

Knowledge Management and Performance among Top Emerging Market Companies

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Abstract

This study examines knowledge management trend of top Fortune Global multinational enterprises from emerging markets and its relation to business performance. Drawing on the resource-based and its extension, knowledge-based strategic management theories, it is argued that companies that best manage their intangible resources such as knowledge and patent are more likely to have a competitive advantage. Data of top thirty Fortune Global multinational enterprises from emerging markets show a trend toward spending more on research and development, registering more new patents, and better usage of assets from 2002 to 2007. A positive correlation was identified between changes in new patent registration and return on assets. Implication for managers is that they can achieve better business performance through efficient and effective management of assets, intangible assets in particular, and investment in research and development.

Keywords: knowledge management, research and development, performance, innovation, patent, research and development

Introduction

Emerging markets that are in a transitional phase between developing and developed status comprise eighty percent of the world's population and about 75% of its trade growth in the foreseeable future according to the U.S. Department of Commerce (Alon and McIntyre, 2004). The emerging markets such as Brazil, Russia, India, and China are believed by many to be the markets of the future (Waggoner, 2007). The key for emerging markets' future success lies in their establishment of competitive advantages.

Since the early days of strategic management, researchers and managers have tried to find general rules for developing successful and competitive business strategies. Resource-based view of strategic management has explored research questions like: why are some competitors more profitable than others or what are successful strategies to outperform a competitor (Grunert and Hildebrandt, 2004) and asserted that companies gain sustainable competitive advantages by deploying valuable resources and capabilities that are inelastic in supply (Peteraf, 1993). In particular, intangible assets such as knowledge, innovation, and intellectual properties have been identified as value

drivers and sources of company's competitive advantage (Stewart, 1997; Edvinsson and Malone, 1997) in knowledge-based view, an extension of resource-based view. Innovative knowledge is what companies require to dominate an industry (Malik and Malik, 2008). Companies need to innovate to create new processes and products in order to sustain competitive advantage for without innovation a company's value proposition will eventually be imitated, eroding competitive advantage (Malik and Malik, 2008).

Robert Shapiro (2007), former United States under Secretary of Commerce for Economic Affairs, highlighted the drastically increased value of intellectual property since 20 years ago. The collective value of intellectual property in America is about \$5.5 trillion, equivalent to about 45 percent of U.S. GDP. The growth rate of U.S. economy depends more on the development and spread of economic innovations than on how much is invested in plants and equipment. Bill Gates stated that "CEO's must now be able to formulate strategies that capitalize on and maximize the value of their company's intellectual assets to drive growth, innovation and cooperative relationships with other companies" (Sherman, 2004).

However, Volkov and Garanina (2008a) revealed that Russian companies still do not consider intangible assets as the key factor for success even though the conditions of knowledge-based economy (Hamel and Prahalad, 1994) have led to increasing attention to intangible assets (Bontis, 2001) such as patents. They concluded that on the Russian market the influence of fundamental value of tangible assets on the market value of assets of a company surpasses the influence of fundamental value of intangible assets upon the same parameter (Volkov and Garanina, 2008b).

It's therefore worthwhile to study the value of intangible assets and knowledge management in emerging market context. There are many successful companies in emerging markets that have become world-spanning multinational enterprises in face of severe competition from well-established multinational enterprises from developed countries. Examples of such companies are everywhere. From Brazil, Embraer has become a big supplier of regional jets in the airline industry. Russian companies like Gazprom are using Russia's natural resources to leap into the United States and other countries. India is

producing powerhouses in technology services like Wipro. In China, Haier has over 40% of the U.S. market for small refrigerators and wine coolers (AsiaTimes, 2005) while Huawei Technologies is competing against Cisco Systems to sell telecommunications equipment around the world. Identifying resource management and knowledge management of such successful multinational enterprises from emerging markets provides effective benchmarking for other companies in emerging markets.

This study contributes to the literature by revealing recent trends in knowledge management among top Fortune Global multinational enterprises from emerging markets. In addition, this study also contributes in identifying the possible link between knowledge management and financial performance of companies in emerging markets. Understanding sources of sustained competitive advantage for companies has become a major area of research in the field of strategic management (Barney, 1991). Enterprise strategy in emerging economies is clearly an area of considerable interest to both strategy scholars (Hoskisson et al., 2000) and managers of multinational enterprises in emerging markets.

Extant Research

Resource-based view of strategic management has achieved an increasing popularity in understanding the nature and causes of competitiveness. In this context, companies are seen as distinct bundles of resources and competences which have evolved over time (Penrose, 1959). A company's resources at a given time could be defined as those (tangible and intangible) assets which are tied semi-permanently to the company (Wernerfelt, 1984). Such resources enable the company to conceive of and implement strategies that improve its efficiency and effectiveness (Daft, 1983).

Resource-based theories of strategy assert that valuable and unique resources of the company, meeting specific criteria like imperfect imitability/substitutability and imperfect mobility, are the real causal factors of business success and sustained competitive advantage (Peteraf, 1993). Imitability refers to the extent to which rivals can imitate a competence or resource. This stream of research gained momentum in the late eighties/early nineties when researchers elaborated on resource-related ideas expressed earlier by Wernerfelt (1984). Penrose (1959) argued that heterogeneous capabilities give each company its unique character and are the essence of competitive advantage. Barney (1991) indicated that company resources and capabilities could be differentiated on the basis of value, rareness, inimitability, and

substitutability. Most of empirical work that develops measures of a company's resources and capabilities and the extent to which they meet the criteria established in the theoretical literature for generating sustained competitive advantages and then correlates these measures with some measures of company performance has been consistent with resource-based theory (Barney and Arkan, 2001).

The resource-based view has focused significant attention on intangible resources which play a critical role in competitive advantage (DeCarolis and Deeds, 1999). Intangible resources or assets like knowledge, patent, technology, and brand loyalty are found to be important sources of sustainable competitive advantage (Teece et al., 1997). Chatterjee and Wernerfelt (1991) showed that intangible technical and marketing-related resources influence not only competitive advantage in a business unit, but also the expansion of diversification efforts. Montgomery and Hariharan (1991) and Sharma and Kesner (1996) showed that intangible resources or knowledge-based resources are important determinants of the direction of diversified entry and its post-entry performance.

The focus on intangible resources has led to an extension of the resource-based view—the knowledge-based view of the company where knowledge is the most strategically important of the company's resources (Grant, 1996). Company knowledge is a company specific asset which is not easily imitated and non-tradable (Barney, 1986). Many recent perspectives of company behavior suggest that company competencies are stocks of knowledge (Lev and Sougiannis, 1999) accumulated over time, difficult for competitors to replicate, and are the source of competitive advantage (Reed and DeFillippi, 1990). The knowledge-based view considers the creation, transfer and application of knowledge as the primary rationale for a company's existence (Grant, 1996). Zahra and Nielsen (2002) find support for 16 (80%) of 20 tests of the relationship between four company capabilities (internal and external human capabilities and internal and external technological capabilities) and four measures of competitive advantage. Schroeder et al. (2002) tested the relationship between learning capabilities and competitive advantage as well as the relationship between competitive advantage and performance and found support for all (100%) three tests conducted.

Though the resource-based view of the company is one of the most widely accepted theoretical perspectives in the strategic management field (Rouse and Daellenbach, 1999) and a dominant theory upon which arguments in academic journals and textbooks alike have been grounded, little research using a

resource-based view framework has examined strategy differences in the social context of emerging economies (Hoskisson et al., 2000). Though there is no shortage of examples in management literature that illustrate how innovativeness contribute to business successes (Nonaka, 1991), case studies and anecdotal examples have not been complemented with a large-scale data analysis (Cho and Pucik, 2005). This study contributes in providing dynamic empirical data of knowledge management as reflected in patent management from emerging markets and testing the link between innovative knowledge and business performance.

Research Hypotheses

Empirical analysis based on longitudinal data and dynamic research is appropriate for examining resource-based theory (Barney, 2001). This study takes a dynamic view of companies' efficiency in using assets or resources by comparing their resource management and knowledge management of 2002 against those of 2007.

A major intangible resource that competitors cannot copy or buy easily is patent. Earlier works have measured knowledge based resources and have operationalized the stock of knowledge with patent data (DeCarolis and Deeds, 1999). Patents are one manifestation of company knowledge. The learning that occurs to produce the innovation contained in the patent—whether that learning is acquired through combining existing internal knowledge or combining existing internal knowledge with new internal knowledge—is represented on that patent. The ownership of enforceable property rights protects valuable resources from competitive imitation (Lippman and Rumelt, 1982). Such protection help ensure competitive advantage. According to resource-based view and knowledge-based view, top Fortune Global multinational enterprises from emerging markets' success attribute to intangible knowledge based resources and innovation as manifested in new patents registered each year.

H1: Top Fortune Global multinational enterprises from emerging markets have more new patents registered each year from 2002 to 2007.

Resource-based view argues that sustainable competitive advantages come from efficient usage of companies' assets. Newbert (2007) indicated that of the 161 tests in which the relationship between a resource/capability and either competitive advantage or performance is analyzed, empirical support is found for 114 (71%). As such, top Fortune Global multinational enterprises' success depends on improved effectiveness in using their assets. Multinational enterprises often focus on the revenue-generating potential associated with big

emerging economies (Hoskisson et al., 2000). Therefore, this study uses a popular financial ratio to measure the enterprises' usage of assets in generating revenue. Return on assets ratio (net income/total assets) helps measure how profitable a company's assets are in generating revenue. Financial measures remain the most popular and widely accepted approach in strategy-performance studies (Geringer et al., 1989)

H2: Return on assets ratio increased in top Fortune Global multinational enterprises from emerging markets from 2002 to 2007.

Wolfe (1994) believes that few issues have been characterized by as much agreement among organizational researchers as the importance of innovation to organizational competitiveness and effectiveness. There is some evidence that organizational innovation can have a positive impact on financial performance (Yamin et al., 1999). Superior organizational performance has been associated with innovation in product development (Nicholson et al., 1990). Isobe et al. (2000) examine whether early movers and technology leaders attain superior performance in emerging economies and find that technology leaders and first movers in Sino-Japanese joint ventures in China do attain superior performance.

H3: Changes to new patent developments and return on assets are positively correlated among Top Fortune Global multinational enterprises from emerging markets.

Internal developed patents come from research and development. Therefore, internal research and development are critical for generating inimitable resources. Research and development expenses have been used as a proxy for innovation (Hill and Snell, 1988) because more funds committed to research and development may open more chances a company has to be innovative. Regional investment in research and development has been found to lead to increased regional economic growth (Rodriguez-Pose, 1999).

H4: Top Fortune Global multinational enterprises from emerging markets invest more into research and development from 2002 to 2007 as reflected in increased ratio of research and development to revenues.

Research Methodology

The variables measured were the number of patents registered in a year, research and development expense/revenue in a year, return on asset ratio (net income/total assets), and the percentage changes in the number of patents registered per year and the percentage changes in return on asset ratio.

Data for the variables were collected from annual reports of individual multinational enterprises for fiscal year 2002 and for fiscal year 2007. Most annual

reports were readily downloadable from the enterprises' websites. When annual reports were not available, data were collected from the World's Best Base Inc.'s database.

30 multinational enterprises from the emerging markets were studied. As Singh (2008) indicated, emerging markets of particular interest to international investors and business managers are those tracked by the Morgan Stanley Capital International (MSCI) and the International Finance Corporation (IFC). Therefore, emerging markets were identified based on the Morgan Stanley Emerging Markets Index as of June 2006. The following markets were identified as emerging markets: Argentina, Brazil, Chile, China, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Israel, Jordan, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, Poland, Russia, South Africa, South Korea, Taiwan, Thailand, and Turkey.

Benchmarking works the best only when companies evaluate various aspects of their processes in relation to the best practices from top performers. Therefore, the sample was 30 chosen enterprises from emerging markets in 2007 Fortune Global 500 list from top down. The sample included only listed companies but excluded non-listed or state-owned companies as the annual reports and financial information on listed companies were publicly available. The sample size was determined with considerations of time, cost, and the objectives of this study. The sample size of 30 enterprises out of about 60 listed enterprises from emerging markets in 2007 Fortune Global 500 was deemed to have a good representation of the whole population.

Analysis and Results

The sample consisted of 17 percent mining and construction, 27 percent manufacturing, 20 percent transportation, communication, and utilities, 7 percent wholesale and retail trade, and 30 percent finance, insurance, and real estate enterprises. Enterprises with revenue under US\$ 50m, between US\$ 50m and US\$ 100m, and over US\$ 100m were 73 percent, 23 percent, and 1 percent of the sample, respectively. Enterprises with employees under 5,000, between 5,001 and 50,000, and over 50,000 represented 7 percent, 33 percent, and 60 percent of the sample, respectively.

Before data were compared between year 2002 and year 2007, skewness and kurtosis were tested to measure the asymmetry and peaked-ness of the probability distribution of the variables. Neither skewness nor kurtosis of the variables was close to zero. Therefore, none of the variables were normally distributed.

Due to non-normal distribution of the data, the two-tailed, nonparametric, Wilcoxon Sign-Rank Test was used to compare data between 2002 and 2007. Table 1 reports the results of the comparisons.

Table 1: Variable Means for 2002 and 2007
(Wilcoxon Sign-Rank Test, Two-Tailed Test)

Variables	Mean for 2002	Mean for 2007	Z-Stat
Return on Assets	0.05	0.11	-3.013**
New Patents Registered	46	489	-2.668**
Research and Development/Revenue	0.01	0.05	-2.201*

** denotes $p < 0.01$

* denotes $p < 0.05$

Significant increases were identified between 2002 and 2007 for variables studied. Return on assets ratio analysis shows higher efficiency and effectiveness in using assets to generate revenue in 2007, suggesting that given \$1 dollar invested in assets, higher net income (\$0.11 in 2007 vs. \$0.05 in 2002) on average were generated in 2007 than in 2002 in support of H2. 2007 data for both research development to revenue ratio and new patents registered had a significantly higher mean than that of 2002 indicating that enterprises invested more in research and development (\$0.05 in 2007 vs. \$0.01 in 2002) and fostered more new patents in 2007 (489 in 2007 vs. 46 in 2002) on average in support of H1 and H4.

To test H3, Spearman's rho was used to analyze the correlation between percentage change in number of new patents registered from 2002 to 2007 and percentage change in return on assets due to their non-Gaussian distribution. The correlation coefficient was 0.604 significant at $p < 0.05$. This finding reveals a positive correlation between the change in number of new patents registered and the change in return on assets in support of H3.

Discussion and Conclusion

Our finding that there was significant increase in resource management efficiency and effectiveness in top Fortune Global 500 enterprises from emerging markets coincide with the competence-based theory. Efficient and effective usage of assets contributes to competences that help companies to achieve competitiveness. The implication for managers is that effective and efficient usage of assets should be a part of corporate culture despite possible low-cost advantage in natural resources or labour in some emerging markets (Aulakh et al., 2000). This strategic goal is especially important for emerging markets as resources such as financial resources that are valuable

in a market context are generally scarce (Filatotchev et al., 1996).

The finding that significantly more patents were registered in 2007 than in 2002 among these top enterprises matches up with the resource-based management theory. Such a finding reveals the recognition of intangible assets' value among top companies in emerging markets. The finding of positive correlation between changes in new patents registered and return on assets highlights the value of intangible assets in facilitating business performance. Knowledge-based assets or resources such as patents provide heterogeneous capabilities that give each company its unique character and are the essence of competitive advantage. The implication for managers is that knowledge-based assets should not be ignored just because they are often hard to measure and take a long time to materialize. Patents, for example, embody stocks of accumulated knowledge—not just from one or two years but also from many years (DeCarolis, 2003). Managers should encourage and invest in improving learning and innovating capabilities within the company.

Another important finding is that the top enterprises increased their investment in research and development. This finding further confirms the importance of creating valuable, rare, inimitable resources to achieve superior performance as indicated by the resource-based view. Market available resources can be easily bought and copied by other companies, thus contribute little to getting sustainable competitive advantage. The implication for managers is that investing in productive research and development, recruiting and retaining intelligent people are critical for generating and renewing heterogeneous resources.

The purpose of this study is to identify trends in knowledge management among top emerging market multinational enterprises and its link to business performance. The findings comply with resource-based and knowledge-based theory of strategic management. Top enterprises studied showed significant increase in resource management efficiency and effectiveness, research and development investment, and new patents registered from year 2002 to 2007. In general, by better managing intangible resources like knowledge, managers can develop sustainable competitiveness.

Applicability of this study's research findings is limited in at least three aspects. First, the small sample size limits the generalizability of the findings. Future research may study the complete population of the emerging market enterprises among Fortune Global 500. Second, this study is

limited in that only emerging market enterprises were analyzed. Future study may include Fortune Global 500 enterprises from developed economies to identify similarity and differences between the developed markets and the emerging markets. Finally, this study is also limited in that only patent was studied as representative of knowledge-based resource management. This is far from the whole picture of intangible assets which is critical for sustainable competitive advantage. Future study may also study important resource such as relationships with governments. In emerging economies, advantages are difficult to establish without good relationships with home governments. Early relationships give tangible benefits, such as access to licenses, whose number is often limited by a government. Diversified business groups have evolved in many emerging economies. Such groups often obtain licensing advantages because of their government relationships (Hoskisson et al., 2000). In addition, marketing and human resource management capabilities and resources could also be studied as these two functions are as important as production and general management of resources.

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