

**Knowledge Management Practices and Competitive Advantage: The Mediating Role of
Innovation Capacity**

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Abstract

This study has investigated the impact of knowledge management on competitive advantage through innovation capacity (mediator) of an organization. The research sample comprised employees (N=331) of private telecommunication organizations. Two step procedure of Structural equation modeling has been followed. In the first step confirmatory factor analysis was conducted for scale validation and the second step included structural model for investigating the relationship between these three processes. The results revealed that all the practices of knowledge management are being practised by the telecommunication organizations. Further, innovative capacity fully mediates the relationship of knowledge management and competitive advantage. In future, the impact of organization culture in between knowledge management and innovation capacity should be tested.

Keywords: knowledge management, competitive advantage, innovation capacity

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Introduction

In late nineties, Asian countries, including India, realized that knowledge burst, dispersal of information and communication will affect their paradigm alteration in development strategies and help to reach global market (Thakur and Sinha, 2013). This opened the doors for knowledge management (KM) program in Indian organizations, with new analytical perspective (Bender and Fish, 2000). For achieving competitive advantage, Indian industries looked forward to adaption and up gradation of its knowledge management system regularly, especially the service industries. Information technology (IT) has been recognized as a key enabler/implementer of KM program within the organizations (Jennex, 2005; Bhosale and Nalawade, 2012; Tsui, 2005; Carneiro, 2000), which is used to decide, to fight competitors, and to catch target markets. Its capabilities in the terms of both storage and communication, helps to control knowledge resources easily and effectively (Alavi and Leidner, 2001).

In India, IT industry has grown at the rate of about fifty percent in domestic as well as export market for the last five years. At present, India is one of the fastest-growing IT services markets in the world, with three-quarters of large Indian enterprises planning to increase IT spending with an average budget of US\$ 12.2 million (Gartner, 2013). This sector is contributing substantially to GDP, employment, and exports. Beside this, Indian IT industries have also gained a brand identity of “knowledge economy” (NASSCOM, 2012), not only due to high number of presence in Most Admired Knowledge Enterprise (MAKE) award in last

few years but also for winning this prestigious award for their better management of knowledge (Sanghani, 2008). KM in Indian IT industry is being highly implemented a lot (Sanghani, 2008; Chaudhuri, 2011; Thakur and Sinha, 2013), indicating the knowledge intensiveness of this sector.

Review of literature has revealed that past research on knowledge management has focused on their theoretical framework as well as on judging their employees awareness and implementation level by the organizations (Nonaka, 2007; Easterby-Smith and Prieto, 2008; Sanghani, 2009; Holsapple and Joshi, 2002; Singh and Soltani, 2010; Anand and Singh, 2011; Gavrilova and Andreeva, 2012; Yadav et al., 2012; Lashkary et al., 2012; Abdel – Qader et al., 2013; Denford, 2013). Further, they also have focused on the impact of KM on competitive advantage of an organization or enhancing the innovation capacity of the organization separately (Adams and Lamont, 2003; Rahimli, 2012; Akram et al., 2011; Alawneh et al., 2009; Schiuma and Lerro, 2008; Karaszewski, 2008; Akdere, 2009; Mahdi et al., 2011; Kongpichayanand, 2009; Alipour et al., 2010; Krstic and Petrovic, 2012; Cantner et al., 2009; Dhopte and Nandola, 2012; Gyensare and Asare, 2012; Jyoti et al., 2011; Iacono et al., 2012). These researchers have studied KM with a limited perspective, means one or practices of KM at a time (Darroch, 2005; Nonaka and Takeuchi, 1995, Jantunen, 2005; Sher and Lee, 2004; Zaim et al., 2007; Decker et al., 2008; Taminiaue et al., 2009; Nowack et al., 2008; Niaz and Amuei, 2008; Palacios et al., 2008; Alrawi, 2008; Taminiaue et al., 2009; Honarpour et al., 2012). Further, some of the researchers have discussed indirect role of knowledge management and competitive advantage through innovation (Taleghani et al., 2012; Costa and Cabral, 2010; Carneiro, 2000).

This study proposes broader prospect of KM by considering all possible dimensions of KM as well as validating the KM scale too. We shall also explore impact of KM on innovation capacity and competitive advantage. Further, we shall also investigate the mediating

relationship played by innovation capacity in between knowledge management and competitive advantage relationship. The literature review also indicated that even after the adoption of knowledge management in Indian IT sector still there is very less number of studies in this context, particularly in Telecommunication sector (Singh and Soltani, 2010; Mundra et al., 2011; Sharma et al., 2012; Singh and Sharma, 2011; Chawla and Joshi , 2010). The main aim of these studies was to check the awareness, implementation level and role of KM practices in Indian information technology companies. Mundra et al. (2011) studied that competitive advantage can be achieved through knowledge management and innovation. Further, Singh and Sharma (2011) studies aim was to analyse how the organizational culture and organizational learning impacts knowledge management, and ultimately the satisfaction of employees working in the Indian telecommunication sector. Previous authors have targeted their research in following Indian sectors viz., manufacturing/industries (Kant and Singh, 2011; Singh et al., 2006; Yadav et al., 2012), pharmaceuticals (Sharma and Goswami, 2009; Hung, 2005), banks (Deepak, 2007; Suvarchala, 2011; Goswami, 2008), LMEs and SMEs (Hutchinson and Quintas, 2008; Phillip and Jeanne, 2006), Academic Libraries (Nazim and Mukherjee, 2011), Hospitality (Halin, 2008) and so on. But, there are very few studies in the area of knowledge management in telecommunication sector. There is a dearth of formal research in the area of knowledge management, competitive advantage and innovative capacity in Indian telecommunication sector. So, this model will be tested in Indian Telecommunication sector as it is the lifeline of the rapidly growing Information Technology industry in India, which is needed for rapid growth and modernisation of various sectors of the economy (OIFC, 2013). The major questions of the present study are:

- 1) Is KM a significant predictor of innovation capacity?
- 2) Is KM a significant predictor of competitive advantage?
- 3) Is innovation capacity a significant predictor of competitive advantage?

4) Does innovation capacity act as a mediator in between KM and competitive?

Literature Review and Hypotheses Development

Knowledge

Knowledge is basically a social, cultural and organizational knowledge that can be realized through changes in organizational activities and practices from time to time. Further, it is a collection of thought in the form of information that changes somebody or something either by becoming grounds for actions or by making an individual capable of different or more effective action (Drucker, 1998). It is treated as new or modified insight or predictive understanding of individuals (Kock and Queen, 1998), comes from fluid mix of framed experience (Davenport and Grover, 2001). Different authors classified knowledge in different ways such as technical and strategic knowledge, but the most common form of knowledge is tacit and explicit (Nonaka, 1994). Nonaka and Takeuchi (1995) viewed transactions of tacit to explicit and explicit to tacit as an ongoing process, which eventually results in new knowledge, and integrates the knowledge-base of the organization. According to them knowledge is justified like a true belief that increases an entity's capacity or effective action. So, it is concluded that knowledge includes understanding, mindset, intelligence and the competence of people, which comes from experience.

Knowledge Management

Knowledge is not only an important resource for a firm, but also serves as a basic source of competitive advantage (Gold et al., 2001). This advantage forces firms to look for managing individual or organizational knowledge by new strategies, supported by smarter IT solutions. Additionally, Tsui (2005) revealed that KM is becoming more and more process-centric and relevant technologies are gradually being aligned to support process-based KM activities.

The knowledge management research gained impetus between 1990-1995 with its definition, potential benefits for business, and designing specific KM projects (Nonaka, 1994; Wiig, 1993) under the responsibility of leader's (Newman, 1997). Initially in 1996, KM was viewed as a practical application, when management realized that strong leadership could not provide the necessary direction and organization will also need to implement effectively organize a knowledge management program (Hansen et al., 1999). The twenty first century organizations focused on result part i.e. the link between knowing and action (Paraponaris, 2003). The above three phases of knowledge management was focused on Explicit, Tacit and Implicit knowledge (Kidwell et al., 2000; Nonaka and Takeuchi, 1995), KM fundamentals (Wiig, 1993; Liebowitz and Beckman, 1998), KM framework (Holsapple and Joshi, 1999; Rubenstein-Montano et al., 2001), KM projects (Davenport et al.,1998), KM and AI (Fowler, 2000; Liebowitz, 2001), KM and decision support (Courtney, 2001 ;Bolloju et al., 2002), KM survey (Liao, 2003; Kakabadse et al., 2003; Singh et.al., 2006; Anantatmula and Kanungo, 2006; Wong and Aspinwall, 2005), KM software tools (Tyndale, 2002), KM in SMEs (Cantu et al., 2009; Wong and Aspinwall, 2004; Nunes et al., 2005; Durst and Edvardsson, 2012), KM in higher education (Rowley, 2000; Metaxiotis and Psarras, 2003; Kidwell et al., 2000; Milam, 2009; Niaz and Amuei, 2008; Nowack et al., 2008; Tian et al., 2009), KM standardization (Weber et al., 2002), KM strategies (Chong et al., 2007) and KM in banking sector (Cebi et al., 2010; Gyensare and Asare, 2012; Abou-Moghli et al., 2012). At present the business houses, especially IT sectors are focusing on role of knowledge management in enhancing innovation capacity of an organization as well as competitive advantage in global market.

Different authors have different definitions of KM. In industrial language, KM is the synergistic combination of data, which eloquent the skills, expertise and innovative capacity supported by information technology (Chong et al., 2006). Alavi and Leidner (2001) defined

KM system as IT based system, which is developed to support and enhance the processes of knowledge creation, storage, retrieval, transfer and application. Hsu and Shen (2005); Ooi et al. (2009) defined it as a methodological method that enhances the capability of a company to assemble and organize the knowledge in order to improve the decision-making ability and business strategy formulation process. In HR perspective, Knowledge management is a strategy to manage organizational knowledge assets to support decision making, to enhance competitiveness, and to increase individual capacity for creativity and innovation (Bharadwaj and Saxena, 2005; Nowack, et al., 2008; Diakoulakis et al., 2004). This strategy involves people, information, work-flows, best practices, alliances, and communities of practice (Bharadwaj and Saxena, 2005). From the process point of view, Nonaka and Takeuchi (1995) studied how knowledge is produced, used, and diffused within organizations and how such knowledge contributes to the diffusion of innovation. They classified knowledge management into four part viz., knowledge creation, knowledge retrieval, knowledge sharing and knowledge application, which has be reconfirmed by Wilson and Cattell (2005). Alrawi (2008) described knowledge management into three perspectives emerged, information based one, a technology based one and a culture based one. Hence, KM is result-oriented, process oriented, technology oriented, culture oriented and HR-oriented and supported by four key enablers viz., leadership, culture, technology, and measurement (Ho, 2009).

Literature has revealed that following six basic KM practices should exist simultaneously in every organization for managing the knowledge: 1) orientation towards development, transfer and protection of knowledge; 2) continuous learning in the organization; 3) development of an innovative culture; 4) competence development; 5) approach based on people; and 6) an understand organization on a global prospective (Nonaka and Takeuchi, 1995; Nonaka, 1994; Scarbough, 1999). One or two practices of knowledge management are not enough to judge the particular organizational knowledge management system as a whole. Jennex (2005)

suggested that institutions or organizations become more effective if they are capturing, sharing, retaining, and reusing organizational and individual knowledge to create a successful business environment. KM capabilities refer to the knowledge management processes in an organization that develop and use knowledge within the firm (Gold et al., 2001) and consist of knowledge acquisition, conversion, application, and protection. Although, there are many classifications of KM, this study prefer the viewpoints of knowledge capabilities because IT sector is knowledge based. It uses knowledge capabilities for continuous innovation in business products, services, and processes for achieving competitive advantage (Datta, 2012; Chaudhuri, 2011).

Knowledge Management and Competitive Advantage

Competitive Advantage is the important issue in the marketing literature (Alipour et al., 2010). It is vital for the success and survival of companies. It is necessary for the company to be competitive in order to achieve major share in market and profits. Lismen et al. (2004) defined competitive advantage as an abundance of company's suggestion attractiveness from the customer's point view in comparison with other rivals. It is diversity of features or any company's dimensions that enable it to provide better services to customers than their competitors. The resource based theory also favours KM to achieve competitive advantage (Alipour et al., 2006). It depicts that competitive advantage of an organization is based on resources. It is not only competing on the ability to exploit but also on their ability to renew and develop their existing resources. Today, competitiveness of the firm lies less on traditional factors (capital, land and labour), as knowledge is now replacing these traditional factors (Sher and Lee, 2003). Now, companies realized that competitive advantage will be gained when companies value their tacit knowledge. It can be the source of a huge range of opportunities and potentials that constitute discovery and creativity (Alwis and Hartmann,

2008). The competitive advantage of an organization depends on the quality, quantity, creation, use and application of knowledge (Ahn et al., 2009). Turbulent environmental change continuously requires effective knowledge management in order to achieve competitive advantage (Nielsen, 2006; Rahimli, 2012). When knowledge is applied to existing ends, the size and durability of a firm's competitive advantage can be defined by how well protected its knowledge is (Chakravarthy et al., 2005). It is because knowledge as an asset is the source of a competitive advantage only when it is rare and matchless. KM affects competitive advantage in three ways, viz., reduced costs, shortened production time and product differentiation. First, KM reduces the operation costs of a firm and creates added value to customers by significantly increasing product quality (Akdere, 2009). Secondly, firms shorten time by analysing current situations and allowing previous knowledge to be utilized to solve the problem for current situation (Scarbrough, 1999). Finally, KM can be regarded as central to product and process innovation and improvement, executive decision-making and organizational adoption and renewal (Earl, 2001). Well- managed KM system in an organization improves business excellence and competitive advantage (Wiig, 1997). So the hypothesis generated from the above literature is:

H1: Implementation of Knowledge management practices enhances the competitive advantage of an organization.

Knowledge Management and Innovation Capacity

Innovation has become a key to achieve competitive success (Francis and Bessant, 2005). Innovation is the embodiment, combination, or synthesis of knowledge in original, relevant, valued new products, processes or services (Luecke and Katz, 2003), whereby organizations transform ideas into new/improved products, service or processes, in order to advance, compete and differentiate themselves successfully in their marketplace (Baregheh et al.,

2009). Thus, innovation is a knowledge-based process (Jantunen, 2005) to create new ideas, markets, products and services toward achieving competitive advantage by satisfying maximum number of customers, which in turns establishes an organization as a brand. The number of innovation and organization is able to successfully adopt or implement can measure the definition of innovative capacity of an organization. This innovative potential cannot derived from a single specific skill, but a set of skills termed as innovative capacity, which are defined as the internal potential to generate new ideas, identify new market opportunities and implement marketable innovations, which is the exploration of the degree of company's existing resources and capacities (Hii and Neely, 2000). But, it becomes difficult to achieve due to the lack of a methodology and tools for systematic innovative thinking (Lee and AbuAli, 2010). Today, the prevalent challenge for the companies is to be innovative and creative in products and services that enable the business to achieve higher margins i.e. profits, to reinvest in the business.

One of the factors influencing innovation capacity of the organizations is knowledge management (Lopez-Nicolas and Merono-Cerdan, 2011; Cantner and Schmutd, 2009; Schiuma and Lerro, 2008). The role of knowledge management in the innovation capacity enhancement of organization is well-established and predominant in the literature (Darroch and McNaughton, 2002; Fosfuri and Tribo, 2006; Gray, 2006; Chen and Huang, 2009). Du Plessis (2007) stated that innovation in the organization depends upon the workforce knowledge. Effective knowledge management enhances innovation performance through the development of new insights and capabilities (Chen and Huang, 2009). So, to bring innovation, organizations must identify knowledge capability, and its richness. Knowledge management practices can enable innovation by competences deployment (Cavusgil et al., 2003) and coordinating mechanism (Darroch and McNaughton, 2002). A firm with knowledge management capability will able to use resources more efficiently and will be

more innovative and perform better (Darroch, 2005; Jantunen, 2005; Basadur and Gelade, 2006). Through knowledge management, organization can identify their tacit knowledge, which they usually do not know before. Knowledge management also helps the organization to articulate tacit knowledge in the form of explicit knowledge and this is a strong base to bring innovation (Du Plessis, 2007; Gavrilova and Andreeva, 2012; Alwis and Hartmann, 2008). Technical and non-technical innovation in the form of product, process and organizational innovations, can be delivered efficiently by company (Palacios et al., 2008) through sound implementation of knowledge management practices (Edvardson, 2009), by providing a better manufacturing or services process and implementing new managerial regulations, systems, practices and methods that increase managerial efficiency (Palacios et al., 2008). According to Chen and Huang (2009) knowledge management capacity in terms of acquisition, sharing, and application provides a positive contribution to the firm's innovation performance. In line with this discussion, we put forward the following hypothesis:

H2: Higher the implementation of knowledge management practices, higher is the innovative capacity of an organization.

Innovation Capacity and Competitive Advantage

Innovation is a critical factor for organizations to create value and prolong competitive advantage (Tellis et al., 2009). Only, good innovation practices can help to enhance a firm's competitive advantage even at global recession (Singh, 2011). Further, this innovative capacity is also the measure of organizational capability and competitiveness (Atuahene-Gima, 2005). Studies have revealed that the ability of continues innovation is influence by internal and external factors of the organizations (Cravens et al., 2002) and is considered as an important source in the era of knowledge economy to meet the demands of the customer and secure long-term competitive position (Hernandez-Mogollon et al., 2010; Chang and Lee,

2008; Chen et al., 2009). Innovation to competitive advantage is not a new idea in the field of research, Tushman and Nadler (1986) stressed on this concept that competitive advantage can be gained through only by managing effectively for today and creating innovation for tomorrow simultaneously.

As we know that competitive advantage reflects an advantageous and sustainable position obtained by an organization. In this sense, Abou-Moghli et al. (2012); Freitas and Von Tunzelmann (2008); Ramsey et al. (2008) stated that the sustainable competitive advantage of firms reflects their capability to respond, timely and adequately, to external challenges that totally depend on the development of new capabilities and innovative capacity. Weerawardena (2003) also confirmed that both technological innovations (product and process) and non-technological innovation (marketing methods and organization systems) reflects the competitiveness of an industry/organization. So, based on the above literature, we hypothesized that:

H3: Higher the innovation capacity better will be organization's competitive advantage.

Knowledge Management (KM), Innovation Capacity and Competitive Advantage

Though there is lack of empirical studies regarding the mediating role of innovation capacity in the context of knowledge management and competitive advantage. Yet, there is some specific support for indirect impact of KM on competitive advantage through innovation (Taleghani et al., 2012; Mundra et al., 2011; Hana, 2013). Competitive advantage depends upon the new knowledge, which integrates the existing knowledge into activities that creates quality, flexibility, timeliness, delivery and cost strategies to give an organization an edge but to create substantial competitive advantage (McEvily et al., 2004) one has to come out with new ideas with the help of knowledge, abilities and competencies, which in turn enhances the innovative capacity of the organization (Hana, 2013). As we know that knowledge

management practices help to enhance existing organizational knowledge; productivity; making individuals more effective at sharing explicit knowledge; and providing new ways to expose tacit knowledge. Further, tacit knowledge plays significant role to encourage the process of innovation (Du Plessis, 2007), which in turn lead to competitive advantage (Omerzel and Antoncic, 2008; Wang et al., 2006; Leitch and Rosen, 2001; Adam and Lamont, 2003; Carlucci, 2004). Knowledge management as a HR function results in maintaining technological and non-technological innovation ability in process of products/services, effective decision-making, and organizational adaption to the market, which in turn help organizations to achieve sustainable competitive advantage (Du Plessis, 2007; Karadsheh et al., 2009). Additionally, various authors have enlightened that various knowledge management practices viz., knowledge gathering, managing, sharing, learning, reuse and retrieval play important role to gain the sustainable competitive advantage through improved performance, developing new products or services, improving quality, responding to market change and reducing cost (Nonaka and Takeuchi 1995, Johannessen and Olsen, 2003, Chuang, 2004, Michailova and Husted, 2003; Ju et. al., 2006; Cavusgil et al., 2003). Therefore, Innovative capacity mediates the relationship between knowledge management and competitive advantage. Taleghani et al. (2012) also explored significant indirect relationship between knowledge management and competitive advantage through innovation. Theoretically, Costa and Cabral (2010) proposed that innovation performance or capability mediates the relationship of knowledge management with competitive advantages. Similarly, Ussahawanitchakit (2008) tested that organizational knowledge, which includes organizational learning, organizational memory, and knowledge management affect competitive advantage through a mediating effect of innovation capability. Hence, on the basis of strong literature support, we hypothesise that:

H4: Innovation capacity mediates the relationship between knowledge management and competitive advantage

[INSERT FIGURE 1 HERE]

Research Methodology

This study use quantitative technique to test hypotheses as explored above empirically. In this part, we showed the measures of various variables, sample, and final questionnaire designing.

Scale generation (Measures)

Knowledge management: Knowledge management scale was finalized after reviewing the literature based on all the practices of knowledge management. Knowledge sharing items was generated from the study of Yi (2009); knowledge acquisition and knowledge conversion items were developed from Azari and Amuei (2008); knowledge utilisation items were generated from the study of Berce et al. (2008); knowledge creation items were adapted from Nonaka (1994); Arling and Chun (2011); knowledge protection and knowledge approach items were developed from Sher and Lee's (2003) study.

Innovation capacity: Innovation capacity (Technical and non-technical) of the organization was measured by the items developed after reviewing the previous research papers viz., Hurley and Hult (1998); Atuahene-Gima (2005).

Competitive advantage: Competitive advantage scale was finalized after reviewing the previous research papers, viz., Nguyen and Neck (2009); Kongpichayanond (2009); Gold et al. (2001); Davenport and Grover (2001).

Sample

The telecommunication sector was selected on the basis of being key driver of economic and social development in an increasingly knowledge intensive global scenario (OIFC, 2013). For pilot survey, 100 employees (through convenient sampling) working in

Jammu telecommunication organisations were selected to determine the sample size as well as for refinement of questionnaire. To determine the sample size, mean and standard deviation of the population was used with the help of following formula (Mukhopadhy, 1998, p.21-32):

$$1.96 * S.D \sqrt{N-n/n * N} = 0.05 * \text{mean}$$

Where, S.D. = standard deviation; N = total population; n= sample population; and mean = sample mean.

From the total population of 1,190 employees, the sample size came to 57, which was too small for application of multivariate techniques. So, it was decided to go with census method. Only 331 employees responded properly. Hence, the response rate came to 28 per cent (see Table 1).

Questionnaire Designing

We assessed the content/face validity of the constructs through review of literature and formal discussions with the subject experts, managers and employees of telecommunication organizations. Based on the respondents' feedbacks (from pilot study) and other concerned people's suggestions, we incorporated changes in the questionnaire to improve its explainability and suitability. In addition, the data collected from pilot study was used to assess the factors with the help of factor analysis. Factor analysis reduced the 48 item scale of KM to 22 that got converged under 7 factors viz., Knowledge Sharing (F1), Knowledge IT approach (F2), Knowledge Protection (F3), Knowledge Creation (F4), Knowledge Acquisition (F5), Knowledge Conversion (F6) and Knowledge Utilisation (F7). The item loadings ranged

between 0.5 to 0.8 range. The Cronbach's alpha values of all the factors were greater than 0.70.

Innovation capacity scale was reduced to six items under two factors, namely, technical and non-technical.

Competitive advantage scale was reduced to six and converged under one factor.

Common Method Variance

The data were collected from single source, which can create the problem of common method bias (Podsakoff et al. 2003; Williams and Brown, 1994). In this context, we used Harman's single factor test, which is most commonly used by researchers (Podsakoff and Organ 1986). The result indicated that no single major factor emerged to account for a majority of the variances explained by the model, which shows that no substantial threat of common method bias exists in the data (Liu et al., 2011). Further, confirmatory factor analysis method also minimizes the common method variance problem (Richardson et al. 2009).

Results

To estimate the hypothesized relationships, we followed the Anderson and Gerbing (1988) and Henseler et al. (2009) approach of two-stage modeling viz., 1) the measurement model and 2) the structural model. Each model was estimated twice i.e. once with no statistical controls and then controlling for age and qualification of the employees. The result indicated that control variables did not change our findings, so we used only the uncontrolled model results for testing hypothesized relationships (Arnold et al., 2007).

CFA was conducted to assess the validity of the scales used in the study. The fit results revealed that goodness of fit of the three factor model was better than the one factor model ($\chi^2/df= 1.835$, RMSEA= .051, NFI= .783 and CFI= .886), thereby establishing the discriminant validity (Arnold et al., 2007). Further, the variance extracted of all the scales is

higher than the squared correlation amongst them (Table 2) thereby proving the discriminant validity of the scales (Fornell and Larcker, 1981).

Further, the convergent validity is achieved if the loading of each of the individual items on its latent scale is 0.5 or higher. In the present study majority of loadings are above 0.7 higher (Table 2). Beside this, convergent validity has also been established through Average Variance Extracted (AVE) and Bentler-Bonnet Delta Coefficient. A scale with Bentler-Bonnet coefficient value of 0.90 or above implies strong convergent validity (Bentler and Bonnet, 1980). Results indicated that the Bentler- Bonnet coefficient delta for all scales is above 0.90 (Table 2), which gave strong support for convergent validity. Further, variance extracted of these scales is also above 0.5 (Table 2). Hence, convergent validity for all scales stands established.

Structural model

In the second phase, structural modeling (AMOS 17) as recommended by Anderson and Gerbing (1988) was carried out. Structural equation modeling is implemented to assess the robustness of the results and the stability of the models as suggested by Arbuckle and Wothke (2004). In the present study, the relationship among knowledge management, innovation capacity, and competitive advantage have been assessed.

First three hypotheses, which are necessary conditions for proving mediation viz., 1) independent variable (KM) should significantly predict dependent variable (competitive advantage), 2) independent variable (KM) should significantly affects mediator (innovation capacity), and 3) the mediating variable (innovation capacity) should significantly affect the dependent variable (competitive advantage), were tested.

Firstly, we tested the direct structural effect from knowledge management to competitive advantage (SRW=.79, $p < .001$). Secondly, direct structural effect from knowledge

management to innovation capacity (SRW=.86, $p < .001$). Lastly, direct structural effect from innovation capacity to competitive advantage (SRW=.79, $p < .001$). All the three relations were significant and their goodness of fit was also appropriate (Table 4), which helps us to accept our first three hypotheses i.e. H1, H2 and H3, as well as satisfy the three conditions of mediation.

The assessment of the mediating role of innovation capacity in the relationship between knowledge management and competitive advantage was tested by sequence of mediation tests given by Kelloway (1998) by competing three models (no mediation, partial mediation and full mediation) and testing significance of $\Delta\chi^2$. Differences between the models were assessed through both the chi-square difference test and the change in the CFI values (Arnold et al., 2007).

The first model (no mediation) traced the impact of independent variable (KM) and mediating variable (innovation capacity) on dependent variable (competitive advantage) with no path from KM to innovation capacity. The second model traced partial mediation of innovation capacity. This model adds three paths that link knowledge management to competitive advantage to estimate the proportion of direct effect of KM directly as well as indirectly through innovation capacity. Introduction of third made the direct relationship between KM and competitive advantage insignificant hinting at full mediation. So, the third model (full mediation) traced the indirect impact of KM on competitive advantage through innovation capacity as mediator (Sobal test=3.384, $p < 0.001$).

The fully mediated model provided a better fit to the data than the partially mediated model, ($\Delta\chi^2 = 6.537$, $p < .01$; $\Delta CFI = 0.1$) and the non mediated model ($\Delta\chi^2 = 127$, $p < .01$; $\Delta CFI = 0.4$) (Table 5). To conclude, the findings provide a strong support for mediating role of innovation capacity between knowledge management and competitive advantage. Therefore, hypothesis 4 is accepted. The final model appears in Figure 2.

[INSERT FIGURE 2 HERE]

Discussion

This study hypothesises and tests an inclusive model that explicitly clears the role of various key variables with each other, which received only partial and independent attention. The major findings and the implications are discussed as bellow:

Employee's perception about knowledge management, innovation capacity and competitive advantage in Telecommunication sector (on the basis of mean and standard deviation, see Table 2)

The study results indicate that employees of telecommunication organizations have high perception about implementation of knowledge management practices in their organization. They believe that knowledge sharing process of knowledge management help the organization as a whole to meet its objectives, but not for their self-interests. Further, they also indicated that team-meeting, brainstorming sessions and discussion increases their knowledge and help to solve problems concerned with goals attainment (Jialin, 2009). Employees are also revealed that acquiring knowledge about opportunities and competitors helps in the growth and diversification of their organizations as well as for remain in the competition (Nguyen and Neck, 2009). Further, knowledge conversion process of knowledge management has always been used in the telecommunication organizations in order to promote the effective and efficient management of knowledge. Integration of knowledge also increased the capability of the organization. Knowledge utilisation and knowledge application practices are also used for competitive advantage and problem-solving (Nguyen and Neck, 2009). An organization also creates knowledge for social benefits, customers and on the basis of problem as it increases the efficiency of their organizations and competition level (consistent with Choi and Lee, 2003). Beside this, organizations take step to protect

their knowledge embedded in their minds as well as trade secrets with policies and procedures, which is also helpful in preventing the inappropriate use of knowledge (Chakravarthy et al., 2005). Knowledge IT approach is also the valuable practices of knowledge management. It has been found that IT system in their organizations help in the formation of knowledge. There are IT specialists in the telecommunication organizations to maintain data base, which help in the formation of new knowledge to perform special tasks efficiently (consistent with Sher and Lee, 2003; Ajiferuke; 2003).

In the case of innovation, employees have resulted into some important findings. They agreed that their organizations are always involved in technical innovation viz., improvement in roaming services, broad band etc., which providing advance techniques as it increases their capabilities, performance and promote innovation (Palacios et al., 2008). Further, employees are also satisfied with the non-technical innovation. They revealed that their organizations have advanced management techniques and strategies, which helps in bringing a change in the structure as well as system of management which is consistent with previous research (Palacios et al., 2008).

According to employees perceptions, their organization gained competitive advantage by changing their range of services according to the market competition; widen the line/range of services without increasing cost (major determinant for attracting customers as well as giving a competitive edge in the market), as in line with Gold et al. (2001).

Knowledge Management and Innovation Capacity

Knowledge management and innovation is highlighted topic in the global business arena, as both are central source of competitive advantage. Yet, they are also closely linked to each other. The correlation analysis and SRW values (Table 2 and 3) provide evidence for significant relationship between knowledge management and innovation capacity. This

finding is consistent with the thoughts and findings of various researchers such as Martín-de Castro et al. (2013); Hana (2013); Krstic and Petrovic (2012); Mehrabani and Shajari (2012); Esterhuizen et al (2012); Rahimli (2012); Basadur and Gelade (2006); Huang and Li (2009); Nonaka and Takeuchi (1995); Gyensare et al. (2012); Majchrazk et al. (2004); Goh (2005); Gloet and Terziovski (2004). Further, the researchers (Messa and Testa, 2004; Chesbrough, 2004; Du Plessis, 2007; Andreeva and Kianto, 2011; Chang and Lee, 2008; Hung et. al., 2010) have stated that innovative ideas can be derived from, both internal as well as external knowledge and this capability and richness make organizations innovative. So, it is necessary to realise that the inventive part of any individual or an organization is based on people's knowledge, skills and experience (Molina-Morales et al., 2011), which totally depends upon the knowledge culture of the organization. Knowledge culture consists of better corporate alignment and unity, which helps to improve innovation for instance knowledge sharing is a knowledge based culture, which stimulates individual to share their knowledge with others and helps employees to determine their resource requirements. Further, informal knowledge sharing practice offers a platform for employees for asking questions and providing innovative solutions to the management (Carneiro, 2000; Taminiau et al., 2009; Kamasak and Bulutlar, 2010). It means that knowledge culture of the organization helps them to become innovative by ideas, product and process and creates new market opportunities. Further, a large number of academic studies have found a positive association between knowledge management and innovation (Chung-Jen et. al., 2010; Dhopte and Nandola, 2012; Darroch, 2005; Huang and Li, 2009; Jiang and Li, 2009; Liao and Wu, 2010; Mei and Nie, 2007). Beside knowledge sharing, organization develops skills through capability enhancement by the acquisition, transfer, dissemination and application of accumulated knowledge, and an increase in the variety of the organization memory (Akram et al., 2011). Additionally, knowledge management can bringing innovation through the transformation of knowledge

into knowledge assets in organizations (Akram et al., 2011). In this sense, knowledge management acts a mechanism to coordinate the explicit and tacit knowledge distributed in the organization. Knowledge management framework that enables growth in innovation capability maturity by aligning knowledge creation processes to the requirements for moving from one maturity level to the next (Esterhuizen et al., 2012). Further the effect of knowledge management on technical and non- technical innovation competences is due to the knowledge approach and knowledge protection (Jyoti et al., 2011). Additionally, external knowledge, networking, and relationships as key drivers of firm technological innovation (Martín-de Castro et al., 2011). It concludes that knowledge management system improves innovative capacities of an organization.

Knowledge Management and Competitive Advantage

There is significant impact of knowledge management practices on competitive advantage. This result is supported by previous literature (Abdel-Qader et al., 2013; Alipour et al., 2010; Johannessen and Olsen, 2003; Karaszewski, 2008). Tacit knowledge when used explicitly helps to generate competitive advantage (Alwis and Hartmann, 2008; Lubit, 2001). Further, knowledge and KM practices provide strategic and tactical element respectively, which is considered as an organizational capability and a potential source for sustainable competitive advantage (Mahdi et al., 2011). Strategic importance of knowledge management helps organizations to identify the ability, which can improve to gain sustainable competitive advantage (Okunoye and Bertaux, 2008). According to our finding, successful implementation of all KM practices within the organizations through knowledge management systems helps to gain competitive advantage. Further, knowledge acquisition highly influences to competitive advantage because a service provider organization remains in competition only if it has full information about its competitors, policies of governments,

customers etc. They get all these information from the process of knowledge acquisition where as knowledge protection process also plays an important role in the organization to gain competitive advantage by protecting the acquired information from illegal use.

Innovation Capacity and Competitive Advantage

There are numerous studies in different sectors that revealed the importance of innovation for gaining the competitive advantage (for e.g. Abou-Moghli et al., 2012). Finding of our study also revealed that innovation has a positive and significant impact on competitive advantage. Technological innovation is essential for creating and sustaining competitive advantage in the market (Martin- de Castro et al., 2013). The innovative culture in organizations can enhance innovative potential, which leads to a competitive advantage (Hana, 2013). Innovation contributes to achieving a competitive advantage in several aspects such as maintain market shares, improve profitability; growth by non-price factors; producing less costly products of better quality as compared to competitors (Hana, 2013). Further, non-technological innovation in the form of process innovation also helps to enhances competitive advantage. Our result revealed that advanced management methods as compare to competitors, frequently changes in business/HR strategies and the way of doing business transactions and actives can helps to enhance organizational competitive positions in the market. In addition to these, if an organization changes its structure and management systems as demanded by business environment (especially external environment) through innovative ideas aid to organization more competitive (Abdel-Qader et al., 2013).

The mediating Role

After testing the three models regarding mediating relation i.e., no mediation, partial mediation and full mediation. The result of this study supports the fully mediated model as

compared to other two models. This finding supports Mafabi et al. (2012) study that revealed the mediating effect of innovation between KM and organization resilience, which is a phenomenon to gain competitive advantage. Our study indicates that without the innovative capacity (technical and non-technical innovation), management is unable to achieve sustained competitive advantage. The reason may be that knowledge management practices are intangible in the eyes of stakeholders, marketers and customers (sources of competitive market). KM effectiveness will be enlightened by the proper and successful implementation in the product/process for enhancing the market value (Chang and Ahn, 2005). This can be achieved through innovative capability/capacity of the organization. Through proper knowledge distribution and sharing, organizations can bring the innovation because continuous learning from inside as well as outside help to generate competitive advantage (Ju et al., 2006).

Practical implications

Knowledge management program has been implemented for many years in the every organization, but its effectiveness cannot be measured through one or two or three factors/practices. This study explored seven major practices of knowledge management viz., Knowledge creation, Knowledge acquisition, Knowledge conversion, Knowledge sharing, Knowledge utilisation, Knowledge protection and Knowledge approaches. Further, knowledge management, innovation and competitive advantage scale also have been validated in this study. This study also explored the direct relationship of knowledge management with innovation capacity and competitive advantage in telecommunication sector. From empirical as well as theoretical evidence, we found that innovation capacity enhances through knowledge management practices, which in turn help organizations to gain competitive advantage. If an organization (especially IT sector) ignores knowledge

management practices for innovation it will not be able to sustain competitive advantage. So, this study has tested the role of innovative capacity as a bridge (mediator) to connect knowledge management with competitive advantage in telecommunication sector.

Managerial Implications

This study provided some course of actions to assist managers to understand how to enhance knowledge management, innovation capacity, and competitive advantage. Our research has several implications for managers in general and in Telecommunication sector particular. First, our research shows the importance of knowledge management practices for improving and promoting innovation capacity and competitive advantage. It is recommended that managers should promote all major practices of knowledge management in their organizations these are important and necessary component for survived and sustainable competitiveness in this era of knowledge economy (Wei et al., 2009). In this context, managers need to enhance the awareness, motivation and engagement level in between their employees. For motivating the employees, managers should adopt intrinsic motivational techniques viz., opportunity for advancement, skill variety, feedback, recognition, autonomy, which will help to engage them in knowledge management initiatives. All this will encourage employees to suggest new ideas for increasing the innovative capacity of the organization. Further, managers have to update their employees with important organizational information through discussion, team-meeting, presentation etc (Suraj and Ajiferuke, 2013). Seminars/workshops (with the basic objectives and methods of effective KM) can help to enhance awareness of the employees that the knowledge they possess is a valuable resource, which must be managed effectively to benefit individuals, the team of which they are part, and the organization as a whole. Managers should also introduce the system of concept maps

in their organization in order to maximize the utilisation of valuable functions like acquisition of knowledge from different sources i.e. customers, employees etc. Managers should always ensure interdepartmental coordination to manage their knowledge management initiatives successfully. Managers have to acknowledge expert employees for training the most valuable resources and preferred employees. So that employees can be able to understand how their jobs contribute to the corporate goal (Suraj and Ajiferuke, 2013). Further, special agent (analyst) must have to use elicited knowledge from individuals (experts) in order of knowledge sharing and knowledge creation within the organization (Gavrilova and Andreeva, 2012). Managers should also caution their employees about not to share the important information with their peers in other organization in order to protect the valuable knowledge from inappropriate use.

Secondly, our research shows the importance of innovative capacity of an organization in between the knowledge management and competitive advantage relationship. It means that innovation capacity acts as a medium to connect knowledge management and competitive advantage. Thus, managers should engage in enhancing innovative capacity of an organization. For being more innovative, managers have to focus more on knowledge creation. It's a formation of new ideas through interactions between explicit and tacit knowledge in individual human minds (Nonaka and Konno, 1998). It includes knowledge development, discovery and capture. Further, the effectiveness of IT communication sector is in the value of creation. So, here the manager's responsibility should encourage their employees to develop their interest to learn about the new processes or services. Consequently, employees will tend to become more creative and acquire new knowledge (Rubery et al., 2002). Further, managers have to develop entrepreneurial mindset among the employees. For enhancing knowledge creation, managers have to focus on following learning functions, which determines the effectiveness of the process of knowledge creation. First, is

communication and social skills, which help people to access the knowledge network of others people. Second, is self-regulation of motivation. It means acquiring skills to regulate motivation, affinities, emotions and affections concerning working and learning. It helps to identify personal themes and ways to develop these. Keursten et al. (2006) concluded that personal motivation and affinity with a particular topic is the driving force behind innovations and improvements. Third is peace and stability. This learning function refers to the need for incremental improvements through further specialisation. It gives employees the opportunity to explore existing knowledge and search for possibilities to apply this knowledge into their daily practice. Fourth is creative turmoil. It refers to the need for creativity as a driver of innovation and improvement. Van Lakerveld (2005) found a positive relationship between work-pressure and learning. Manager can also adopt the generative learning process within the organization where the employees can combine, convert and relate ideas to create new knowledge. This knowledge creation may also help to gain competitive advantage.

In addition, top management business strategic should be 'hand in glove' with middle level managers, who work in the field as a line with AL-Hakim and Hassan (2011).

Limitation and Future Research

All efforts were made to maintain objectivity, reliability and validity of the study, yet certain limitations could not be ignored. The notable limitation of this study is that it is a cross-sectional in nature. In the future, this limitation should be overcome by using longitudinal data.

Further, the results cannot be generalized as the study is limited to telecommunication sector. Additionally, our model analysed only technical and non-technical innovation. It is suggested

that future research should focus on other types of innovation and measure the mediation effect of different types of innovation separately.

Additionally, we did not take into account the impact of organization culture in between KM and innovation capacity, so future research should focus on this aspect too.

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Table 1

The descriptive statistics for samples (N=331)

Variables		N	%
Name of Company	Aircel	86	26
	Airtel	45	14
	Vodafone	85	26
	Reliance	84	25
	TataIndicom	31	9
Departments	Sales and marketing	80	24
	Accounts and Finance	43	13
	Human resource	123	37
	Customer service	85	27
Designation	Lower	141	43
	Middle	180	54
	Top	10	3
Qualification	Under-Graduate	12	6
	Graduate	147	44
	Post-Graduate	115	35
	Others	49	15
Gender	Male	256	77
	Female	75	23
Age	20-23	18	5
	24-27	155	47
	28-31	95	29
	32-35	48	15
	Above 35	15	5
Length of service	1-3	85	26
	4-6	41	12
	7-9	120	36
	10-12	85	26
	Overall	331	100

Key. N_ stands for number of the respondents, % _stands for percentage of the employees

Source: Head offices of the respective companies in Jammu.

Table 2

Reliability and Validity of the Scales

Scales	Standardised Loadings	Mean	S.D	AVE	CR	Bentler-Bonnet Coefficient	Cronbach's alpha
Knowledge Management				.990	0.966	0.934	0.844
KS (F1)	.74	4.06	1.06				
KAP (F2)	.60	4.12	0.86				
KP (F3)	.51	4.16	0.89				
KCR (F4)	.66	4.11	0.82				
KA (F5)	.76	4.04	0.93				
KCO (F6)	.67	4.14	0.83				
KU (F7)	.52	4.05	0.78				
Innovation				.982	0.974	0.916	0.708
Technical Innovation (F1)	.69	4.16	0.88				
Non-technical Innovation (F2)	.68	4.21	0.85				
Competitive Advantage		4.12	0.83	.973	0.982	0.983	0.763
CA1	.45						
CA2	.56						
CA3	.78						
CA4	.53						

Note. S.D._ standard deviation, AVE_ average variance extracted, CR_ composite reliability

Table 3

Discriminant Validity and Correlation Analysis in between the Scales

Scale	Knowledge Management	Innovation	Competitive Advantage
Knowledge Management	.990		
Innovation	(.760)	.982	

Competitive Advantage	(.770)	(.650)	.973
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Note. AVE is on the diagonal and values in parenthesis are correlation between the scales

Table 4

Summary of Goodness of Fit Indices

Scales	SRW (β)	χ^2/df	RMR	GFI	AGFI	CFI	RMSEA
KM-> Completeive advantage	.79***	1.792	.044	.899	.875	.909	.050
KM-> Innovation capacity	.86***	3.261	.050	.913	.873	.982	.084
Innovation capacity-> Competitive advantage	.79***	2.699	.042	.954	.912	.941	.073

Note. RMR_root mean squared error; GFI_goodness of fit index; AGFI_ adjusted goodness of fit index; CFI _ comparative fit index; RMSEA _ root mean square error of approximation

*** $P < 0.001$

Table 5

Result of Model Comparison

Model	χ^2	df	$\Delta\chi^2$	RMSEA	CFI	Δ CFI
Model 1 (no meditation)	842.214	391	-	0.60	.842	-
Model 2 (partially meditation)	720.864	390	6.537*** (Model 2&3)	.051	.884	.1
Model 3 (fully meditation)	714.327	387	127*** (Model1&3)	.051	.885	.4

Note. df_degree of freedom; RMSEA _ root mean square error of approximation; NFI _ normed fit index; CFI _ comparative fit index.

*** $P < 0.001$

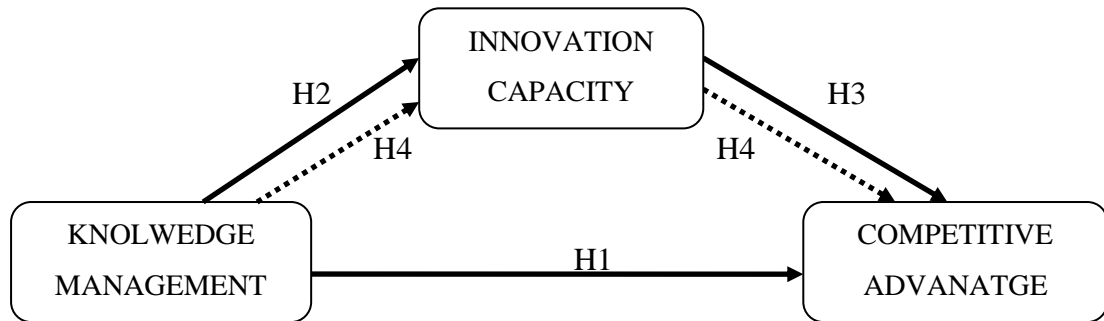


Figure 1: Research framework



Figure 2: Final model with significant pathways of focal variables. ***p<.001