

Change and Competitive Advantage: An Investigative Study of Indian Pharmaceutical Industry

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Year 2005 was an important milestone for the Indian pharmaceutical companies. With the start of the year, Indian pharmaceutical companies had to fall in line with its commitments to the World Trade Organization (WTO). The strategies pursued by the firms for the past 40 years after the implementation of the Indian Patents Act, 1970 must be reviewed for its relevance in the changed context. Current literature in strategic management focuses on dynamic capability as a source of competitive advantage. Earlier studies focused their attention on direct relationships among a few selected factors only; therefore the lack of clarity can be traced to under-specification of the models that the previous studies have examined. Specifically, studies provide limited view of change capability by ignoring the constituting factors which should be integrated. Dynamic capability as a construct involves framework for managing knowledge, ability to combine the existing and acquired knowledge and leveraging knowledge through learning for innovation. Every firm learns through firm-specific methods, and this learning process is operationalized by the firm's knowledge management practices that result in successful learning. Using change capability as a mediator, a model to understand the drivers of competitive advantage in the Indian pharmaceutical industry is developed.

Introduction

The environment in which the firms are operating today is unpredictable, chaotic and turbulent. The nature and pace of change in the contemporary context is characterized by spontaneity. The very nature of competition in all industries which are driven by the forces of change has grown in exponential fashion in terms of complexity. In the light of this unpredictable and multifaceted competitive intensity, reorientation in the philosophy for achieving sustained Competitive Advantage (CA) is inevitable. The ever-increasing business dynamism is presenting new challenges before managers, practitioners and researchers, wherein they are trying to establish new sources of dynamic fit among the requirements imposed by the changing context.

In the past decade, researchers have persistently focussed their attention on the significant role played by the dynamic capabilities and everyone has significantly contributed in their own way towards understanding the contribution of this construct towards CA. Dynamic

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capabilities are needed in the dynamic markets and therefore the resource-based view of firm in the changing context should focus on the managerial ability to integrate, build and reconfigure competencies to address the rapidly changing environments for sustained CA. Leveraging knowledge for CA is now acknowledged widely by the mainstream researchers in the area of strategic management. But the roots of the problem lie in exploiting the knowledge resources for taking lead and achieving competitive superiority. Managers of all organizations are well versed with the fact that knowledge leads to competitive superiority; therefore, organizations must strive continuously to learn and innovate. Organizations must have tangible and intangible systems to combine and exploit the existing and potential sources of knowledge. Still, a cohesive and integrative framework to understand the interwoven complexities is somewhere lacking.

Year 1990 onwards, the changed face of competition has placed ever-increasing demand on firms to adapt, renew, reconfigure and recreate their resources and capabilities in line with the competitive environment. Organizational flexibility is now an established rule for survival in the market place. Pharmaceutical industry presents an excellent platform to address and investigate the issues of what drives Change Capability (CC) and what is its impact on CA. An agile organization can achieve CA by targeting its people and processes to the continually changing needs of the market place with the support of the knowledge it possesses, by its ability to learn and innovate and also with systems which facilitate effective combination of the abilities and resources. Based on this conceptual premise, a model is developed which includes determinants of organizational change capabilities, viz., Knowledge Management Framework (KMF), learning and innovation and combinative capabilities, their synergistic effects on change capabilities and its ultimate impact on CA.

The scheme of the paper is as follows. First, we discuss the theoretical underpinnings of our study and the key theoretical constructs pursued. Second, we describe our research model, then deal with the organizational setting, data collection and the analysis of the quantitative data that we collected. The implications of the findings are discussed and conclusions are drawn from this analysis. The conclusion points to further research directions.

Theory

The economic liberalization (1991) and the intellectual property reforms (1995) can be considered as watershed events or exogenous shocks in the form of institutional reforms which changed the rules of game (Peng, 2003) for the Indian pharmaceutical companies. The pharmaceutical sector along with information technology has emerged as an industry spearheading India's growth in the global trade (KPMG, 2009). But the reforms have significantly contributed to alteration of the competitive landscape, especially for domestic firms which are now involved in search of new capabilities to survive, along with reconfiguration of their existing resources and capabilities.

Investigation into the role of change has always been a theme around which the existing strategic management literature revolves (Ginsberg, 1988). How organizations change and adopt clearly guides the firm's survival, long-term success and the alignment of strategy with the environment (Smith and Grimm, 1987; Cameron *et al.*, 1988; and Haveman, 1992). Earlier research in the field of strategic management on change and its contribution to CA has focused between managerial cognition and the process of change (Bartunek, 1984; and Gioia and Chittipeddi, 1991) and the beliefs and understanding of decision makers (Hedberg and Jonsson, 1977; Bartunek, 1984; Daft and Weick, 1984; Fiol and Lyles, 1985; Gioia and Chittipeddi, 1991; Milliken and Lant, 1991; and Gioia *et al.*, 1994). However, cognition and the understanding of decision makers can constitute only one facet when CC as a construct is related to CA. Managerial cognition and understanding for organizational CC as a variable for ensuring CA requires careful reinvestigation because the contemporary focus is on dynamic capabilities (Teece, 2007).

Strategic decision making is a dynamic capability (Fredrickson, 1984; Eisenhardt, 1989a; and Judge and Miller, 1991). Routines, by which managers combine their varied skills and functional backgrounds to create revenue-producing products and services (Clark and Fujimoto, 1991; Dougherty, 1992; and Helfat and Raubitschek, 2000), are dynamic capability. Transfer processes, including routines for replication and brokering (Szulanski, 1996; Hargadon and Sutton, 1997; and Hansen, 1999), are used by managers to copy, transfer and recombine resources, especially knowledge-based ones within the firm, are dynamic capability. Knowledge creation routines, whereby managers and others build new thinking within the firm, are a crucial dynamic capability in industries like pharmaceuticals, optical disks, and oil where cutting-edge knowledge is essential for effective strategy and performance (Henderson and Cockburn, 1994; Helfat, 1997; and Rosenkopf and Nerkar, 1999). Other capabilities, viz., distinctive competence (Selznick, 1957; and Learned *et al.*, 1969), organizational routine (Nelson and Winter, 1982), architectural knowledge (Henderson and Clark, 1990), core competence (Prahalad and Hamel, 1990), core capability and rigidity (Leonard, 1992), combinative capability (Kogut and Zander, 1992) and architectural competence (Henderson and Cockburn, 1994), are the forms of dynamic capabilities exhibited by the firms.

For the evolutionary and economic fitness of enterprises, Teece (2007) proposed three basic dynamic capabilities: (1) sensing (and shaping) opportunities and threats; (2) seizing opportunities; and (3) reconfiguring assets and structures to maintain competitiveness. Sensing, as a function, essentially rests on the foundation of organizational knowledge which requires searching and exploring markets and technologies both local to and distal from the organization. Seizing, in contrast, is dependent on the organizational learning and innovating capability which requires the capacity to make high quality, interdependent investment decisions, such as those involved in selecting product architectures and business models. The final capability, reconfiguring, focuses on embedding the learning and knowledge for continuously transforming the firm in response to market and technological changes, such that it retains evolutionary fitness. Thus KMF, learning and innovating capability and the

firms combinative capabilities are interpreted as drivers of change and adaptive capability which are synergistic in their effects for achieving CA.

Change Capability as a Strategic Construct

Firms' adaptive capability depends upon its ability to change, and adaptive capability is a dynamic capability (Miles and Snow, 1978; Chakravarthy, 1982; Hooley *et al.*, 1992; Sanchez, 1995; Camuffo and Volpato, 1996; Forrant and Flynn, 1999; Rindova and Kotha, 2001; Staber and Sydow, 2002; Alvarez and Merino, 2003; and Wang and Ahmed, 2007). The higher a firm exhibits adaptive capabilities the higher it has dynamic capabilities (Teece *et al.*, 1997). Organizational activities, which require linking technological knowhow, product development and customer requirements, can serve as sources of dynamic capabilities and enable firms to generate new competencies (Daneels, 2002). Firms in emerging economies face a unique problem in that they are marred by significant knowledge and resource disadvantages in developing the frontline capabilities required to compete in demanding markets. The generation of capabilities may follow a complex iterative process of exploration or learning activities that lead to the addition of new resources, and then their subsequent exploitation by using these resources in new product markets (Daneels, 2002, March 1991). This relationship between exploration of new resources and competencies and exploitation in new product markets, which Wernerfelt (1984, p. 171) has referred to as "two sides of the same coin", deserves further attention in the context of organizational transformations in emerging economies, especially in the context of change. The construct of Organizational Change Capability (OCC) as proposed by Barrie *et al.* (2002) establishes a relationship between learning, market orientation and organizational performance.

The creation and management of knowledge-based resources, their development, renewal and exploitation are central in connection with the creation of CA in the dynamic market places of today (Hamel and Prahalad, 1996; Verona and Ravasi, 2003; and Powell and Snellman, 2004). There is a general agreement that KM will represent the most important CA factor for organizations (Toffler, 1990; Quinn, 1992; Drucker, 1993; Stewart, 1997; and Ferran, 1999). Within the research on the dynamic capabilities concept, there is a discussion on the mechanisms underlying the development of the firm's resources and organizational capabilities. Attention has been given to organizational learning (Winter, 2000; and Zollo and Winter, 2002), organizational processes of exploitation and exploration (Benner and Tushman, 2003), dynamic capabilities as fundamental business processes (Eisenhardt and Martin, 2000), knowledge transfer and change capacity (Zahra and George, 2002).

Learning is viewed as a key element in developing and maintaining CA (DeGeus, 1988; Stata, 1989; Senge, 1990; Nonaka, 1991; Schein, 1993; Slater and Narver, 1995; Liedtka, 1996; Baldwin *et al.*, 1997; Goh and Richards, 1997; Porth *et al.*, 1999; and Armstrong and Foley, 2003). Organizational learning plays a significant role in CA of firms (Barnes, 1991; Grant, 1991; and Iles, 1997). An organization's ability to survive and grow is based on advantages that stem from core competencies that represent collective learning (Nevis *et al.*, 1995). Argyris and Schön (1977) and Senge (1990) focused on the learning required to make

transformational changes—changes in basic assumptions—that organizations need in today's fast-moving, often chaotic environment. Their approach does not negate the value of everyday incremental 'fixes'; it provides a more complete model for observing and developing organizational learning. After periods of significant discontinuous change, incremental, adaptive learning may be just to help consolidate transformational or generative learning. Huber (1991, p. 89) argued that an organization learns if any of its units acquires knowledge that it recognizes as potentially useful to the organization. Productive learning exploits, explores and restructures an organization's values and criteria, enhances organization capability and improves an organization's performance. This is the type of learning that organizations promote (Argyris and Schon, 1996). Learning is identified as a quantifiable improvement in activities, increased available knowledge for decision making or sustainable CA (Dodgson, 1993; and Cavaleri, 1994).

The concept of dynamic capabilities as a coordinative management process opens the door to the potential for intra-organizational learning. Thus, it can be inferred that coordination capabilities are a form of dynamic capability (Teece and Pisano, 1994). Doz and Shuen (1989) and Mody (1990) have pointed out that collaborations and partnerships can be an instrument for new organizational learning, enabling firms to recognize dysfunctional routines and preventing strategic failures. Managers coordinate or integrate activities inside the firm. How efficiently and effectively internal coordination or integration is achieved is very important (Aoki, 1990). CA requires the integration of external activities and technologies. The work of Clark and Fujimoto (1991) on project development in the automobile industry illustrated the significant role played by the coordinative routines.

The understanding that there is certain rationality or coherence to processes and systems in an organization is a different concept as corporate culture, as we understand the corporate culture refers to the values and beliefs that employees hold; culture can be an implied governance system as it mediates the behavior of individuals and economizes on more formal administrative methods. Rationality or coherence notions are more akin to the Nelson and Winter (1982) notion of organizational routines. Learning is a process by which repetition and experimentation enable tasks to be performed better and quicker and new production opportunities to be identified. Learning involves organizational as well as individual skills. While individual skills are of relevance, their value depends upon their employment, in particular organizational settings. Learning processes are intrinsically social and collective and occur not only through the imitation and emulation of individuals, as with teacher-student or master-apprentice, but also because of joint contributions to the understanding of complex problems. Learning requires common codes of communication and coordinated search procedures. Second, the organizational knowledge generated by such activity resides in new patterns of activity, in 'routines', or a new logic of organization.

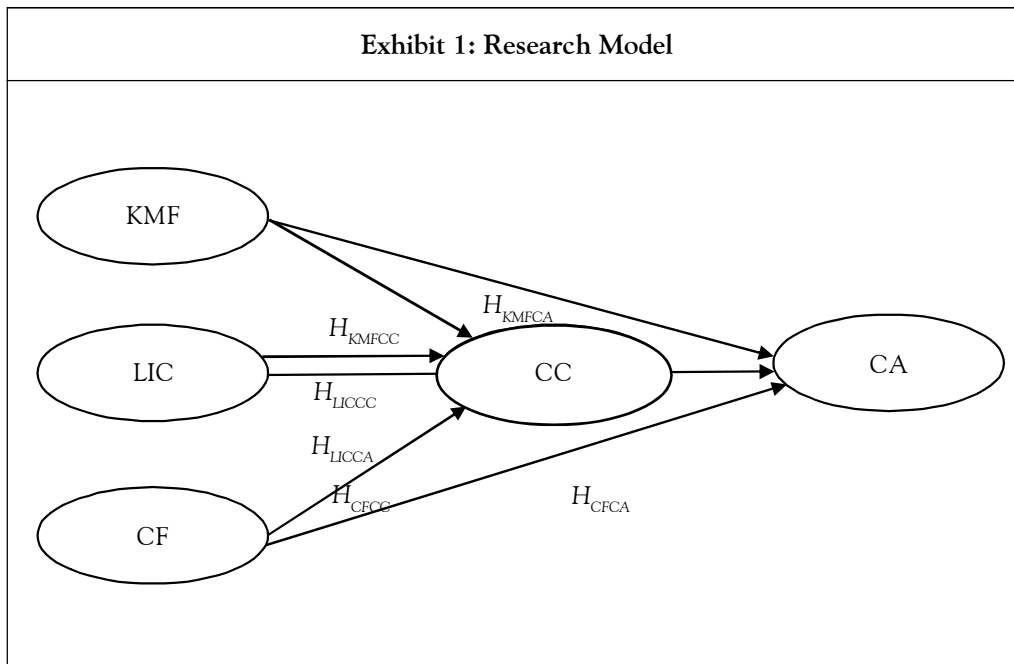
Research Model

We propose that the firm's CC leads to CA; however, a firm's CC will lead to distinctive advantage over its rivals when the learning capability, KMF and Combinative Framework (CF) are integrated and aligned (Cohen and Levinthal, 1990; Kogut and Zander, 1992; Nonaka

and Takeuchi, 1995; and Crossan *et al.*, 1999). Therefore, the explicit research questions considered for investigation are as follows:

- What is the relationship between organizational learning and innovation capabilities and firms' CA, especially when organizations focus on change capabilities? To what extent, learning and innovation capabilities lead to superior performance?
- What is the relationship between KMF and firms' CA, especially when organizations focus on change capabilities? To what extent, KMF leads to superior performance?
- What is the relationship between CF and firms' CA, especially when organizations focus on change capabilities? To what extent, CF leads to superior performance?

His idea is expressed in the model as Exhibit 1, where the firm's CC act as a mediating variable in the relationship between Learning and Innovation Capabilities (LIC), KMF, CF and CA.



The following hypotheses are derived from this model and properties of AMOS, 19 are used to test them:

- H_{LICCC} : Learning and innovation capability has a significant, direct and positive impact on CC.
- H_{LICCA} : Learning and innovation capability has a significant, direct and positive impact on CA.
- H_{KMFCC} : KMF has a significant, direct and positive impact on CC.

- H_{KMFA} : KMF has a direct and positive impact on CA.
- H_{CFCC} : CF has a significant, direct and positive impact on CC.
- H_{CFCA} : CF has a significant, direct and positive impact on CA.
- H_{CCCA} : CC has a significant, direct and positive impact on CA.
- H_{MCA} : CC plays a mediating role between learning and innovation, KMF, combinative capabilities and CA.

Methodology

Sampling Frame and Characteristics

The target population for the study was senior managerial level employees associated with the Indian pharmaceutical firms that operate primarily in India, incorporated and registered under Companies Act 1956, whether operating in India or outside India and are not branches of a larger foreign corporation. The Centre for Monitoring Indian Economy (CMIE) database (PROWESS) yielded a list of 648 pharmaceutical organizations along with their financial details. CMIE is a leading information provider and many studies have used this database in India for specific purposes. The organization was the level of analysis identified for this study. The level of analysis was determined by the level at which the main research questions were posed and analyses were carried out rather than the level at which data were collected (Davidsson and Wiklund, 2001).

Snow and Hrebiniak (1980) affirmed that 'top managers have the best vantage point for viewing the entire organizational system' (p. 320). So the information was collected from the senior level managers and the data was hypothesized to represent aggregated measurements at the organizational level. Several prior studies have adopted this approach as reasonable (Cragg and King, 1988; Gadenne, 1998; Davidsson and Klofsten, 2003; and Kara *et al.*, 2005). Senior management people have "sufficient information about and understanding of the firm". So each organization was used to learn about the processes managers use to understand the drivers of CA and then make resource investment decisions to enhance organizational performance (Maritan, 2001).

Short *et al.*, (2002) examined 437 strategic management studies published in major scholarly journals during the period of 1980-1999. Their examination showed that less than 20% used a random sample and only about 40% of the scholars checked for the representativeness of their sample. Also, Short *et al.* (2002) found a heavy reliance on the purpose of sampling with the focus on available data. In general, one would believe that a simple random sample or a stratified random sample (based on a knowledgeable or intended focus on particular types of firms) would provide more accurate and generalizable results, at least to the universe intended, in contrast to other sampling approaches (Hitt *et al.*, 2004). Thus, the list obtained from the CMIE database was analyzed on the basis of sales turnover, i.e. firms having a turnover of more than ₹500 cr and their growth in sales over past eight years. A total of 30 firms met the study objectives as per the sales turnover criteria. To resolve the existing disparities and for

equivalence, as mentioned in the earlier researches in the area of strategic management, all 30 firms were decided to be the target of the study with a targeted response of 15 filled questionnaires per firm, as on an average every firm will have at least fifteen key informants at senior level. Thus, on the basis of an initial survey and other available literature, the researchers attempted initially to target about 450 respondents from these 30 firms.

Models of organizational processes have three elements: (1) a theoretical language that describes causal relations between constructs; (2) an operational language that links certain indicators to their respective constructs; and (3) an integrative theory that links the causalities between constructs and indicators (Blalock, 1979). The second component is of particular relevance to strategy research. SEM technique for data analysis was employed. If the variables are reliable, the effects are strong and the model not overly complex, smaller samples will suffice (Bearden *et al.*, 1982; and Bollen, 1990). Although there is little consensus on the recommended sample size for SEM, Hoelter (1983), Garver and Mentzer (1999) and Sivo *et al.* (2006) proposed a 'critical' sample size of 200. In other words, as a rule of thumb, any number above 200 is understood to provide sufficient statistical power for data analysis. Boomsma (1983) suggested that sample sizes of 100 are lower bounds when considering maximum likelihood estimation and suggested samples of 200 or more. Gerbing and Anderson (1985) found the added benefit that with three or more indicators per factor, a sample size of 100 will usually be sufficient for convergence, and a sample size of 150 will usually be sufficient for a convergent and proper solution.

The researchers personally visited large hospitals and IMA conferences for personally getting the questionnaires filled up. An online questionnaire was also hosted on Google Documents, which was sent to various organizations as per the information obtained from the directory of National Pharmaceutical pricing authority of India (2008). Researchers using online data collection techniques on large sampling base treat even 20% responses as valid responses (Malhotra and Grover, 1998; and Hitt *et al.*, 2004). The response rate in the present study is relatively high as compared to similar researches in the area: 21% (Paxson *et al.*, 1995), 41% (Dyer and Nobeoka, 2000; Kotabe *et al.*, 2003; and Dyer and Hatch, 2006), 25% (Kale *et al.*, 2002; and Kale and Singh, 2007), 32% (Hoskisson *et al.*, 2000) and 38% (Subramaniam and Venkatraman, 2001). But target respondents being limited, the researchers could not rely on web-based responses which resulted in only 48 filled responses. So the respondents were personally contacted. With 216 usable responses generated (168 out of 250 attempted through physical contact and 48 out of 200 solicited through online source), the response ratio of 48% was considered to be high as compared to the other studies in the area.

In addition to the response rate, item completion rate is used as another measure of survey effectiveness, as suggested by Klassen *et al.* (2001). They defined completion rate as "the proportion of survey items answered relative to all applicable items". The item completion rate for this study was 99%, suggesting high survey effectiveness. In the case of only two questionnaires, responses were found to be incomplete. These questionnaires were discarded because of unsatisfactory response (Malhotra, 2010) and hence the final number of usable questionnaires was 216.

Measures

We followed recommended guidelines for developing measures of our constructs (Churchill, 1979). As our study is based on testing the relationships between the variables affecting CC and its subsequent effect on CA, the following scales were reviewed for adoption in the intended study: Dynamic competitive capabilities scale (McEvily and Zaheer, 1999 and McEvily and Marcus, 2005), Sources of CA scale (Ulrich and Lake, 1991), Learning (Ulrich and Lake, 1991; Zhuang *et al.*, 1999 and Kale *et al.*, 2001), and CA scales (Koufteros, 1995; Solis, 1998; Tu *et al.*, 2004; Li *et al.*, 2005; and 2006).

Considering the objective of the research, no preexisting instrument was found suitable for this study. Therefore, the existing scales were modified by mixing the questions and changing the narration. So, the research instrument (Exhibit 2) was developed in two stages, as proposed by Menor and Roth (2007).

Exhibit 2: Constructs and Their Measures		
Construct	Construct Operationalization	Measure (Seven-Point Scale 1 Strongly Agree-7 Strongly Disagree)
Learning and Innovation (LIC)	Organizational learning is the process of change in individual and shared thought and action, which is affected by and embedded in the institutions of the organization (Crossan <i>et al.</i> , 1999).	<ol style="list-style-type: none"> 1. Products offering superior benefits to customers vis a vis competitors. 2. Ability to acquire much new and relevant capability over the years. 3. Ability to sense shifting boundaries of the industry. 4. Sensing the dynamics and pace of knowledge transformation. 5. High speed in adopting the latest technology 6. Ability to manage technological obsolescence. 7. Focus on speed of product development.
Knowledge Management Framework	Knowledge management is the systematic process of creating, maintaining and nurturing an organization to make the best use of its individual and collective knowledge to achieve the corporate mission, broadly viewed as sustainable competitive advantage or achieving high performance (Nonaka and Takeuchi, 1995)	<ol style="list-style-type: none"> 8. Ongoing programs wherein services and products are refined 9. Recognition of quick utilization of external knowledge by employees. 10. System of identifying, developing and sustaining people's knowledge and competencies. 11. Systems which can describe knowledge having strength for competitive advantage. 12. Quick understanding of new opportunities to serve clients and customers.

Exhibit 2 (Cont.)

Construct	Construct Operationalization	Measure (Seven-Point Scale 1 Strongly Agree-7 Strongly Disagree)
(KMF) Combinative Framework (CF)	Combinative capabilities refer to organizational processes by which firms synthesize and acquire knowledge resources and generate new applications from those resources (Kogut and Zander 1992).	13. Unique ability to outperform competitors' strategies and tactics. 14. Routing communication between people through proper channels. 15. System to reinforce knowledge and learning. 16. Diversified cash flows across business line or geography.
Change Capability (AC)	Definitions of change typically suggest it is composed of three main elements, a current state, a desired future state, and a set of transition processes to shift from the current state to the desired future state (Beckhard and Harris, 1987).	17. Leadership with consensus based direction setting. 18. Focusing change simultaneously on systems and corporate culture. 19. Valuing to be proactive rather than reactive. 20. Emphasis on new practices to suit changes. 21. Ability to align with need of change in case of shifting business priorities.
Competitive Advantage (CA)	The capability of an organization to create a defensible position over its competitors (Li <i>et al.</i> , 2006, p. 111)	22. Utilizing learning capability to drive change. 23. Ability to change swiftly than the competitors. 24. Strong change capability (i.e., ability to imbibe knowledge). 25. Utilizing change capability to drive learning.

Measurement Models

Exploratory Factor Analysis

Measurement analysis was performed on all the study scales, each construct/scale was assessed for unidimensionality and reliability. The concept of unidimensionality has been recognized as one of the most basic assumptions in the measurement theory (Steenkamp and Trijp, 1991). It is defined as the existence of one construct underlining the set of items (Anderson and Gerbing, 1987; Dillon *et al.*, 1987; and Steenkamp and Trijp, 1991). Before proceeding with Confirmatory Factor Analysis (CFA), Exploratory Factor Analysis (EFA) was performed initially on each scale separately to check as to whether all factors load on a single construct on the study sample of 216. As the scales are hypothesized to be unidimensional, all items in one scale should load highly on one factor, i.e., KMO should be greater than 0.5. Stringent item loading retention rules are items loading 0.5 and at least three items loading on one

factor (Tansey *et al.*, 2001; and Bawa, 2004). Following the above rules, the results of EFA were interpreted for each scale (Table 1). In the exploratory factor analysis, it was found that the scales were unidimensional on the basis of Eigenvalues greater than 1 heuristic (Delgado *et al.*, 2003). One principal component was extracted that accounted for more than 50% of the total variance for the scale.

Measures	KMO Measures of Sampling Adequacy	Bartlett's Test of Sphericity		
		Approx. Chi-Square	df	Sig.
Change Capability	0.815	274.640	10	0.000
Knowledge management framework	0.842	268.326	10	0.000
Learning and Innovation Capability	0.874	283.871	15	0.000
Combinative framework	0.746	147.311	6	0.000
Competitive Advantage	0.822	270.835	6	0.000

Confirmatory Factor Analysis (CFA)

We used the maximum likelihood method to assess our structural model with the study sample of 216. The convergent reliability and validity of the alignment were evaluated by examining the adjustment level of the model and the causality coefficient linking various constructs. Although all the scales were established as unidimensional after EFA, a CFA was performed to further check the reliability and validity of scales. Indicator reliability was found to be greater than 0.5 (Table 2) in conformance with that proposed by Long (1983), Schumacker and Lomax (2004) and Wu (2005).

Indicators	CA	CF	CC	LIC	KMF
1	0.54	0.67	0.46	0.53	0.54
2	0.49	0.56	0.54	0.52	0.55
3	0.52	0.45	0.53	0.55	0.52
4	0.49	0.55	0.57	0.52	0.56
5	–	–	0.58	0.56	0.47
6	–	–	–	0.57	–

Cronbach's alpha values of all scales were found to be above 0.6 (Nunnally and Bernstein, 1994; and Hair *et al.*, 1998). The construct reliability was found to be higher than 0.6 (Fornell and Bookstein, 1982) and the average variance extracted resulted in values higher than 0.5 (Fornell and Larcker, 1981), indicating that construct reliability is good with high internal consistency. The estimated correlation between the factors was not greater than 0.85 which suggested evidence of discriminate validity (Kline, 2010). While comparing the average variance extracted and shared variance, the AVE was found to be greater than the shared variance giving evidence of discriminate validity. To draw a logical relationship among the variables in the model, predictive validity (Dun *et al.*, 1994; Ahire *et al.*, 1996; Mentzer and Flint, 1997; and Garver and Mentzer, 1999) was also calculated (Table 3). It was observed that all correlation values were found to be positive and significant, thus giving proof of predictive validity. As far as the measurement models are concerned, all of them showed good adjustment, therefore enabling us to accept the reliability and validity of the scales used to measure each of the theoretical concepts.

Table 3: Cronbach's Alpha Values of All Scales

Measures	No. of Items	Cronbach's Alpha	Construct Reliability	AVE
Change Capability	5	0.787	0.84	0.51
Knowledge management framework	5	0.817	0.87	0.50
Learning and Innovation Capability	6	0.849	0.90	0.53
Combinative framework	4	0.766	0.86	0.55
Superior Performance/ Competitive Advantage	4	0.832	0.87	0.53

Structural Model: The SEM capabilities of AMOS, 19 were employed to assess the conceptual research model illustrated in Exhibit 1. LIC, KMF and CF were considered as independent variables in the study. The dependent variable in the study was CA which was measured by superior performance as a proxy, (Porter, 1980; Christensen and Fahey, 1984; and Kay, 1994, cited by Barney, 1991; Chacarbaghi and Lynch, 1999; Passemard and Calantone, 2000; cited by Clulow *et al.*, 2003), whereas CC was considered as mediating variable. The structural model (Exhibit 3) shows reasonable fit as the values obtained by the various indices fall within the commonly accepted limits (Mueller, 1996). Garver and Mentzer (1999) recommended the Comparative Fit Index (CFI) and the Root Mean Squared Approximation of Error (RMSEA). Therefore, the commonly applied fit indices are CFI (>0.90 indicates good fit), RMSEA (<0.08 indicates acceptable fit), and commonly used χ^2 statistic (χ^2 / df ratio of 3 or less) (Exhibit 3 and 3a).

Path Coefficients and Hypothesis Testing

Mediation Analysis: Mediation analysis was conducted to test the effect of CC as mediator in the relationship between LIC, CF, KMF and CA. The mediation hypothesis is stated as:

H_{MCA} : CC plays a mediating role between learning and innovation, KMF, combinative capabilities and CA.

AMOS assists in direct calculation of direct and indirect effects. Mediation exists if the coefficient of the direct path between the independent variable and the dependent variable is reduced when the indirect path via the mediator is introduced into the model (Bontis *et al.*, 2007). The indirect effect can be estimated by the product of direct effect (β -value) of independent variable on mediator variable and direct effect of mediator variable on dependent variable (MacKinnon, 2000; and Cheung, 2007 and 2009).

The indirect effects should be lower than the direct effects if mediation is to be confirmed. The relationship of three constructs with CA revealed three different findings. Indirect effect of LIC on CA is lower than the direct effect, indicating that learning and innovative capability is mediated by CC. Indirect effect of CF on CA is higher than the direct effects, so CF is a direct determinant of CA. The value of KMF observed in the direct effect is negative which indicates suppression effect (Tzelgov and Henik, 1991; and Cliff and Earleywine, 1994). However, in isolation, KMF alone does not seem to contribute to CA based on negative path coefficient values of the direct effect (Table 4).

Symbol	Hypothesis	β	Result
H_{LICC}	Learning and innovation capability has a significant, direct and positive impact on change capability.	0.59	Accepted
H_{LICC}	Learning and innovation capability has a significant, direct and positive impact on competitive advantage.	0.93	Accepted
H_{KMFAC}	Knowledge management framework has a significant, direct and positive impact on change capability.	0.12	Accepted
H_{KMFCA}	Knowledge management framework has a direct and positive impact on competitive advantage.	-0.33	Not Accepted
H_{CFCC}	Combinative framework has a significant, direct and positive impact on change capability	0.37	Accepted
H_{CFCA}	Combinative framework has a significant, direct and positive impact on competitive advantage.	0.08	Accepted
H_{ACCA}	Change capability has a significant, direct and positive impact on competitive advantage.	0.25	Accepted

Exhibit 3: Structural Model

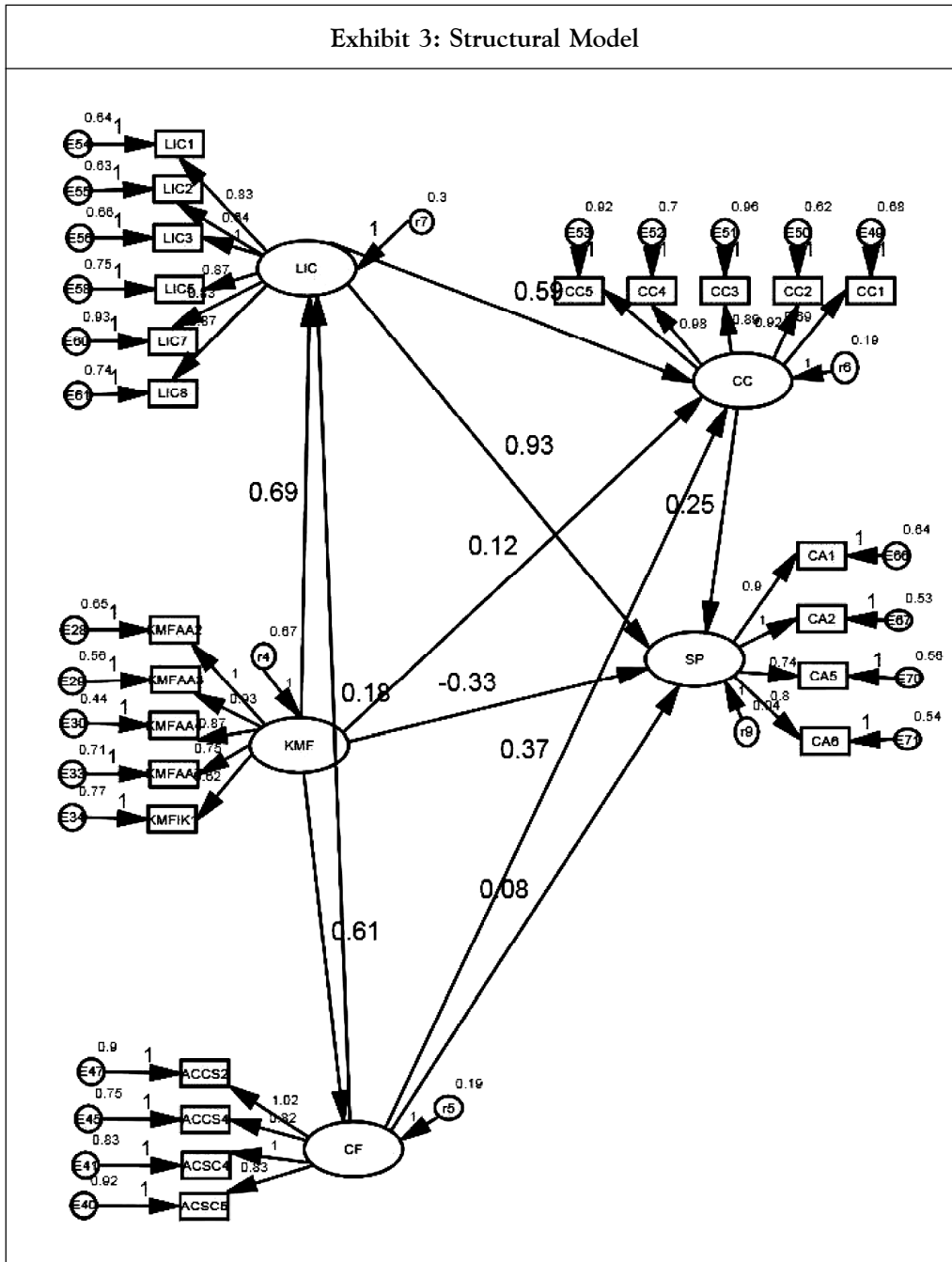


Exhibit 3a: Goodness of Fit Indices for the Proposed Model

γ^2	DF	P	CFI	PCLOSE	RMSEA	HOELTER (0.01)	HOELTER (0.05)
347.447	234	0.002	0.942	0.645	0.047	180	188

Independent Variables	Direct Effect on CA	Indirect Effect on CA	Nature of Mediation
Learning and Innovation Capability (LIC)	0.93	0.148	Yes
Combinative Framework (CF)	0.015	0.292	No
Knowledge Management Framework (KMF)	-0.033	0.939	No

Discussion

The results of the three indices, namely, the normed chi-square, RMSEA and CFI, indicate that the hypothesized model fits the sample data and proves the adequacy of the model. The above indices show that the theoretical underpinning of the model shown in Exhibit 3 is sound. The findings of this research have implications for research and practice of CC and CA. This research contributes to a better understanding of the field of strategic management. The results provide useful insight for an organization that considers implementing learning and innovation capability, KMF and CF as a strategy for gaining CA. This study has supported existing knowledge. From the results, we conclude that CC contained three constructs—LIC, KMF and CF—that are positively associated with organizational performance which is used as a proxy for CA (Table 5). These findings support previous studies (Nelson and Winter, 1982; Cohen and Levinthal, 1990; Kogut and Zander, 1992; Nonaka and Takeuchi, 1995; and Crossan *et al.*, 1999).

To date, numerous studies have been conducted based on the individual components of CC (learning and innovation, knowledge management and CF) and its relations to organizational performance. No empirical evidence, except this present study, found in the literature has supported the relationship between organizational performance and the aggregate of all four concepts in one study. This research also found that CC, as an aggregate concept, is positively associated with organizational performance. Better focus on learning and innovation, proper KMF and CF towards managing core processes, and providing high flexibility tend to achieve better performance of an organization. No empirical evidence in the literature supports the relationship between these three factors as an aggregate concept and business performance in one study.

When we implement strategies, LIC, KMF, CF and CC should be viewed as a core concept for superior sustained performance. From these results, it was not confirmed that CC as an aggregate concept plays an important mediating relationship between learning, knowledge, combination and organizational performance. This finding can be further corroborated for indepth interpretation of previous studies regarding the relationship between the effects of change capabilities and organizations' superior performance.

This research also provides empirical evidence for guiding principles that current strategic management literature advocates, namely, the concept of dynamic capabilities (Eisenhardt, 1989b; Grant, 1996; Kogut, 1996; and Teece *et al.*, 1997). Concentrate on these, and while

there is no certainty in the environment; the chances of achieving successful position will be amplified. The implications for managers in this research are, when an organization seeks to sustain their CA joint effect of learning, knowledge and their enabler referred above as combination framework should be considered. This implies that future research should take these three factors into account when conceptualizing and measuring firm's CA.

Limitations: The result of this research should be viewed with some caution. Our methodology adopted a cross-sectional survey type research and we can only prove association not causality. Another limitation is the use of the same respondent for both our independent and dependent variables. As the dependent and independent variables were collected using the same survey instrument, there is a danger that common method variance might influence the result. Although our respondents appeared to possess sufficient knowledge of their organization's ability to sense, understand and respond to the indicators used, as well as their performance relative to major competitors, a multiple-respondent survey design would have strengthened the validity of our results. SEM-based techniques require greater amount of data to generate more appropriate results, i.e., we need to collect more data for more valued interpretation.

Implications for Future Research: Based on the results and discussion of our research, one of our future research avenues is to extend the research model by adding a different set of independent variables and examine its impact on CA. We hope that this study adds more granularity to the CA construct. It reflects a capability that is increasingly important in today's hypercompetitive environments. However, in order to build on this work, more research is needed on the nomological network around CC. This could include specific antecedents to change capabilities like firm's external networks, their change capacity, and the important role of information infrastructure and software to tap into important repositories. Additionally, the role of environmental scanning, its incidence, people and structures can shed light on the integrative aspects of CC. For absorption of knowledge, its manifestation into learning through proper combination, flexibility and speed in configuring people, technology, structure, strategy and processes would be key aspects to building capabilities. The constructs and the measures used in the research can be coextended to industries of similar type to analyze the effect of 'applied to determine the interrelationships'. There are several avenues for future research. For example, research could focus on industries in other sectors such as manufacturing and information technology. So, a new questionnaire could be constructed to better evaluate the constructs of the structural model used in the research. ✪

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