

# Exploring the Effects of Top Management's Commitment on Knowledge Management Success in Academia: A Case Study

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**Abstract**—In this paper the effects of top management commitment on knowledge management activities has been analyzed. This research has been conducted as a case study in an academic environment. The data collection was carried out in the form of semi-structured interview with an interview guide. This study shows the effects of knowledge management strategic plan developing in academia strategic plan on knowledge management success. This paper shows the importance top management commitment factors including strategic plan, communication, and training on knowledge management success in academia. In particular the most important role of Strategic planning in knowledge management success is clarified. This study explores one of the necessary organizational infrastructures of successful implementation of knowledge management. The idea of this research could be applied in the other context especially in the industrial organizations.

**Keywords**—Knowledge Management, top management's commitment, knowledge management's Success.

## I. INTRODUCTION

**K**NOWLEDGE management (KM) and knowledge management systems are consistently capturing the attention of organizations today in a quest for achieving competitive advantage. KM is "the process of systematically and actively managing and leveraging the stores of knowledge in an organization" [22]. KM is the systematic management of the knowledge processes by which knowledge is created, identified, gathered, shared and applied [26].

Assessing the tangible assets of an organization as against the intangible ones (KM, forms part of intangible asset), in 1982 were 62 %: 38 % and by 1992, these figures just reversed [5]. It is estimated that the book value of intangible assets accounted for more than 80 % of company's market values [33]. Thus, there is a clear shift in strategy for creating value from tangible asset to knowledge-based strategies that creates and deploys organizations intangible assets [19]. So, we can see that the world economy is in transition due to the shift in KM. More than half the total GDP in the rich economy is now knowledge based. High-tech industries have nearly doubled their share of manufacturing output over the past two decades to about 25 percent, and

knowledge-intensive services are growing even faster. Knowledge workers from brain surgeons to journalists accounts for eight out of 10 new jobs [18].

Based on research and experiences from leading global knowledge management case studies critical success factors (CSF) for knowledge management can be broadly categorized into four classes: people, process, technology and sustained strategic commitment. While all four are critical to build a learning organization and get business results from knowledge management. A majority of the organization worldwide implementing knowledge management have found it relatively easier to put technology and process in place, where as the "people" and "sustained strategic commitment" have posed greater challenges.

In the present postindustrial society, Knowledge has become a key resource. However, organization faces innumerable challenges in nurturing and managing knowledge. Unlike manufacturing and universities activities, knowledge activities are difficult to monitor and control, because only a part of knowledge is internalized by the organization, the other part is internalized by individual. This duality between individual knowledge and organizational knowledge demands different sets of management strategies in knowledge management's success for the organization. The "commitment of top management" is one of the important factors for this success.

The term top manager usually refers to the chief executive and those reporting to him or her. One of the key assets of enterprises/organizations is their knowledge and top-management's commitment on KM. Top management commitment includes activities such as: active support to KM, setting personal example, communicating company's KM value, reinforcing knowledge messages meeting with the work force and the customers, giving formal and informal recognition of KM, personal training, and training others.

In this case study investigations were undertaken on issues concerning sustained knowledge management in academia. Using the example of a case study we carried out 'What are the top management related factors for KM?' We will analyze how technical and organizational aspects influence knowledge processes and top-management's commitment. Particular emphasis will be placed on the question of how knowledge visibility and transfer can be supported by top management commitment. A key to sustained knowledge management is organizational culture and knowledge management that forms

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the environment in which information and know-how can flow.

## II. PROBLEM IDENTIFICATION

The main objective of this study is to found out the effects of top management commitment in KM in an educational institute. In particular; this research tries to answer the following question:

How the top management commitment enables the knowledge management development?

In order to find the answer to this research question, we have to find answers to the following sub-questions:

- Does top management commitment affect knowledge management's success?
- What are the top management related factors for knowledge management success in an organization?
- How much of top management commitment affect the knowledge management success?

## III. LITERATURE REVIEW

### A. Knowledge

Before going through the meaning of knowledge management, it is necessary to define the term "knowledge". The definition of knowledge in Webster's dictionary (1976) is "the fact or condition of possessing within mental grasp through instruction, study, research, or experience one or more truths, facts, principles, or other objects of perception". In general, knowledge can be experience, concepts, values, or beliefs that increase an individual's capability to take effective action [1],[2]. It is important to address the differences between knowledge, information, and data. Data is raw numbers and facts, while information is a flow of messages or processed data. Knowledge is actionable information that is possessed in the mind [4],[23],[27]. In other words, knowledge is created and organized by the very flow of information, anchored by the commitment and beliefs of its holders [1]. Furthermore, [1] argued that information becomes knowledge when it is processed in the mind of an individual and knowledge becomes information when it is articulated or communicated to others in the form of text, computer output, speech or written words, etc.

Also, following [13], knowledge is actually a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experience and information. It originates and is applied in the minds of knower. In organizations, it often becomes embedded not only in documents or repositories, but also in organizational routines, processes, practices and norms. This definition on knowledge is parallel with what [21] has in mind. She has pointed out that human beings are the main element in knowledge creation. That knowledge is constructed through circulation of knowledge and resides within the individual (in informal, unwritten routine practices) in communities that are brought together by common interests. In this understanding, she holds that

"knowledge is both produced and held collectively rather than individually, in knit groups, or communities of practice" [21].

### B. Knowledge Management

Defining the concept of KM is difficult, as different perspectives or schools of KM can yield different dimensions and meaning. For examples, [24] holds that KM embodies organizational processes that seek synergistic combination of data and information processing capacity of information technologies, and the creative and innovative capacity of human beings". [11] classified KM activities under three major headings: knowledge processing, knowledge domains and knowledge formality. For [7], KM is "the process by which the organization generates wealth from its intellectual or knowledge-based assets". Empirical survey by [9] has identified it as "a process of leveraging and articulating skills and expertise of employees, supported by information technology". [4] sees knowledge management as "a process of knowledge creation, validation, presentation, distribution and application". In the eyes of corporate players such as Jim Botkin, President of Interclass, he associates KM with "communications, capturing of best-yet practices and sharing for reuse what has worked before" [8]. A more formal definition of KM given by The American Productivity & Quality Center is "the strategies and processes of identifying, capturing, and leveraging knowledge" [25].

A simple definition of KM is the process of collaborative thinking, learning, communication, and execution. The other definition of KM is the collective management of knowledge assets through collaborative processes and culture in line with the business processes to build, market, and support intellectual capital.

Although KM is as an enterprise-wide goal, many companies find success if they kickoff an initiative in one department and then extend the practices throughout other parts of the organization. Often KM practices relating to service and support can be defined as knowledge-powered problem resolution - using a knowledge base, knowledge sharing, collaboration and knowledge reuse to efficiently solve customer questions [32].

Knowledge has limited value if it is not shared. The ability to integrate and apply the specialized knowledge by organization members is fundamental to a firm to create and sustain a competitive advantage [16]. Knowledge management is managing the corporation's knowledge by means of a systemic and organizational specified process for acquiring, organizing, sustaining, applying, sharing and renewing both tacit and explicit knowledge by employees to enhance the organizational performance and create value [14],[2],[1]. It is quite often that companies, particularly those that compete on the basis of services and expertise, facilitate the codification, collection, integration, and dissemination of organizational knowledge using computer systems because they can facilitate communication and information sharing [1], according to [14], there are four kinds of knowledge management projects. They are (1) creating knowledge repositories in which knowledge can be retrieved easily. (2) Improving knowledge access to

facilitate its transfer between individuals. (3) Enhancing a knowledge environment to conduct more effective knowledge creation, transfer and use, (4) managing knowledge as an asset and concern about how to increase the effective use of knowledge assets over time.

### C. Knowledge Management in Academia

The university environment is essentially a collection of individual experts who constitute an accepted body of knowledge for many degree-granting areas. As such, universities have traditionally been utilized as transfer mechanisms for providing students with a knowledge base that will enable the students to function and thrive on graduation. However, the success of this model is contingent on the critical assumption that universities possess relevant expertise and are up-to-date with regard to the knowledge and skills that students will need. As critical members of the education supply chain, colleges, at least in part, are tasked with the role of teaching currently accepted and relevant doctrine and practices. In order to do so, colleges must first be able to identify what is accepted and relevant, and then take the necessary steps needed to ensure that faculty members and instructional staff possess the appropriate knowledge and expertise. However, distinguishing what is relevant from the many “fads” that frequently gain short-term popularity is often difficult. Complicating matters is the fact that the rate of knowledge creation is accelerating [6], which means that colleges must not only periodically retool segments of their programs, but must do so at a much quicker pace. Thus, in a manner similar to organizations, it is reasonable to expect that colleges can benefit greatly from the development and application of certain knowledge management (KM) mechanism that assist in identifying not only what is known, but also what must be known.

Fortunately, the concepts related to KM, as well as the mechanisms used to manage organizational knowledge, are well known to many in academia. Whether taught in the classroom or the focus of primary research, the concept of KM and its implications for a wide variety of organizations continues to receive considerable attention on the college campus. However, while academics have become astute at teaching and conducting research related to KM, they have been much slower at adopting the concept. Given any of the unique characteristics associated with colleges, it should not be surprising that many of the principles taught in the classroom are not always adhered to in the educational context. For example, a central premise of KM concerns the importance of sharing knowledge within the organization. Knowledge that has been acquired or developed by organizational members often increases in value when shared with other organizational members. However, in many organizations, physical and psychological barriers often exist and hinder the effective transfer of knowledge within the so-called functional silos, as well as across the organization as a whole. Colleges are not immune to this problem because they are often organized as functional areas (e.g. marketing, finance, etc.) that operate somewhat independently. Thus, as

in a business context, functional areas within many colleges often fail to share knowledge that can lead to the establishment of a higher standard to education.

It is important to note that any KM process initiated by a college of business for the purpose of ensuring continued relevancy must begin with an initial assessment of current intellectual capital as it relates to teaching, research, and service (i.e. the traditional units for which performance measures are evaluated). In addition, since most colleges operate at several distinct levels (i.e. individuals, departments, the college as a whole), a critical assessment is necessary for each component, as well. Only after knowledge boundaries have been identified can mechanisms be implemented to ensure that colleges are keeping pace with the changing environment. This presumes, of course, a level of understanding of both individual and organizational capability in terms of KM and learning capabilities. Regardless of the level at which KM is applied, the main goal remains the identification of existing skills and expertise so that they can be matched with current needs. Once this is done, any gaps or deficiencies in the college’s knowledge base can be identified and remedied.

### D. Top Management Commitment

Top management commitment becomes a reality when a manager of a company or division accepts the responsibility for the successful implementation of the business plan. The manager should get involved and add the expertise and special talent that made him president. You’ll be surprised how much common sense will prevail and how much of it has ([www.pgmm.org/berif\\_guides.htm](http://www.pgmm.org/berif_guides.htm)).

The term top manager usually refers to the chief executive and those reporting to him or her. Top management commitment includes activities such as communicating company’s quality value, reinforcing quality messages meeting with the work force and the customers giving formal and informal recognition, receiving training and training others. Top managers develop and facilitate the achievement of the mission and vision, develop values required for long term success and implement these via appropriate action and behaviors, and are personally involved in ensuring that the organizations management system is developed and implemented. Another important responsibility of top management is establishment of an environment in which performance is rewarded ([www.pgmm.org/berif\\_guides.htm](http://www.pgmm.org/berif_guides.htm)).

## IV. THE LINK BETWEEN TOP MANAGEMENT COMMITMENT AND KM

[3] consider following factors as top management activities to support KM implication success:

### A. Economics and Strategic Planning

For an organization to anticipate its future technology needs, it is extremely important to do long-range strategic planning. [34] found that most enterprises pursue one or more of the following Knowledge Management strategies:

- Knowledge strategy as business strategy
- Intellectual asset management strategy
- Personal knowledge asset responsibility strategy
- Knowledge creation strategy
- Knowledge transfer strategy

The choice of which KM strategy to pursue is typically based on other strategic thrusts and the value discipline that the enterprise pursues, challenges it faces, and opportunities it wishes to act upon.

#### *B. Training*

It is safe to claim that “people” should be the main driver of KM [10],[15],[29],[30]. If a KM system is anywhere on the organization’s horizon, human resources should be training knowledge engineering.

In terms of human resource training, the focus is placed on developing people who are capable of tapping internal and external information and turning it into useful organizational knowledge.

#### *C. Compensation and Reward*

Domain experts must be recognized and rewarded in ways that make them feel it is worth their time to cooperate. The compensation and reward system focuses on promoting knowledge exchange and group collaboration.

#### *D. Performance Appraisal*

The performance appraisal apart from providing the input to KM activities, also aims at bringing organizational improvement through effective directing of the employee’s behavior.

### V. RESEARCH METHOD

Case study research is an empirical inquiry that Investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident [36]. Besides, it’s advised by researchers to use case study design when there are many more variables of interest than data points and benefits from prior theoretic propositions, guiding data collection and analysis [36] and [12]. Also, in the literature of KM success, case study is a utilized approach in similar studies such as [31], [20], [35]. So, our approach in this study was a case study and the data collection was carried out in the form of semi-structured interview for which an interview guide was formulated based on the variables of top management’s commitment and knowledge management success factors. Interview guide measures the commitment of the head of division and the success of knowledge management in the division. Our sample was included the head of the division and couple of related staff members.

To improve the validity and reliability of the data, the measurement instrument was evaluated by pre-testing the interview guide prior to its administration [12].

#### *A. Pre-Testing*

In order to control elements like understanding, number,

order, sensitiveness, and required time of questions, initial personal interviews with four academic experts were held. First, we asked one of the experts for any modifications. After applying his/her views, the test was administered for the second time when the last expert did not have any significant point to add, we stopped the modification process. After that, a pilot interview has been done with a person who has experience in management in a division of university and also is an expert in knowledge management field. Understandability of the questions and time of interview was checked in pilot interview. According to the results of pilot testing, the interview guide modified.

### VI. HOW ‘DIVISION’ IS ORGANIZED

Organizational structure of the division shows a clear demarcation, but the job responsibilities, teaching and research activities of division are overlapping and interrelated. For example, lecturers are involved in research program, teaching, thesis work and industrial research work, as well.

### VII. FINDINGS

#### *A. Results of Interviews*

Interviews were conducted with the help of the interview guide. Recorded issues not clear were clarified. After interviews, a detail analysis was carried out. The findings were as under:

1. How does top management’s commitment affect knowledge management’s success?

The results of interviews show the important role of three factors of top management commitment including strategic plan, communication, and training, on KM success. However this study shows that the effect of compensation and reward and performance appraisal on KM success is not as strong as the effect of the other factors.

**Strategic plan:** Interviewees emphasized on short-term applied research in industry, as the division’s strategy and its effect immediately on industry. The combined short term research and its future development will lead the overall strategy at the division. According to interviewees’ belief, this is a very critical factor of KM success.

**Communication between top management and staff:** Informal communication is in practice in the division, in that one to one, one to group and group-to-group communication exists. It is not necessary to book time in much advance for a communication with the head of division. KM is integrated in teaching, research and in inter-personal communication because knowledge is a dynamic phenomenon. From the viewpoint of describing mission, vision and strategy to the staff, no formal document exists. But the philosophy and working of the division follows the path leading towards these.

**Performance appraisal:** In this division the appraisal performance is based on the points generated and knowledge gained.

**Training:** Training is conducted through courses, attending conferences, recognizing industry requirements by communication, creating opportunity for people to contact with industry and discuss analyzing and solving of their problems. According to interviews results, training is one of the most important factors affecting the KM because by training you make people learn and understand effectively.

**Compensation and reward:** The results of interviews show that there isn't any written criterion for rewarding people. However, in general they have two ways for people who achieve success: one it themselves create recognition by publishing their work, contacting the leading group, participation in workshop. Secondly, their reward is prompted by their career growth.

2. What are the top management related factors for knowledge management success in an organization, in terms of knowledge sharing, knowledge creation and knowledge transfer?

Factors for KM success commitment found to be:

**Knowledge sharing:** interviewees stressed this factor as a problem in general, but they emphasized that their groups haven't such problem. They follow sharing, distributing and facilitating without any written program in KM. they believe that sharing facilitate easy KM.

**Knowledge creation:** They create knowledge through individual research input, and teamwork-creating information both individually and for the team.

**Knowledge transfer:** They transfer knowledge by courses, seminars and meetings. They believe that, though not effective as sharing, but if the mode of transfer be effective, it will be effective.

3. How much of top management commitment affect the knowledge management success?

The head of division gave about 70% of his time to research, supervising research in the research area, 20% for Under Graduate teaching and 10% for administrative jobs. His focused on knowledge sharing team as the top management's commitment affects the knowledge management success. He said; "The barriers are removed. We are a new division and don't have 5 or 10 years program for our division but our activities following our goals of the division". We have been recognized at international level through step-by-step activities.

#### B. Observations at 'Division'

This division is relatively very new and follows an informal and effective work culture within the division. The interpersonal relationship and communication against the members are very effective. They mostly move and act as a team and the head of the division personally leads and participate with the team whenever he is present. The team follows a weekly conference, where weekly progress of activity and problems are discussed and resolved.

Through there is scope for further, improvement the division is following an informal, yet defined path to achieve good results in future.

### VIII. DISCUSSION AND CONCLUSION

Findings of this case study shows that knowledge transfer and knowledge creation are manage in the division through regular ways of knowledge creation and transfer such as courses, seminars and presentations, teamwork, and weekly meetings. So these issues of KM are managing in some extent. According to, [3], 'Knowledge transfer' is a part of the organizational life. It is carried out whether the process is managed or not. It is transmission of knowledge (experience, lessons learned, and know-how) and use of transmitted knowledge and conveying the knowledge of one source to another source. Knowledge can be transferred from repositories to people, from teams to individuals, and between individuals. Knowledge transfer is done directly by working together, communicating, learning by doing, apprenticing, through face-to-face discussions, or embedding knowledge through procedures, mentoring, or documents exchange.

This case study shows that sharing facilitates easy KM and plays an importance role for teamwork in the division. Interviewees believe that knowledge sharing and knowledge acquisition will be facilitated by means of application of proper tools of acquisition and sharing of knowledge.

This research shows that communication between top management and staff, as an issue of top management commitment, is easy and frequent. Although we find some evidences about the other issues of top management commitment (including Strategic Planning, Training, Compensation and reward, Performance Appraisal), but findings show the lack of a written strategy for these issues. Interviewees emphasized on short-term applied research in industry as division strategy and its effect immediately on industry. The division needs a KM strategic plan developing in its strategy.

A Research framework of the relationship between top management commitment, KM strategies and KM activities for future research is proposed. Based on literature survey and our case study a KM strategy model based top management commitment is given at Fig. 1.

Proposed research question after this first case study is: "How top management commitment could be enabling a KM strategy and a better driving the knowledge management activities in academia environment?"

## REFERENCES

- [1] Alavi, M.; Leidner, D. (1999) "Knowledge management system: Emerging views and practice from the field", Proceedings of the 32<sup>nd</sup> Hawaii International conference of system science.
- [2] Allee, V. (1997), "the knowledge evolution: expending organizational intelligence, Butterworth-Heinemann.
- [3] Award, E., M.; Ghaziri, H., (2003), "Knowledge management ", Prentice Hall.
- [4] Bhatt, G.D. (2001), "Knowledge management in organisations: examining the interaction between technologies, techniques, and people", *Journal of Knowledge Management*, Vol. 5 No. 1, pp. 68-75.
- [5] Blair, M.B. (1995), Ownership and control: Rethinking corporate governance for the twenty-first century, Washington. D.C., Bookings Institution.
- [6] Brooking, A. (1996), *Intellectual Capital: Core Asset for the 3rd Millenium*, International Thomson Business Press, London.
- [7] Bukowitz, W.R. and Williams, R.L. (1999), *The Knowledge Management Fieldbook*, Pearson Education.
- [8] Chatzkel, J. (2000), "A conversation with Jim Botkin, President of InterClass", *Journal of Intellectual Capital*, Vol. 1 No. 3, pp. 273-86.
- [9] Chong, C.-W., Holden, T., Wilhelmij, P. and Schmidt, R.A. (2000), "Where does knowledge management add value?", *Journal of Intellectual Capital*, Vol. 1 No. 4, pp. 366-80.
- [10] Civi, E. (2000), "Knowledge management as a competitive asset: a review", *Marketing Intelligence & Planning*, Vol. 18 No. 4, pp. 166-74.
- [11] Coombs, R. and Hull, R. (1998), "Knowledge management practices and path dependency in innovation", *Research Policy*, Vol. 27, pp. 237-53.
- [12] Cooper D.R.; Schindler, P.S., 2003. "Business research methods." 8<sup>th</sup> ed., McGraw Hill, pp. 234-240.
- [13] Davenport, T.H. and Prusak, L. (1998), *Working Knowledge: How Organisations Manage What They Know*, Harvard Business School Press, Boston, MA.
- [14] Davenport, T.H. et al. (1996), "Improving knowledge work processes", Sloan management review, pp. 53-65.
- [15] Gooijer, F.D. (2000), "Designing a knowledge management performance framework", *Journal of Knowledge Management*, Vol. 4 No. 4, pp. 303-10.
- [16] Grant, R. M., (1996), "Toward a Knowledge-Based Theory of the Firm", *Strategic Management Journal*, Vol. 17, 109-122
- [17] Harlow.
- [18] Hlupic, Vlatka (Editor). (2002), Knowledge and Business Process Management, Hershey, PA, USA: Idea Group Inc., 2002. pp 239.
- [19] Kaplan, R. and Norton, D.P. (2001), Transforming the balanced scorecard from performance measurement to strategic management, Accounting Horizons, vol. 5, Issue 1.
- [20] Kridan, B., A. and Goulding, J., S., (2006), "A case study on knowledge management implementation in the banking sector" VINE: *The Journal of Information and Knowledge Management Systems*, vol. 36, No. 2, pp. 211 – 222.
- [21] Lang, J.C. (2001), "Managerial concerns in knowledge management", *Journal of Knowledge Management*, Vol. 5 No. 1, pp. 43-57.
- [22] Laudon, K. C. and Laudon, J. P. (1998) Management Information Systems: New Approaches to Organisation and Technology. Englewood Cliffs, NJ: Prentice Hall.
- [23] Maglitta, J. (1996), "Martren Up!" Computerworld, Vol. 29, pp. 84-86
- [24] Malhotra, Y. (1998), "Deciphering the knowledge management hype", *Journal for Quality & Participation*, Vol. 21 No. 4, pp. 58-60.
- [25] Manasco, B. (1996), "Leading firms develop knowledge strategies", Knowledge Inc, Vol. 1 No.6, pp.26-9.
- [26] Newing, R. (1999), Connecting people: Both through IT and face-to-face, Knowledge Management, Financial Times Survey, (November 10), 2.
- [27] Nonaka, I. (1994), "A dynamic theory of knowledge creation", *Organization science*, Vol. 5 No. 1. pp. 14-37.
- [28] Politis, John, D., (2001), "The relationship of various leadership styles to knowledge management", *Leadership & Organization Development Journal*, Vol. 22, No. 8, pp 354 – 364.
- [29] Robertson, M. and Hammersley, G.M. (2000), "Knowledge management practices within a knowledge intensive firm: the significance of the people management dimension", *Journal of European Industrial Training*, Vol. 24 No. 2/3/4, pp. 241-53.
- [30] Soliman, F. and Spooner, K. (2000), "Strategies for implementing knowledge management: role of human resources management", *Journal of Knowledge Management*, Vol. 4 No. 4, pp. 337-45.
- [31] Squier, M., M. and Snyman, R. (2004) "Knowledge management in three financial organisations: a case study", Aslib Proceedings, Vol. 56, No. 4, pp. 234 – 242.
- [32] Tobin, T. (2004). *The Insider's Guide to Knowledge Management ROI*, ServiceWare Technologies white paper, Feb., available at <http://www.serviceware.com>.
- [33] Weber, A.M. (2000), New mathematics for new economy, Fast Company, US.
- [34] Wiig, Karl M., (1997), "Knowledge Management: Where Did It Come From and Where Will It Go?" *Journal of Expert Systems with Applications*, Special Issue on Knowledge Management, Vol. 13, No. 1, Fall.
- [35] Yeh, Y., Lai, S. and Ho, C., (2006), "Knowledge management enablers: a case study", *Industrial Management & Data Systems*, Vol. 106, No. 6, pp. 793 – 810.
- [36] Yin, R.K., (1994), "Case study research – Design and methods", Second Edition, SAGE Publication, Thousands Oaks.

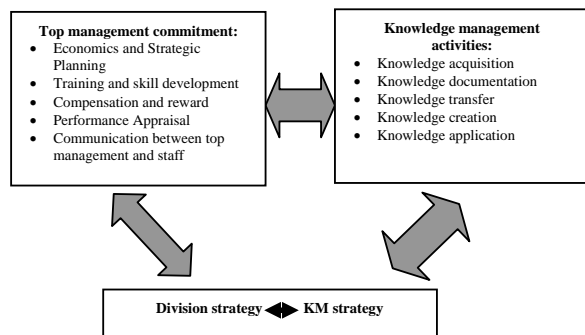


Fig. 1 KM strategy model