

Absorptive Capability and Competitive Advantage: Some Insights from Indian Pharmaceutical Industry

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ABSTRACT: Every firm learns through firm specific methods. This learning process is operationalized by firm's knowledge management practices. Therefore, knowledge to result in successful learning should be assisted by a combinative framework which can enhance a firms' absorptive capability. This in turn will play a decisive role for achieving competitive advantage. Current literature in strategic management focuses towards dynamic capability as a source of competitive advantage. Earlier studies have focused their attention on direct relationships among few selective factors like knowledge management framework 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 absorptive capability by ignoring the constituting factors which should be integrated. Absorptive capability is a type of dynamic capability. Absorptive capability as a construct involves framework for managing knowledge, ability to combine the existing and acquired knowledge and leveraging knowledge through learning for innovation. Using absorptive capability as a mediator a model to understand the drivers of competitive advantage in Indian Pharmaceutical Industry is developed.

Keywords: *Absorptive capability, Competitive advantage, Knowledge management framework, Learning capability, Combinative framework*

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 forces of change has grown in exponential fashion in terms of complexity. In light of this unpredictable and multifaceted competitive intensity, reorientation in the philosophy for achieving sustained competitive advantage 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 focused their attention on the significant role played by dynamic capabilities and everyone has significantly contributed in their own way towards understanding the contribution of this construct towards competitive advantage. Dynamic capabilities are needed in dynamic markets; therefore, the resource based view of firm in the changing context should focus on managerial ability to integrate, build,

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and reconfigure competencies to address rapidly changing environments' for sustained competitive advantage. Leveraging knowledge for competitive advantage is now acknowledged widely by the mainstream researchers in the area of strategic management. But it is believed that the roots of the problem lie in exploiting the knowledge resources for taking lead and achieving competitive superiority. Managers of all organizations are well aware of 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; while a cohesive and integrative framework to understand the interwoven complexities is somehow lacking.

Existence of prior knowledge is a prerequisite which has been empirically verified by the earlier researchers in strategic management. Pharmaceutical industry presents an excellent platform to address and investigate the issues of what drives absorptive capability and what is its impact on competitive advantage. The concept of organizational absorptive capacity refers to the acquisition, assimilation and exploitation of information. Thus, to understand the sources of a firm's absorptive capacity in line with what has been proposed by Cohen and Levinthal (1990), the present study focuses on the knowledge management framework within an organization, its relationship with learning & innovation capability and the combinative framework which the organization employs and their cumulative effect on competitive advantage. A model is developed which includes determinants of organizational absorptive capabilities viz. knowledge management framework, learning and innovation and combinative capabilities their synergistic effects on absorptive capabilities and its ultimate impact on competitive advantage.

The scheme of the paper is as follows. First, it discusses the theoretical underpinnings of our study, and the key theoretical constructs pursued. Second, the research model is described, the subsequent section, deals with the organizational setting, data collection and the analysis of the quantitative data collected. Finally there is a discussion on the implication of the findings, as well as the conclusions of the

study. This concluding section points to further research directions.

Literature Review

It has been established that dynamic capabilities are an essence for competitive advantage (Teece et al., 1997). It is the extension of resource based view to dynamic market which advocates that the dynamic capabilities by which managers integrate, build, and reconfigure competencies to address rapidly changing environments' become the source of sustained competitive advantage (Teece et al., 1997). Dynamic capabilities refer to the ability to sense and then seize new opportunities, and to reconfigure and protect knowledge assets, competencies, and complementary assets and technologies to achieve sustainable competitive advantage (Teece, 1998). Henderson and Cockburn, (1994) and Teece et al. (1997), have demonstrated that dynamic capabilities are behind the creation, evolution and recombination of resources into new sources of competitive advantage. Reviewing the aspects addressed by various researchers one can define dynamic capability as configurations, Core competencies, Prahalad and Hamel, 1990; lean production, Womack, Jones, and Roos, 1991; Collis and Montgomery, 1995, 1998; Porter, 1996.

The world pharmaceutical market has undergone fast, unprecedented, tremendous and complex changes in the last several years. The pharmaceutical industry is one of the most inventive, innovative and lucrative of the so-called "high-tech" industries of the modern world; however, it might be that the pharmaceutical industry has been adapting itself more and more to strategic market trends and market demands. Further strategic development of the world pharmaceutical industry shows clearly its consolidation, concentration and strong market orientation.

The changed face of competition has placed ever increasing demand over firms to adapt, renew, reconfigure and recreate their resources and capabilities in line with the competitive environment since 1990 onwards. Organizational flexibility and absorptive capability 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 and what is its

impact on competitive advantage. Although, R&D has been identified as a key variable driving the competitiveness of the firms in the pharmaceutical industry, a number of studies suggest that R&D expenditures, even if they lead to innovation, do not necessarily provide firm-specific advantages that lead to higher performance (Mansfield, Schwartz and Wagner, 1981; Teece, 1987). Strategic group analyses of the pharmaceutical industry (Cool and Schendel, 1987; Fiegenbaum et al., 1990) suggest that factors other than R&D expenditures may be responsible for performance differences. Thus, it is necessary to understand the role of absorptive capability as a construct.

Literature reveals various constructs for dynamic capability viz. Strategic decision making (Fredrickson, 1984; Eisenhardt, 1989; Judge and Miller, 1991), Routines (Clark and Fujimoto, 1991; Dougherty, 1992; Helfat and Raubitschek, 2000). Transfer processes (Szulanski, 1996; Hargadon and Sutton, 1997; Hansen, 1999), knowledge creation routines whereby managers and others build new thinking within the firm, is 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; Rosenkopf and Nerkar, 1999).

Other capabilities viz. distinctive competence (Selznick 1957; 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- Barton 1992), combinative capability (Kogut and Zander 1992) and architectural competence (Henderson and Cockburn 1994) are the forms of dynamic capabilities exhibited by firms. Absorptive capability is a dynamic capability (Verona and Ravasi 2003; Salvato 2003; Woiceshyn and Daellenbach, 2005; George 2005; Wang and Ahmed, 2007) the higher a firm exhibits absorptive capabilities the higher it has dynamic capabilities.

For successful innovation competencies must be possessed by organizations at multiple level (Leonard-Barton, 1992), This includes skills, knowledge, management systems for the knowledge and institutional values which can enhance its ability to combine the existing and

potential knowledge, Warner (2003) has reviewed evidences that firms' ability to learn is effected by the prior investments they have made in the areas of their competence.

The innovative capabilities, in which Indian companies are gaining mastery, have made the introduction of generic pharmaceuticals to Western markets remarkably different as compared to the other novel drugs. It requires a wide range of technical, legal and regulatory skills. Development of a process for chemical and chiral synthesis on a relatively large scale to the expected levels of quality and purity, its implementation at a specific site and a product which is "bioequivalent" according to exacting criteria are required. The same is to be demonstrated to the EU and US regulators for permission to produce and market these generic pharmaceutical to this market (Maris et al., 2003; Meadows, 2003).

Absorptive Capability as a Strategic Construct

A firm's ability to develop new knowledge through external sources depends upon its learning capacity, that is, on its ability to acquire, create and disseminate new knowledge. Cohen and Levinthal (1990) refer to this organizational capacity to generate new knowledge as absorptive capacity and define it as the ability of a firm to identify, assimilate and apply external knowledge. In-depth inquiries have examined multilevel cognition constructs, including organization learning (Crossan, Lane, and White, 1999), organizational knowledge (Nonaka and Takeuchi, 1995), organization memory (Walsh and Ungson, 1991), and organizational intelligence (Glynn, 1996) which affect organizational dynamic capabilities.

Nonaka and Takeuchi (1995) have proposed that organizational learning and the knowledge management process are different concepts. 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. Organizational knowledge as a firm resource and a source of competitive advantage and is rooted in research on the resource-based view of the firm (Penrose, 1959; Barney, 1991). Several authors argue for a

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“knowledge-based theory of the firm” as a theory that explains the organizational advantage of firms over markets (Ghoshal and Moran, 1996; Grant, 1996).

“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, Lane, and White, 1999). When individual and group learning becomes institutionalized, organizational learning occurs and knowledge is embedded in non-human repositories such as routines, systems, structures, culture, and strategy (Nelson and Winter, 1982; Walsh and Rivera, 1991; Crossan, Lane and White, 1999). Because of its intrinsic notion of change, organizational learning research has dealt with questions of how organizations evolve, transform (Barnett, Greve and Park, 1994; MacIntosh, 1999), and renew themselves (Crossan et al., 1999; Lant and Mezias, 1992; Mezias and Glynn, 1993) in order to face the challenges of a continuously changing environment. Learning is the individual and organizational process for creating new knowledge to meet changing environments (Burkhard, 2005).

Research on organizational learning examines underlying processes that affect an organizational unit’s potential to develop competencies based on its own and others’ experience (Levitt and March, 1988; Argote, 1999). This literature and related research on technological innovation and dynamic capabilities, which addresses how firms sustain advantage by spawning new competencies and by developing existing competencies more effectively than competitors, have deepened competence-based inquiry into value creation through voluntary transfer (Argote, Beckman and Epple, 1990; Zander, 1991; Kogut and Zander, 1992; Zander and Kogut, 1995; Epple, Argote, and Murphy, 1996) and replication of competencies (Teece et al., 1997, 2000; Winter and Szulanski, 2001).

Knowledge can be obtained through the mind (learning by reflection, anticipatory learning) and through the body (learning by doing, experimental learning). Knowledge also can be accumulated in our minds (knowing what, theoretical knowledge, declarative knowledge) and also in our bodies (knowing how, practical knowledge, procedural knowledge). Learning is

the change in knowledge and the change in knowing, which involves, as mentioned before, changes in cognition and changes in behavior.

Knowledge and competences which are not easily acquired by others have been included in research mainstream because it leads to distinctive advantage over competitors (Johannessen et al., 2005). Nahapiet and Ghoshal (1998), define social capital as “the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit”; Kogut and Zander (1996) have proposed that “a firm be understood as a social community specializing in the speed and efficiency in the creation and transfer of knowledge”. Internal and external relationships of an organization (referred here as combinative framework) enhance the ability to create effective partnerships and strategic alliances which can help to build intellectual capital through the facilitation of innovation, knowledge acquisition, knowledge transfer and knowledge translation (Koka and Prescott, 2002; Chiesa and Toletti, 2004).

How knowledge can become the source of competitive advantage requires an understanding about how it can be developed, retained and transferred (Pisano, 1994; Szulanski, 1996; Almeida, 1996; Hoopes and Postrel, 1999; Argote and Ingram, 2000). Thus it is necessary to understand the micro processes through which knowledge is created or acquired, communicated, applied, and utilized in organizations. For this organizational capabilities which ensure alignment through combination merit careful investigation (Hedlund, 1994; Leonard, 1995; Sanchez, 1996; Bierly and Chakrabarti, 1996; Davenport and Prusak, 1998; Zack, 1999) about the role of strategy, structure, environment, and leadership.

Both the literature on organizational learning and knowledge management has been growing over the past years. While organizational learning primarily aims to identify the underlying processes of learning by clarifying critical issues like the content, agents and levels of learning, knowledge management takes a proactive role of explicitly providing guidelines for active intervention into the organization’s knowledge base. The enablers of the active interventions are located in the organizational

systems and practices. Above discussion leads us to explore the interrelationship between a firm's learning, Knowledge, and the firm's combinative ability and bearing of this interrelationship on the firm's absorptive capability which can result in distinctive advantage over its rivals through the proposed model.

RESEARCH METHOD

It is proposed that the firm's absorptive capability leads to competitive advantage; however, a firm's absorptive capability will lead to distinctive advantage over its rivals when the Learning capability, knowledge management framework and combinative framework are integrated and aligned (Cohen and Levinthal 1990; Kogut and Zander, 1992; Nonaka and Takeuchi, 1995; Crossan, Lane and White, 1999).

Research Objectives

1. What is the relationship between organizational learning and innovation capabilities and firms' competitive advantage, especially when organizations focus on absorptive capabilities? To what extent, learning and innovation capabilities lead to superior performance?
2. What is the relationship between knowledge management framework and firms' competitive advantage, especially when organizations focus on absorptive capabilities? To what extent, knowledge management framework leads to superior performance?
3. What is the relationship between combinative framework and firms' competitive advantage, especially when organizations focus on absorptive capabilities? To what extent,

combinative framework leads to superior performance?

His idea is expressed in the model shown in figure 1 where the firm's absorptive capabilities (AC) act as a mediating variable in the relationship between learning and innovation capabilities (LIC), knowledge management framework (KMF), combinative framework (CF) and competitive advantage (CA).

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

H_{LICAC} : Learning and innovation capability has a significant, direct and positive impact on absorptive capability.

H_{LICCA} : Learning and innovation capability has a significant, direct and positive impact on competitive advantage.

H_{KMFAC} : Knowledge management framework has a significant, direct and positive impact on absorptive capability.

H_{KMFCA} : Knowledge Management Framework has a direct and positive impact on competitive advantage.

H_{CFAC} : Combinative framework has a significant, direct and positive impact on absorptive capability.

H_{CFCA} : Combinative framework has a significant, direct and positive impact on competitive advantage.

H_{ACCA} : Absorptive capability has a significant, direct and positive impact on competitive advantage.

H_{MCA} : Absorptive capability plays a mediating role between learning and innovation, Knowledge management framework, combinative capabilities and competitive advantage.

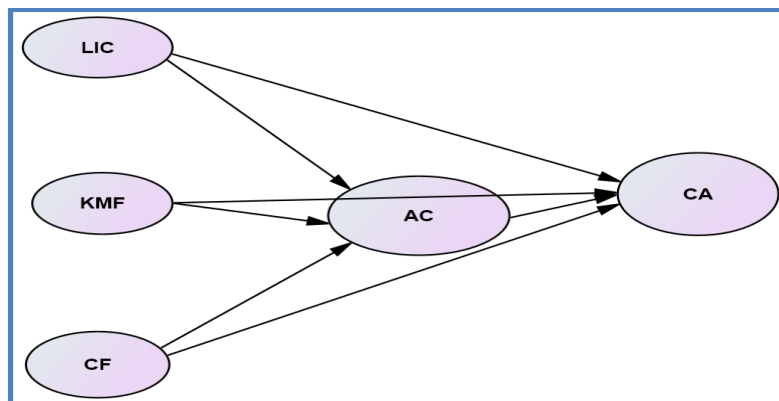


Figure 1: The proposed model

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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 CMIE (Centre for monitoring Indian Economy) database (PROWESS) yielded a list of 648 pharmaceutical organizations along with their financial details. The list obtained from PROWESS was deemed as a reliable sample frame. The organization was the level of analysis identified for this study. The level of analysis is determined by the level at which the main research questions are posed and analyses carried out rather than the level at which data are collected (Davidsson and Wiklund, 2001).

Snow and Hrebiniak (1980) affirm that 'top managers have the best vantage point for viewing the entire organizational system' (1980, p. 320). So, the information was collected from 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, for example, 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 competitive advantage and then make resource investment decisions to enhance organizational performance (Maritan, 2001).

Based on Ketchen and Palmer (2002) who examined a large number of strategic management studies published in major scholarly journals during the period of 1980–1999. Their examination of the 437 studies published in the top journals 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 data base was analyzed on the basis of sales turnover i.e. firms having turnover more than Rs. 500 crore and their growth in sales over past eight years. A total of 30 firms qualified the study objectives as per the sales turnover criteria. To resolve the existing disparities and for equivalence as mentioned in earlier researches in the area of strategic management all thirty 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 four hundred and fifty respondents from these thirty 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 causal ties 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, Sharma and Teel, 1982; Bollen, 1990). Although, there is little consensus on the recommended sample size for SEM (Hoelter, 1983; Garver and Mentzer, 1999; 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, suggest that sample size 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 of size 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, 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 focus on large sampling base treat even 20% responses as valid responses (Malhotra and Grover, 1998; Hitt et al., 2004). The response rate in the present study is relatively high as compared to similar researches in the area 21% (Paxson, Dillman and Tarnai, 1995), 41% (Dyer and Nobeoka, 2000; Kotabe, Martin and Domoto, 2003; Dyer and Hatch, 2006), 25% (Kale, Dyer and Singh, 2002; Kale and Singh, 2007), 32% (Hoskisson et al., 2000) 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 response rate, item completion rate is used as another measure of survey effectiveness, as suggested by Klassen and Jacobs (2001). They define 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 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 and Analysis

The present study has followed the recommended guidelines for developing measures of our constructs (Churchill, 1979). As the study is based on the testing the relationships between the variables affecting absorptive capability and its subsequent effect on competitive advantage, 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 Competitive Advantage scale Ulrich and Lake (1991); Learning by Zhuang et al. (1999); Kale et al. (2001) and (Ulrich and Lake, 1991); Competitive Advantage scales Liet al. (2005); Tu et al. (2004); Solis-Galvan (1998); Li et al. (2006); Koufteros (1995).

Considering the objective of the research no pre-existing 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 was developed in two stages as proposed by (Menor and Roth, 2007), (table 1).

Measurement Models Exploratory Factor Analysis

Measurement analysis was performed on all the study scales each construct/scale was assessed for Uni-dimensionality and reliability. Exploratory factor analysis (EFA) was performed initially on each scale separately to check as to whether all factors load on a single construct. To determine if the data is likely to factor well, before proceeding with EFA, Kaiser-Mayer-Olkin (KMO) measure of sample adequacy and Bartlett's Test of sphericity were performed. KMO measures quantifies the degree of the inter correlations among the variables and hence the appropriateness of factor analysis. If, KMO, is found to be greater than 0.50 then one can proceed with factor analysis (Melhotra, 2010). The KMO values of all scales were found to be meritorious; signaling that the data was suitable for factor analysis. As the scales are hypothesized to be unidimensional, all items in one scales should load highly on one factor i.e. KMO should be greater than 0.5. Stringent item loading retention rules suggest items loading of 0.5 and at least three items to load on one factor (Tansey et al. 2001; Bawa, 2004). Following the above rules, the results of EFA was found satisfactory for all scales.

Confirmatory Factor Analysis (CFA)

We used the maximum likelihood method to assess our structural model. 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.

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Table 1: Constructs and its 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, Lane and White, 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 dynamic and pace of knowledge transformation 5. High speed of adopting the latest technology 6. Novelty of the technology used. 7. Ability to manage Technological obsolescence. 8. Focus on speed of product development.
Knowledge Management Framework (KMF)	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"> 9. Ongoing programs wherein services and products are refined 10. Recognition of quick utilization of external knowledge by employees. 11. System of identifying, developing and sustaining people's knowledge and competencies. 12. Systems which can describe knowledge having strength for competitive advantage. 13. Quick understanding of new opportunities to serve clients and customers.
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)	<ol style="list-style-type: none"> 14. Unique ability to outperform competitors' strategies and tactics. 15. Routing communications between people through proper channels. 16. Inclusion of activities performed in formal planning process 17. Covering specific activities by task descriptions 18. System to reinforce knowledge and learning 19. Diversified cash flows across business line or geography.
Absorptive capability (AC)	Cohen and Levinthal (1990) refer to this organizational capacity to generate new knowledge as <i>absorptive capacity</i> and define it as the ability of a firm to identify, assimilate and apply external knowledge.	<ol style="list-style-type: none"> 20. Unique tangible assets that customers pay a premium for and their rivals cannot imitate. 21. Control of intangible resources that customers pay a premium for and their rivals cannot imitate. 22. Ability to lock Customers into using their product by high switching costs.
Competitive Advantage (CA)	The capability of an organization to create a defensible position over its competitors" (Li et al., 2006)	<ol style="list-style-type: none"> 23. Ability to change swiftly than the competitors. 24. Utilizing learning to drive absorptive capability 25. Strong absorptive capability (i.e. Ability to imbibe knowledge). 26. Utilizing absorptive capability to drive learning.

Although all the scales were established as unidimensional after EFA, a confirmatory analysis (CFA) was performed to further check reliability and validity of scales. Indicator reliability was found to be greater than 0.5 in conformance to that proposed by (Long, 1983; Schumacker and Lomax, 2004, Wu, 2005). Cronbach's Alpha values of all scales were found to be above 0.6 (Hair et al., 1998; Nunnally and Bernstein, 1994). 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 (Klin, 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; Graver and Mentzer, 1999) was also calculated. 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.

Structural Model

The SEM capabilities of AMOS 19 were employed to assess the conceptual research model illustrated in figure 1. Learning and innovation capabilities (LIC), Knowledge Management Framework (KMF) and Combinative Framework (CF) were considered as independent variables in the study. The dependent variable in the study was Competitive Advantage (CA) which was measured by Superior Performance as a proxy, whereas Absorptive capability was considered as mediating variable. The structural Model (figure 2) 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), (table 3).

Table 2: Path coefficients and hypothesis testing

Symbol	Hypothesis	(β)	Result
H_{LICAC}	Learning and innovation capability has a significant, direct and positive impact on absorptive capability.	0.42	Accepted
H_{LICC}	Learning and innovation capability has a significant, direct and positive impact on competitive advantage.	0.77	Accepted
H_{KMFAC}	Knowledge management framework has a significant, direct and positive impact on absorptive capability.	0.36	Accepted
H_{KMFCA}	Knowledge Management Framework has a direct and positive impact on competitive advantage.	0.08	Accepted
H_{CFAC}	Combinative framework has a significant, direct and positive impact on absorptive capability	0.11	Accepted
H_{CFCA}	Combinative framework has a significant, direct and positive impact on competitive advantage.	-0.10	Not Accepted
H_{ACCA}	Absorptive capability has a significant, direct and positive impact on competitive advantage.	0.18	Accepted

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Table 3: Goodness of fit indices for the proposed model

χ^2	DF	P	CFI	PCLOSE	RMSEA	HOELTER(0.01)	HOELTER(0.05)
428.4	279	0.002	0.940	0.497	0.050	161	170

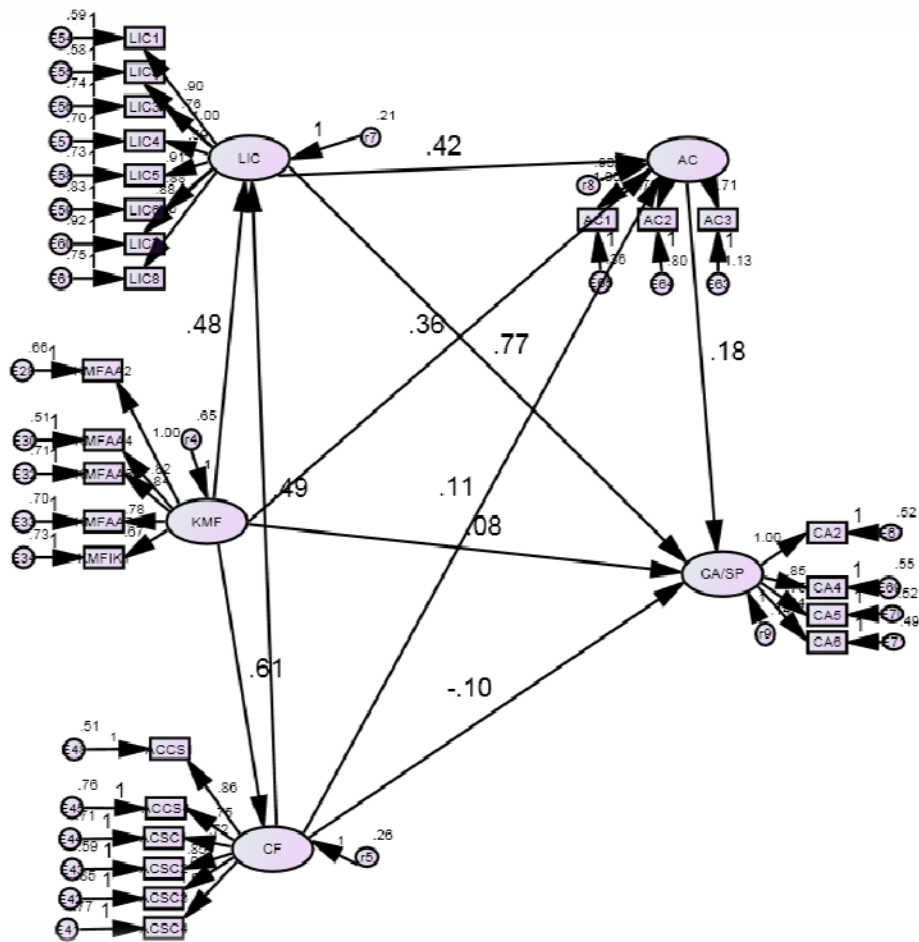


Figure 2: Structural model

Mediation Analysis

Mediation analysis was conducted to test the effect of Absorptive Capability (AC) as mediator in the relationship between Learning and innovation (LIC), Combinative Framework (CF), Knowledge Management Framework (KMF) and Competitive Advantage (CA). The mediation hypothesis is stated as, H_{MCA} : Absorptive capability plays a mediating role between learning and innovation, Knowledge management framework, combinative capabilities and competitive advantage.

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; Cheung, 2007; Cheung, 2009), (table 4).

The indirect effects should be lower than the direct effects if mediation is to be confirmed. The relationship of three constructs with Competitive Advantage (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 Absorptive capability. Indirect effect of KMF on CA is higher than the direct effects, so knowledge management framework is a direct determinant of competitive advantage. The value of CF observed in the direct effect is negative which indicates suppression effect (Tzelgov and Henik, 1991; Cliff and Earleywine, 1994). However in isolation CF alone does not seem to contribute towards competitive advantage based on negative path coefficient values of the direct effect.

Table 4: Direct and indirect effect of independent variable on dependent variable

Independent Variables	Direct Effect on CA	Indirect Effect on CA	Nature of Mediation
Learning and Innovation Capability (LIC)	0.769	0.078	Yes
Combinative Framework (CF)	-0.10	0.437	Suppression effect
Knowledge Management Framework (KMF)	0.016	0.679	No

RESULTS AND DISCUSSION

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

To date, numerous studies have been conducted based on the individual components of AC (Learning and innovation, knowledge management, combinative framework) 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 absorptive capability, as an aggregate concept, is positively associated with Organizational Performance. Better focus on learning and innovation, proper knowledge management framework and combinative framework 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.

CONCLUSION

When we implement strategies, LIC, KMF, CF and AC should be viewed as a core concept for superior sustained performance. From these results, although it was not confirmed that absorptive capability as an aggregate concept plays an important mediating impact relationship between learning, knowledge, combination and organizational performance. This finding can be further corroborated for in-depth interpretation of previous studies regarding the relationship between the effects of absorptive 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, 1989; Grant, 1996; Kogut, 1996; Teece, Pisano and Shuen 1997; 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 competitive advantage joint effect of learning, knowledge and their enabler referred above as combination framework should be considered. This implies that future research should take into account these three factors when conceptualizing and measuring firm's competitive advantage.

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 result 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 competitive advantage. We hope that this study adds more granularity to the competitive advantage construct. It reflects a capability that is increasingly important in today's hypercompetitive environments. However, in order to build on this work, far more research is needed on the nomological network around absorptive capability. This could include specific antecedents to absorptive capabilities like firms external networks, their absorptive 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 absorptive capability. 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 for example. So, a new questionnaire could be constructed to better evaluate the constructs of the structural model used in the research.

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