents of innovation in the GLC and innovation in turns result in better organizational performance.

Keywords

Knowledge Management Initiatives, Innovation, Performance, GLC

1.0 INTRODUCTION

Knowledge management can be defined in other words as the achievement of the organization's goals by making the factor knowledge productive. We facilitate and motivate people to tap into and develop their capacities (their core competencies) and stimulate their attitude towards innovation. With effective knowledge management the entire systems with which the information within and outside an organization can be managed and opened up (Beijerse, 2000).

With the rising importance of knowledge in our global economy, knowledge management has gained worldwide attention. Individuals including Sveiby (1997), Stewart (1997), Davenport and Prusak (1998), Allee (1997) and Nonaka (1991) have taken on the challenge to discover the opportunities, practices and benefits of knowledge management. Companies such as Buckman Laboratories, Dow Chemical, Skandia, Hewlett-Packard, Celemi, and IBM to name a few, have leap-frogged on the knowledge management initiative in order to effectively manage and utilize the knowledge and expertise in their organizations.

Organizational knowledge has an increasing impact on the firms' survival and success in the globalize environment. This situation has increased their interest in intellectual capital. However, the mere measurement does not tell how knowledge really ``works'' in a company, and how the value of intellectual capital could be increased. Therefore, a more profound understanding of the underlying knowledge management initiatives is needed. Conventionally, the companies and other organizations are regarded as ``open'' input-output process systems. Applied to knowledge, this would mean that a firm takes in information and processes it into knowledge. However, this model is far too simplistic to describe knowledge initiatives. Instead the firms can benefit from recent research in the field of biological phenomenology and neurophysiology, and especially from the development of autopoiesis theory, the theory of ``selfproduction'' (Maturana & Varela, 1980, 1987; von Krogh & Roos, 1995; Mingers, 1995).

Autopoiesis theory explains the nature of living (as opposed to non-living) entities. It claims that living systems undergo a continual process of internal self-production whereas non-living systems (allopoietic) produce something other than their own self-components (Mingers, 1995). Because autopoiesis theory is a general systems theory, it can be applied on other than biological phenomena as well, provided that certain conditions are met. Therefore, also the companies can be regarded as living systems that reproduce themselves and their own strategic components and boundary elements and in a continuous manner (Maula, 2000).

The three knowledge management initiatives are: creation, dissemination and application. Once organizational objectives are set (the usual case is setting the performance indicators to include both financial and non-financial) and existing knowledge is assessed, a relevant knowledge strategy (such as innovation) can be crafted which will give a helpful start to all the knowledge workers. Knowledge management can be applied to individuals, groups, or organizational structures. It has a strategic and normative aspects as well as the operational use (Darroch, 2005).

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Identifying external knowledge means analysing and describing the company's knowledge environment. A surprisingly large number of companies now find it difficult to maintain a general picture of internal and

external data, information and skills. This lack of transparency leads to inefficiency, uninformed decisions and duplication. Effective knowledge management must therefore ensure sufficient internal and external transparency, and help individual employees to locate what they need. Companies import a substantial part of their knowledge from outside sources. Relationships with customers, suppliers, competitors and partners in co-operative ventures have considerable potential to provide knowledge – a potential that seldom fully utilized (Beijerse, 2000; Mavondo, 1999; Nonaka, 1991).

Firms can also buy knowledge which they could not develop for themselves by recruiting experts or acquiring other particularly innovative companies. Systematic knowledge management must take these possibilities into account. Knowledge development is a building block that complements knowledge acquisition. Its focus is on generating new skills, new products, better ideas and more efficient processes. Knowledge development includes all management efforts consciously aimed at producing capabilities which are not yet present within the organization, or which do not yet exist either inside or outside it (Hall, 1993; Maula, 2000; Maturana & Varela, 1980).

Traditionally, knowledge development is anchored in the company's market research and in its research and development department; however, important knowledge can also spring from any other part of the organization. In this building block, we examine the company's general ways of dealing with new ideas and utilizing the creativity of its employees. When considered from the point of view of knowledge management, even activities that were previously regarded simply as production processes can be analysed and optimised so as to yield knowledge. While knowledge management offers cost savings, the real value is in more forward-looking knowledge workers that drive technological innovation process to make innovation possible, bringing together the technical and commercial worlds in profitable ways (Rosenberg, 1994; Stewart, 1997).

2.0 THEORETICAL UNDERPINNINGS

Penrose (1959) says, the knowledge of an employee is based upon his or her skills and experiences and ability to absorb new knowledge. Therefore, while knowledge is a resource in its own right, the manner in which we manage knowledge will influence the quality of services that can be leveraged from each resource own by the firm. Nelson and Winter (1982) add that knowledge management can be viewed as a coordinating mechanism to be transform resources into capabilities. Knowledge management is one of many components of good management. Sound planning, savvy marketing, high-quality products and services, attention to customers, efficient structuring of work and thoughtful management of an organization's resources are all critical to compete in today's marketplace. Knowledge management may help create the competitive edge in today's global environment. Possible consequences of effective knowledge management include: competitive advantage (Connor & Prahalad, 1996; Hall, 1993) and innovation (Antonelli, 1999; Carneiro, 2000; Dove, 1999; Nonaka & Takeuchi, 1995).

Sveiby asserts that business managers need to realize that unlike information, knowledge is embedded in people, and knowledge creation occurs in the process of social interaction (Sveiby, 1997). A lot of intellectual capital resides in the minds of knowledge workers. Companies such as Accenture, Ford, and Monsanto encourage employees to put "tacit" knowledge, the know-how in their heads, into "explicit" form, such as written reports or video presentations. This captured knowledge is then stored in repositories such as databases and intranet Web servers, all of which users can search.

An organization's competitive potential rests almost wholly on how well it manages and deploys its corporate assets. These assets are comprised of financial, and tangible and intangible elements. For simplicity, consider financial assets such as cash, and tangible assets including plant, equipment, and inventory; intangible assets including core competencies and technologies, management skills, culture, brand image, consumer loyalty, patents, distribution channels, and the like. In addition to being aware of the knowledge process and the infrastructures within which it takes place, a knowledge mapping project should have a conceptual focus (Soliman, 1998).

Ideally the focus will be the fundamental business issues of the organization such as reducing errors or rework, or minimizing cycle time in some manufacturing organizations. Then the mapping project will provide useful results that improve the organizational efficiencies. Zack (1999) has advocated using the well known SWOT technique (strengths, weaknesses, opportunities and threats) as a tool to develop a knowledge mapping strategy specifically tailored to an organization's needs. Zack advises that knowledge-based SWOT analysis could lead to mapping knowledge resources and capabilities against strategies.

Empirical study by Darroch (2005) reveals that each component of knowledge management initiatives will positively affect innovation. For innovation to take effect, knowledge workers must first have the knowledge about the key internal and external environments of that strategically affecting the firm – the more knowledge, and the greater the variety of knowledge, the better. Second, knowledge must flow freely around the firm – the better the dissemination of knowledge the greater the possibility of innovation as more people within levels and departments of the organization are exposed to new knowledge that interacts with knowledge already held. Lastly, the more response and agile an organization

towards applying new knowledge the more likely will it be innovative. Thus, the relevant hypotheses are:

H_1: GLC with knowledge management initiatives tends to be more innovative.

H_{1a}: Knowledge creation will lead to innovation.

H_{1b}: Knowledge dissemination will lead to innovation.

H_{1c}: Knowledge application will lead to innovation.

Organizational knowledge is known to be important intangible resources of an organization to enable sustainable competitive advantage (Hitt, Ireland & Hoskisson, 1999). By managing knowledge firms will be able to accurately predict the nature and commercial potential of changes in the environment and the appropriateness of strategic and tactical actions (Cohen & Levinthal, 1990). Without knowledge management, organizations are less capable of discovering and exploiting new opportunities whilst evading new threats. For example, knowledge about markets and technology has strong potential for the firms to improve their performance because this will increase their abilities to discover and exploit market opportunities.

This can be done through: (1) awareness of customer problems may have great generality and thus constitute real market opportunities; (2) it is easier to determine the market value of new scientific discoveries, technological changes etc.; (3) the locus of innovation often lies with users of new technologies who cannot easily articulate their needs for the not-yet-developed solutions to problems, and therefore organization must share some of the tacit knowledge as it's users (Cohen & Levinthal, 1990; Shane, 2000; von Hippel, 1994).

Meanwhile, technological knowledge can also enhance a firm's ability to effectively exploit an opportunity by, for example, determining the product's optimal design to optimize functionality, cost, and reliability and ultimately the economic impact of exploiting the opportunity (Rosenberg, 1994). Therefore, technological knowledge enables firm to rapidly exploit opportunities or to be able to respond quickly when competitors make advancements (Cohen & Levinthal, 1990). Capon, Farley, Lehmann and Hubert (1992) profiled innovative firms in the USA and conclude that by acquiring other firms as a means of accessing new knowledge, did not significantly affect the ability of a firm to innovate. Instead by hiring scientists, spending money on applied R&D to develop new products and encouraging scientific discussion enhances the ability of a firm to innovate.

Griffin and Hauser (1996) examined the integration between R&D and marketing, citing such integration as an important antecedent of new product success. In fact a positive relationship between innovation and performance is fairly well established in the extant literature (Avlonitis & Gounaris, 1999; Atuahene-Gima, 1996; Capon et al., 1992; Deshpande et al., 1998; Manu & Siram, 1996; Mavondo, 1999; Vazquez et al., 2001). On this basis the following hypotheses are presented:

H_2: Innovative GLC will perform better.

H_3: There is a positive correlation between "knowledge management initiatives" and "performance" when intervened by "innovation".

3.0 METHODOLOGY

Since this study was a correlation study, it was conducted in the natural environment of the organizations, in which the researchers' interference was very minimal with the normal work flow of work in these organizations. The respondents selected were employees of the listed Malaysian Government-Linked Companies (GLC). We used a cluster sampling design with three different clusters: top management, middle management and lower management. Each of the GLC was given 30 sets of questionnaires in which response was invited from the three clusters on a proportionate sampling basis. The actual response was 273 out of 690 samples (the respond rate of 39.5%). To establish content validity, questionnaire was refined through rigorous pre-testing. The focus was on instrument clarity, question wording and validity. During the pre-testing members of the colloquium were invited to comment on the questions and wordings. Their feedbacks together with the opinions from field experts were taken into consideration in revising the construct measures. As can be seen from Table 1, the instruments used in this study were noted to have acceptable reliability where all items recorded an Alpha value exceeding 0.7 (Nunnaly, 1978).

Table 1: Results of the reliability analysis

Construct	Variable	Items	Alpha
K-Creation	CRE	6	0.721
K-Dissemination	DIS	5	0.720
K-Application	APP	5	0.764
Innovation	INN	5	0.767
Performance	PER	7	0.783

The dependent variable in this model was the "performance" in which it's variation was described by the independent construct "knowledge management initiatives" However, it was envisaged that this relationship was also affected by the presence of the third variable (the intervening variable) that modified the original relationship between the independent and the dependent variables. The intervening variable in this model was "innovation" that had a strong contingent effect on the independent variable-dependent variable relationship (Figure 1).

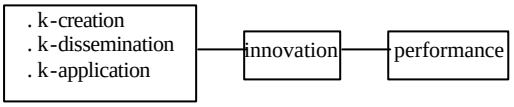

Figure 1: Conceptual theoretical framework

Measurement instruments and measuring scales (ranging from 1 to 5: 1 denotes strongly disagree; 2 disagree; 3 neither agree nor disagree; 4 agree; and 5 strongly agree) used in respect of the various constructs were summarized as follows:

Table 2: Measurement instruments and scales

Constructs	Scale	Literature
K-Creation	5-point Likert	Darroch (2003)
K-Dissemination	5-point Likert	Darroch (2003)
K-Application	5-point Likert	Darroch (2003)
Innovation	5-point Likert	Booz Allen Hamilton (1982)
Performance	5-point Likert	Avlonitis & Gounaris (1999)

4.0 RESULTS AND ANALYSIS

4.1 Sample Characteristics

The survey was performed on 23 listed GLC in which 273 questionnaires were received and analyzed. Of these 41 persons (or 15.0%) were top management, 167 persons (or 61.2%) were middle management and the remaining 65 persons (or 23.8%) were lower management. In terms of gender, 143 persons (or 52.4%) were males and the remaining 130 persons (or 47.6%) were females. Most of the respondents were Malays (63.4%), followed by Chinese (28.2%), Indian (6.1%) and others (3.3%).

4.2 Analysis of the Measurement Model

Confirmatory factor analysis (CFA) was used to test the measurement model. Common measures used to check goodness of fit include $?^2$/degrees of freedom, goodness-of-fit index (GFI), comparative fit index (CFI), root mean square error of approximation (RMSEA) and normed fit index (NFI). The CFA showed that the measurement model fitted the data, as shown in Table 3. All the model-fit indices exceed the respective common acceptance levels indicated by previous research (Chau & Hu, 2001), demonstrating that the measurement model exhibited a fairly good fit with the data collected.

Table 3: Fit indices for measurement mode (MM) and structural model (SM)

Fit indices	MM	SM	Benchmark
$?^2$/d.f.	2.52	2.29	=3.00
GFI	0.92	0.90	=0.90
CFI	0.95	0.92	=0.90
NFI	0.97	0.94	=0.90
RMSEA	0.06	0.03	=0.10

The composite reliability ascertained the internal consistency of the measurement model. This is quite similar to that of Cronbach's alpha, except that it also takes into account the actual factor loadings rather than assuming that each item is equally weighted in the composite load determination. From Table 4, the composite reliability of all constructs exceeded the benchmark of 0.6 recommended by Bagozzi and Yi (1988). Convergent validity refers to the extent to which multiple measures of a construct agree with one another. Bagozzi and Yi (1988) suggest that weak evidence of convergent validity exists when item factor loading is significant. Moreover, strong evidence exists when the factor loading exceeds 0.7. From Table 4, the factor loading for all items exceeds the recommended level of 0.7, and all factor loadings are statistically significant at $p<0.001$.

Table 4: Results of measurement model

Construct/indicators	Factor loadings	t-value
K-creation (CRE)		
B1	0.72	11.12
B2	0.81	12.23
B3	0.79	13.10
B4	0.80	12.28
B5	0.75	12.76
B6	0.81	12.76
K-dissemination (DIS)		
C1	0.76	10.91
C2	0.71	10.87
C3	0.75	10.98
C4	0.81	10.24
C5	0.78	11.23
K-application (APP)		
D1	0.75	12.87
D2	0.76	10.65
D3	0.86	12.56
D4	0.74	12.43
D5	0.71	10.76
Innovation (INN)		
E1	0.87	9.23
E2	0.82	12.23
E3	0.74	15.10
E4	0.86	10.98
E5	0.75	11.24
Performance (PER)	0.76	13.64
F1	0.71	10.31
F2	0.76	11.12
F3	0.73	11.92
F4	0.87	11.04
F5	0.73	10.98
F6	0.89	11.67
F7		

Note:
All t-value are significant at $p<0.001$

The discriminant validity was examined by the correlations between the measures of associated constructs. The analysis showed that the shared variance (the square correlations) for each multi-items construct is less than the amount of variance extracted by the indicators measuring that construct (as shown in Table 5), indicating the measure has adequately discriminant validity. In summary, the measurement model demonstrated adequate reliability, convergent validity, and discriminant validity.

Table 5 Discriminant validity

	1	2	3	4	5
(1) CRE	0.51				
(2) DIS	0.12	0.30			
(3) APP	0.13	0.14	0.21		
(4) INN	0.14	0.15	0.13	0.27	
(5) PER	0.07	0.08	0.07	0.13	0.17

4.3 Test of the structural model

The casual structure of the hypothesized research model (see Figure 1) was tested using structural equation modeling (SEM). As summarized in Table 3 above, all of the model-fit indices of SEM surpassed the benchmark values, suggesting that the data was well fitted to this model (supporting H_3). As predicted the knowledge management initiatives is positively related to innovation (path coefficient = 0.65, $p<0.001$). The results also reveal that knowledge creation (path coefficient = 0.09, $p <0.05$), knowledge dissemination (path coefficient = 0.45, $p<0.001$), and knowledge application (path coefficient = 0.37, $p<0.001$) are positively related to innovation. Hence, hypotheses H_1, $H_{1a} - H_{1c}$ are supported. Innovation is positively related to performance (path coefficient = 0.51, $p<0.001$) thus providing a support for H_2.

In tandem with the fomentation of the Resource-Based View by Penrose (1959), it was found that within the GLC, decisions are made as to what activities the organization will be involved in, how those activities will be performed, what resources are required and, ultimately, which resources are used. Against this backdrop, this paper argues that knowledge takes on a number of roles: first, knowledge is, in itself, both a tangible and intangible resource (Hall, 1993); second, having access to knowledge supports any decision making about resources; third, a capability in knowledge management enable those within the organization to leverage the most service from knowledge and other resources; and fourth, effective knowledge management initiatives make contribution to innovation which in turn lead to better performance of Malaysian listed GLC. The findings of this research are in tandem with the results of empirical study by Darroch (2005) performed among large firms in New Zealand.

5.0 CONCLUSION

Very few empirical researches had examined relationships of innovation and performance. On the other hand, only a few studies could be identified in attempting to identify the antecedents of innovation. In this paper our contribution to the research gap is to model a relationship between knowledge management initiatives, innovation and GLC performance. We had proven the significance of this model that was in tandem with strategic mission and vision of firms competing in the era of the knowledge-based economy having to face the challenges brought about by globalization. In an ever-changing world, knowledge would play an increasingly vital role in establishing competitive and strategic advantage. When the knowledge workers were able to effectively manage the knowledge assets, this would contribute toward building core competencies that can be used as innovation strategy to pursue the performance objectives of the Malaysian GLC.

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