



**UNIVERSITI PUTRA MALAYSIA**

**MODERATING EFFECT OF ORGANIZATIONAL CULTURE ON THE  
RELATIONSHIP BETWEEN ABSORPTIVE CAPACITY AND  
INNOVATION**

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**By**

**CHUA BENG HUI**

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in  
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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

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**February 2007**

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Organizational absorptive capacity is part of the learning capabilities of organization. To manage the three components of absorptive capacity: knowledge acquisition, knowledge dissemination and knowledge utilization effectively can sustain firm's innovation. The purpose of this study is to present the concept of the firm's absorptive capacity as a multidimensional, dynamic construct to test the relationship with innovative capabilities in the context of growth-oriented MSC companies. In addition, this study attempts to determine the moderating effect of organizational culture on the relationships between absorptive capacity and innovative capabilities.

The study draws on empirical results from 215 MSC companies using stratified sampling procedure. The hypotheses were tested using Pearson Correlation and Hierarchical



Regression analysis to examine the relationship between the three dimensions of absorptive capacity with innovation as well as the existence of moderating effect of organizational culture. Using three instruments adopted from Darroch (2005), Denison & Mishra (1995) and Wang & Ahmed (2004) to measure independent variable: absorptive capacity, moderator: organizational culture and dependent variables: innovative capabilities.

The results of the empirical tests give some support to the view that the flow of knowledge is crucial for sustaining innovative capabilities. The regression estimation shows that knowledge dissemination and knowledge utilization were significantly reflected in the firm's innovative capabilities. In addition, the effects of absorptive capacity on innovative capabilities were found to be moderated by organizational culture. The finding of this study shed some light on the importance of the firm's ability to acquire, disseminate and utilize knowledge effectively. In order to channel the knowledge acquired externally to innovation, firms need to adopt supportive organizational culture.

The manifestation of a positive effect of absorptive capacity on innovation suggest that decision makers should place greater emphasis on the role of knowledge acquisition, knowledge dissemination and knowledge utilization if they want to better account for the innovation in MSC companies.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**KESAN MODERASI OLEH BUDAYA ORGANISASI TERHADAP  
HUBUNGKAIT ANTARA KEUPAYAAN PENYERAPAN DAN INOVASI**

Oleh

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Keupayaan penyerapan adalah sebahagian daripada kapasiti pembelajaran sesebuah organisasi. Pengurusan tiga komponen keupayaan penyerapan iaitu pemerolehan penyerapan pengetahuan, penyebaran pengetahuan dan penggunaan pengetahuan secara berkesan akan mengekalkan inovasi sesebuah firma. Kajian ini bertujuan mengemukakan konsep keupayaan penyerapan sesebuah firma sebagai konstruk yang bersifat multidimensi dan dinamik bagi meninjau kaitan antara keupayaan penyerapan dengan kemampuan inovatif. Kajian ini melibatkan 215 buah firma MSC berorientasikan pertumbuhan. Selain itu, hasil kajian ini cuba menunjukkan bahawa tahap budaya organisasi memberi kesan terhadap hubungkait antara keupayaan penyerapan dengan kemampuan inovatif.



Hipotesis diuji dengan menggunakan korelasi Pearson, dan analisis regresi hierarki. Penggunaan tiga instrumen diambil dari Darroch (2005), Denison dan Mishra (1995) dan Wang dan Ahmed (2004) untuk menguji pemboleh ubah tidak bersandar: keupayaan penyerapan, pemboleh ubah moderator: budaya organisasi ; dan pemboleh ubah bersandar: kemampuan inovatif.

Hasil kajian membuktikan bahawa pengaliran pengetahuan adalah penentu untuk mengekalkan tahap kemampuan inovatif. Estimasi regresi menunjukkan bahawa penyebaran pengetahuan dan penggunaan pengetahuan, nyata sekali digambarkan dengan kemampuan inovatif sesebuah firma. Tambahan pula, kesan keupayaan penyerapan terhadap kemampuan inovatif akan dimoderasikan oleh budaya organisasi. Oleh itu, pihak pengurusan perlu berupaya untuk memperoleh, menyebarkan dan menggunakan pengetahuan secara berkesan. Sesebuah firma perlu menerima budaya organisasi supaya dapat menyalurkan pengetahuan yang diperoleh kepada inovasi.

Kesan positif di antara keupayaan penyerapan dengan inovasi memantapkan bahawa keupayaan penyerapan pengetahuan, penyebaran pengetahuan dan penggunaan pengetahuan perlu ditekankan antara golongan pembuat keputusan untuk meningkatkan tahap inovasi antara firma MSC.

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I certify that an Examination Committee has met on 8 February 2007 to conduct the final examination of Chua Beng Hui on her PhD thesis entitled "The Moderating Effect of Organizational Culture on the Relationship between Absorptive Capacity and Innovation" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the candidate be awarded the relevant degree. Members of the Examination Committee are as follows:

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## **DECLARATION**

I hereby declare that the thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UPM or other institutions.

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**CHUA BENG HUI**

Date: 30 MARCH 2007



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## **CHAPTER I**

### **INTRODUCTION**

#### **Background of the Study**

Companies are increasingly faced with intensifying competitive pressures. Customers impose ever more stringent demands regarding uniqueness, customization, speed of delivery, quality, performance, and so on. In order to ensure their competitiveness, and even survival, companies must be able to meet these challenges by providing a continuous stream of new and improved products, processes and services, which can only be achieved through innovation. Innovation is not only of importance for a limited group of high-tech, manufacturing or large-scale companies. On the contrary, the need to innovate is universal, irrespective of size, sector or technological sophistication.

In an environment where technologies, competitive positions and customer demands can change almost overnight and the life-cycles of products and services are getting shorter, the capacity to manage innovation successfully is crucial for the competitive power of a company. It is, therefore, no surprise that the topic of managing the innovative function of firms that have embraced dynamic technological knowledge has been gaining increased attention amongst MSC companies in Malaysia.





Malaysia's development vision, as outlined in Vision 2020, is to become a fully developed nation with a knowledge-based society, by the year 2020. The National IT Agenda (NITA), which is part of this vision, has interpreted it thus; that the role of information, knowledge and technopreneurship is important to enable the nation to leapfrog the developmental stage of an industrial economy to a post-industrial or advanced economy (Government of Malaysia, 2001). These drivers of change contrast against the role of land, labor, capital and material of the industrial era.

The challenge for the 21<sup>st</sup> Century is for Malaysia to find a new competitiveness paradigm. To realize the vision, Malaysia has to breakthrough from the P-economy and shift paradigmatically to the K-economy, by reaping opportunities identified in this environment of turbulent and relentless change. In order to breakthrough from the P-economy, the country's competitiveness must be strengthened (Abdulai, 2001; Turner, 2000). Knowledge-based and knowledge-rich learning environments, embody qualitative characteristics that can provide breakthroughs, and serve as a means to increasing returns in an increasingly complex and global environment (Azizur, 1990; Turner, 2000).

The MSC strategy is a good example of how to develop the new K-based industries, with the aim of breaking through from P-activities to achieve a K-driven growth vision (Latifah, 1999). However, the operational outcome of having more MSC-made knowledge products and services requires more active innovation, a time limit to be

enforced, and a piece of legislation that will foster their development, which altogether will need quite some time to take-off (Latifah, 1999).

### **MSC Companies Outlook**

To date, the companies approved for MSC status are either stand alone companies or joint ventures. One third of the 300 companies are involved in software-related activities, the rests are considered to be in the Creative Multimedia Cluster (CMC) of which 48 percent of the companies are system integrators or heavy users of IT; 12 percent are involved in the telecommunications sector and 7 percent in electronics. A key result of the MSC initiative is the branding of knowledge products, processes, systems and services with the “Made in MSC” mark (Latifah, 1999).

The 5<sup>th</sup> MSC Impact Survey was conducted in May 2004 on a combined 716 MSC companies. The survey was conducted online via e-mails and followed-up by physical face-to-face visit done by the MDC’s Account Managers. A total of 654 companies responded to the particular question on paid-up capital. The result indicates that approximately 14% of the respondents each have a paid-up capital amounting to more than RM5 million, while 30% of the companies have paid-up capitals of between RM0.5 million to RM5 million individually.



Based on the survey findings, there was a commendable achievement despite the fact that more than 50% of the MSC status companies were still in their infancy. There is still much room for improvement, so therefore the present study has targeted selected MSC status companies to try to identify their absorptive capacity, organizational culture and innovation features in order to provide affirmative and immediate action to assist their strong and sustainable growth in the future.

### **The Importance of Innovation**

For MSC companies operating in an environment of greater uncertainty than others, innovation can be a vital means of mitigating the uncertainties associated with being relatively new in the industry. The much more conventional role which MSC companies play in innovation relates to the niches they might occupy. It is their ability to provide something significantly different in their products or services which distinguishes them from the more standardized products or services provided by those long established, and larger companies. There is so much more to gain from innovation that innovative firms tend to have larger market shares and higher growth rates and profits than non-innovative firms (Geroski and Machin, 1992). Furthermore, a link has been demonstrated between the increase in research and development (R&D) expenditures and the subsequent growth in turnover of innovative firms compared to those of their non-innovative competitors (Franko, 1989).



Successful process innovation usually has a positive influence on the productivity and efficiency of a firm and technological renewal is generally considered to be a driving force behind economic growth and, as such, a remedy for structural economic downturns. Technological renewal is also assumed to create new possibilities for companies, regions, sectors and countries (Van de Van, 1986). Thus innovation is a national competitiveness concern. In fact, Prahalad (1990) concludes by saying that good quality and low cost are no longer sufficient for global competitiveness; they are being replaced by the strategy of introducing new products with lower costs and at a much faster rate than before.

Innovation in products, processes and services has indeed become a high-priority issue for firms in many manufacturing and service sectors. However, the attention devoted by firms to product development was subject to business cycles in past decades. Devoting a lot of effort to R&D without having a proper organization to reap the benefits from the technological advantage is also unlikely to lead to competitive strength. Coriat (1995), for instance, argued that Europe is not lagging behind in terms of basic research or R&D, it was losing ground in the process of moving from scientific discovery and invention to innovation and from innovation to commercialization. Thus, the need to devote attention to innovation has regained its high position on the manager's agenda. Policy makers are becoming increasingly aware of the importance of stimulating the growth in organizational knowledge of innovation in addition to the more traditional areas of technology development or transfer.

### **Innovation In The Context of Organizational Learning**



With the emergence of the global economy and the accelerating dynamics of the marketplace, firms everywhere have realized the need to improve constantly their products and processes in order to create and retain competitive advantage (Flood, 1998). To remain competitive, many organizations are adopting a strategy of continuous learning (Goh, 2003). A continuous learning organization is an organization where employees are constantly encouraged to gain new knowledge, try new approaches to solving problems, obtaining feedback and learning new behaviors as a result of the experimentation (Goh, 2003). Whether the need is increased efficiency, better customer service or zero-defect products, managers are beginning to realize that learning organizations can achieve these performance goals better (Kiernan, 1993; Garvin, 1993; Stata, 1989). Organizational learning has been defined as “the capacity or processes within an organization to maintain or improve performance based on experience” (Nevis et al., 1996, p.73). This definition is similar to those advanced by Argyris & Schön (1978), Dodgson (1993), and Senge (1992). According to Dodgson, “Learning is a dynamic concept, and its use in theory emphasizes the continually changing nature of organizations” (Dodgson, 1993, p.376). And Senge (1992, p.14) defined learning organization as “organization that is continuously expanding its capacity to create its future.” This implies that an important underlying success factor for firms to gain their competitive advantages lies in their organizational learning capabilities.

The ability of firms to acquire knowledge and to transform it into a competitive weapon has long been a part of the research agenda. As Hamel (1991) said, learning through



internalization (acquiring skills to close the gap between partners) and sustainable learning help reposition the value-creating core competencies in an alliance context, giving partners the ability to match or overtake their competitors. Learning also reduces the risk that firms might fall into ‘competency traps’ or the inability to face novel competitive and market situations (Cohen & Levinthal, 1990, p.136). Therefore, learning, be it related to technology transfer, acquiring skills, or improving learning capability (or “absorptive capacity” as coined by Cohen and Levinthal), is a critical factor for firms particularly keen on achieving innovative capabilities.

The firm’s ability to learn and create new knowledge is a crucial element for its performance. The notion that firms need to renew and reconfigure their resources constantly is articulated in Teece et al.’s (1997, p.516) concept of dynamic capabilities – defined as “the firm’s ability to integrate, build and reconfigure internal and external competencies to address rapidly changing environments”. The notion of dynamic capabilities pertains to capabilities for flexibility and change in the face of new competitive forces. These capabilities are seen like the driving forces that foster knowledge creation, technological evolution and exploitation of resources to sustain competitive advantage (Eisenhardt and Martin, 2000). Central to the concept of dynamic capabilities is the firm’s ability for learning, which is an essential driver of sustained innovation and competitive advantage.



Organizational learning and innovation have become crucially important subjects in management. Research on these subjects, however, is concentrated mainly in advanced countries (Argyris and Schön, 1978; Dodgson, 1993; Kim, 1998; Nonaka and Takeuchi, 1995). Despite the fact that many developing countries, including Malaysia have made significant progress in industrial, educational, and technological development, yet research on learning, capability building, and innovation in those countries is scanty (Kim, 1998). Models that capture organizational learning and innovation in developing countries are essential to understand the dynamic process of capability building in such countries that are trying to catch-up with the developed nations and to extend the theories already developed in advanced countries (Kim, 1998).

Companies usually invest in research and development (R&D) with the aim of developing or maintaining a competitive advantage. Effective R&D aimed at product innovation can, for instance, lead to successful new products, which in turn might lead to an increase in turnover, higher market shares and increased profits. R&D aimed at process innovations can result in lower production costs, better product quality and so on. The scientific literature, however, is not conclusive in determining the links between R&D investment and company success. Research among companies in a variety of industries has shown associations between R&D spending and subsequent growth in sales, but no clear signs of R&D expenditure links to profitability have been found (Cobbenhagen, 2000). A similar conclusion was drawn from a study of 50 prominent hardware, software and networking companies (Anthes and Betts, 1994). That study did

not show correlations between investments in R&D and short-term profits, nor could company success be attributed to R&D expenditures as such.

There are just too many intervening variables that make it virtually impossible to prove direct linkages between a technology measure, such as R&D intensity, and company profitability (Roberts, 1991). So, although it can be argued that R&D expenditures and innovative success are related, the one does not necessarily have to result from the other. R&D expenditures are just one of many variables which might account for sales growth and rising profits. Heavy spending on R&D thus seems to be no guarantee of overall corporate success.

An innovative company is a company that has a track record of introducing new products to the market or incorporating new technologies in its processes and exploiting its innovativeness in commercial terms (Brown & Eisenhardt, 1995). It requires the continuous flow of new knowledge acquired externally, being disseminated internally and integrated with the existing knowledge (Roberts, 1991). Cohen and Levinthal's seminal article (1990) on "absorptive capacity" articulated the extent to which innovation processes involve the identification, and utilization of external sources of knowledge. Subsequently, this became one of the most important themes in the innovation literature in the 1990s (Koza and Lewin, 1998; Powell et al., 1996). Thus, in terms of knowledge sharing, innovation processes have become conceptualized as primarily involving the





integrating of new external knowledge with pre-existing, internal organizational knowledge.

### **The Importance of Absorptive Capacity**

Earlier studies indicated an implicit consensus on absorptive capacity as a set of organizational routines necessary to recognize and utilize externally generated knowledge (Liao et al., 2003). Given this description, research related to a firm's ability to acquire, transfer, and assimilate new ideas and then put them into concrete actions within the firm can be seen as falling within the conceptual base developed by Cohen and Levinthal (1990). For example, Mowery and Oxley (1995) defined absorptive capacity as a broad set of skills needed to deal with the tacit component of transferred knowledge and the need to modify this imported knowledge. By contrast, Kim (1998) conceptualized absorptive capacity as learning capability and problem-solving skills that enable a firm to assimilate knowledge and create new knowledge. Whereas, Bhatt (2000) argued that Cohen and Levinthal (1990) have provided an important link between learning capability and knowledge creation. They argue that knowledge expansion is dependent upon learning intensity, and prior learning of the concepts, which they refer to as an organization's absorptive capacity (Cohen & Levinthal, 1990).

The general consensus is that absorptive capacity is a multi-dimensional construct involving the ability to acquire, assimilate, and exploit knowledge. The basic character of

