CHAPTER 2
LITERATURE REVIEW

2.1 SURVEY OVERVIEW

Rapid development of the Internet and information technology has pushed the world into the era of a new economy. In addition, with the revolution of information technology and the development of the Internet, the value of knowledge assets has been greatly enhanced. Armistead and Meakins (2002) argues that the creation of business value mainly comes from intangible assets, such as knowledge. The majority of studies show that knowledge can be classified as being either tacit or explicit (Nonaka, 1991, 1994). Tacit knowledge is defined as experience-based knowledge that resides within an individual, whereas explicit knowledge is precise, formally articulated and documented. In organizations, knowledge is often embedded in repositories, documents, routines, operational processes, practices, and norms. It is generally accepted that knowledge also comes from the meaningfully organized accumulation of information through experience, communication, or inference (Zack, 1999).

Furthermore, knowledge activities are dynamic as well as humanistic with active and subjective natures created by social interactions dependent on individuals, their community and organization interactions, and applicability to needs (Holsapple & Joshi, 2002). Hence the activities of KM should enable the creation, communication, and application of knowledge; and they should drive the capability of creating and adding a greater value to the core business competencies. Several studies have
proposed the concept of ‘knowledge gap’ to describe the difference between
the enterprise’s current capability and the capabilities required for KM
(Lovrich & Pierce, 1984; Persaud, 2001; Wild, Griggs, & Downing, 2002;
Zack, 1999). Nonaka (1991) stated identified that there exists different
perceptions of KM activities and implementation amongst employees of
differing levels and positions. The inability to identify and resolve any gaps
prior to implementation greatly hinders the KM implementation. Thus, we
propose a fully holistic framework of ‘KM Gaps’ to illustrate the management
gaps that might occur when implementing the KM system. The reasons for
these gaps and several fundamental approaches for avoiding them are
presented. Through the evaluation of these gaps, enterprises can reduce the
mismatch between the capability and implementation of the KM system, and
greatly enhance the effectiveness of implementation of the KM system.

For years, companies have strived to manage knowledge more
effectively, the primary motivation being improved corporate performance
(Choi & Lee, 2002). However, despite the growing body of theory, there are
relatively few KM texts that make an explicit connection between KM
activities and corporate performance (Kalling, 2003). Therefore, it is valuable
to investigate how managers can eliminate KM gaps through KM activities in
order to enhance corporate performance.

2.1.1 KM in India

India has a rich tradition of knowledge dating back to several
millennia. It was our civilization that raised questions like “What is the
ultimate reality?” and “How did this universe come about?” and so on. Indians
had developed a fund of knowledge on various aspects including astronomy,
metallurgy, food, healthcare, environment, plant and animal life, agriculture,
linguistics, weapons, music, arts, governance, and ethics. This knowledge was
disseminated both in the written form (in palm leaves) and through the oral
tradition. The creativity of Indians can be evidenced from the fact that they ‘represented’ the knowledge in various forms like prose, poetry, songs, stories (or puranaas), proverbs, verses, slokas, sutras, metaphors, carvings, and pictures. In addition to these, much of this knowledge is embedded into the daily routine of people. Thus, the rich experience and wisdom of our ancestors has got integrated into our daily lives.

It is indeed ironical that a country with such a tradition has not taken the lead in KM in business. Both academicians and managers are responsible for this state of affairs. If we look at the KM literature (journal papers, magazine and newspaper articles, and books), there will be very few places where our country’s name will be mentioned. This is despite that fact that we were the first to analyze concepts like buddhi (intelligence), and Vigjnana/Jnana (knowledge/wisdom). Our ancestors also separated apara jnana (knowledge concerning the created world) from para jnana (higher knowledge or knowledge of the ultimate reality). Our body of knowledge including the Vedas, the Epics, the Upanishads, the Puranaas, the Brahma Sutras, and the Bhagavad Gita contain in-depth analysis of various concepts related to knowledge. While one may argue that our tradition did not address issues pertaining to business organizations, we need to remember the fact that the history of formal and organized businesses in India is not as old as those of the West. Thus, it is the responsibility of both academicians and practitioners to ‘adapt’ concepts and experiences from other domains to business.

KM is still in its infancy in India. Very few companies have appointed dedicated personnel to take responsibility of KM. In most firms KM has been tagged on to somebody’s existing responsibilities, often resulting in a step-motherly treatment. But this situation cannot last given the increasing competitive business environment in India. KM is no longer a luxury for
Indian companies. It is a necessity that can make all the difference between survival and an early demise.

2.1.2 Background for Detailed Survey

Based on the study in Chapter 1, the organizations should know the level and process blueprint of the below elements before the implementation of KM solution:

1. Readiness level of people, process and technology for the change
2. Behavior pattern of people for the change and for knowledge creation, use and re-use
3. Taxonomy and technology architecture landscape with navigation and content layer of KM components
4. Process design for knowledge capture, storage and retrieval and environment design for organization structure
5. Reward, learning and communication design
6. Linkage design for internal and external levels and functions of organization

The detailed literature pertain to all the modules / elements will be discussed further in this chapter.

2.2 READINESS ASSESSMENT

Despite early proclamations regarding the value of knowledge and managing knowledge the KM movement has been viewed as a ‘fad’ or ‘recycled’ concept (Spiegler, 2000). The tide is turning, however, as more and more organizations become knowledge-based. In the words of Davenport & Grover, ‘It is becoming increasingly clear that KM is here to stay. There are far too many knowledge workers dealing with too much knowledge for KM to disappear. Given that KM is becoming a competitive necessity, organizations and organization leaders find themselves asking ‘Where to start?’ and ‘Is my
organization ready?’ To begin, considerable qualitative research has suggested ‘enablers’ of organizational KM. Although the literature is varied, common themes have emerged.

Implementing KM or knowledge-sharing projects in an organization require significant organizational prerequisites. Lacking proper infrastructures and prerequisite, not only make the KM process unprofitable, but might incur harmful effects as well. To decrease such risks, it is proposed to introduce the readiness assessment, in order to gauge a company’s appetite for the work involved in implementing the KM. The detailed review on readiness assessment in the context of KM is carried out and relevant literature is indicated here.

implementation. Keith et al (2006) indicated statistically significant differences in KM readiness between groups and need for alignment by doing the field study from a Fortune 500 financial firm while transitioning its structure to service oriented enterprises. Bui et al (2003) illustrated and proposed framework that can be used in providing e-readiness assessment and in making national strategic decisions on infrastructure which is conducive to the new economy. Miri-Nargesi et al (2011) proposed a new model of readiness assessment factors of customer relationship management (CRM) and showed that “top management commitment, project management capability, IT infrastructure management, customer-oriented culture and clearly defined CRM processes are the top five readiness assessment factors.

2.3 BEHAVIOR ASSESSMENT

Literature holds that there exist two basic strategy approaches to culture in terms of implication: conforming strategy (maintaining order and continuity) and transforming strategy (changing and breaking existing patterns) (Bate 1994). Transformation in any organization happens as a result of an effectively managed change system. Consequently, a substantial segment of the change management literature focuses on describing how employees respond to change in organizations; how to handle the stress, conflicts, and emotional issues in the aspect of change in an organization; how to gain support to participate in the change effort, and generally, make organization-wide change less traumatic (Marquardt, 1999; Edward, 2000). Throughout this literature organizations are advised to recognize that change is implemented by and has consequences for people, and that change can be made significantly less traumatic and more successful if these human aspects are anticipated and handled effectively. An entire literature has developed emphasizing the importance and impact of involving employees effectively in organizational decision making and change initiatives. Therefore it is crucial
to assess the values, attitudes and behaviors of the people in the organization that constitute barriers to seeking, sharing and using knowledge, before employing knowledge base and KM. Moreover, management of any organization needs to intentionally and carefully create conditions and stimulate the behavior needed for efficient knowledge sharing among employees, across functions and hierarchies. The knowledge hierarchy is explained by Haeckel and Nolan (1993) in Figure 2.1.

![Knowledge Hierarchy Diagram](image)

**Figure 2.1 From Facts to Wisdom**

KM requires a collaborative approach from all management functions, across disciplines. Cumulative evidence from KM literature suggests that “KM addresses policies, strategies, and techniques achieved through people, process and technology aimed at supporting an organization’s competitiveness by optimizing the conditions needed for efficiency improvement, innovation, and collaboration among employees” (Sousa and Hendriks, 2006). They have also reported the impact of cultural and behavioral aspects in the domain of knowledge creation, shaping
collectively crafted courses of action and addressing the methodology for the adoption of a knowledge-based view (KBV) in the organization.

Effective role of communication in KM have been found to be a critical element of successful supply chain coordination and integration in organizations (Nonaka and Takeuchi, 1995; Pagell, 2004). Nielson (2006) proposed the dynamic capabilities approach to integrate KM activities and also identified the activities of knowledge creation, acquisition, capture, assembly, sharing, integration, leverage and exploitation. Sousa and Hendriks (2006) have found that behavior of individuals is one of the critical components for KM solution implementation. Sabherwal and Fernandez (2003) proposed that socialization and combination influence perceived effectiveness of KM at group and organization levels, respectively. Germain and Iyer (2006) suggest that a task is already half complete if the integration in the organization is good among employees and top management. The top management has to enlighten members of the organization about the need for change, expressing the current status of the organization and where it needs to be in the future, and developing realistic approaches about how change might be accomplished. Thus available literature shows evidence of the role of people management in the organization for the effective setting up of KM. Further examination suggests that proper KM initiation can be gained through organizational culture that promotes organizational citizenship behavior. Podsakoff et al. (1990) examined the effects of transformational leader behaviors on organizational citizenship behaviors, and the potential mediating roles of trust and satisfaction in that process. Organization leaders need to recognize that people in the organization are likely to resist making major changes for a variety of reasons, including fear of the unknown, inadequacy to deal with the change and whether the change will result in an adverse effect on their jobs. It is also important to have trust and monitoring in an organization when any
new change is initialized. Niehoff and Moorman (1996) have examined the theory concerning the relationship between monitoring and citizenship roles. It is also important to note that perceived fairness determines the full extent of cooperative contributions to organizations of citizenship behaviors (Organ and Moorman 1993). People need to feel that their concerns are being heard. Leaders must widely communicate the need for the change and how the change can be accomplished successfully. Choo et al. (2007a) and Choo et al. (2007b) suggested that quality of organization improves with knowledge based system. Hwang et al. (2008) exhibited the method to gauge the actual performance and values of KM systems. It is also important for the employees to feel that the approach to change will include their strong input and ongoing involvement. How the employees perceive KM and the resultant change that occurs in an organization is also important. Nadler and Tushman (1988) have found that any change in an organization is effective only when it is fine tuned, i.e. when it is anticipatory and incremental. Studies have shown that individual reaction to KM differs according to the way they perceive the change.

Thus every system and mechanism in an organization is connected, and transformation is not that easy, especially if employees are not looped in effective way. Change management can be effectual only when the interdependence of the mechanism is kept intact. The four interdependent elements prompting analysis and evaluation of interrelationships are shown in Leavitt's Model of Change which affects KM Culture is shown in Figure 2.2.
Figure 2.2 Leavitt’s Model

Hurley and Green (2005) have found the effect of task, structure, technology, and people characteristics on KM culture which is explained through a regression Model and is shown in Figure 2.3. Looking at the regression model of Hurley and Green (2005), it can be found that people characteristics have a regression coefficient value (0.40) indicating it as a strong predictor for KM culture.
Researchers in organizational development (Lewin, 1939) have focused on the importance of a slow and steady adaptation and change management in an organization. The model of organizational development thrusts on the need for having a strong leadership and empowerment of its employees for a successful organizational transformation. The regression model used in this research also focuses on the need for concentrating on individuals rather than on technology, systems and structure for a proper change management. Any organization can be regarded as a system, in which employees is the most important subsystem and that employees are the people
who make structure and technology work, and therefore they become the cornerstone for the success of any organizational transformation.

A change could be taken as positive or negative depend on the perception of an individual employee. Any change would fundamentally impact a person’s mental models of organizational life and subsequently would impact a person’s attitude about the organization. Change affects everyone in a different way, but the actual challenge is to understand people’s reaction to the alternation and to cope up with their responses. It is therefore imperative to understand and profile the change resilience of an individual employee. Effectiveness of behavior readiness in the organization towards the change management is shown in Table 2.1, which is adapted from the results of Ruben and Kealey, (1979) and Chen and Huang (2007).

<table>
<thead>
<tr>
<th></th>
<th>Respect</th>
<th>Interaction to Knowledge</th>
<th>Role Behaviors</th>
<th>Interaction Management</th>
<th>Ambiguity Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Culture Shock</strong></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>0.0000</td>
<td>0.446^2</td>
<td>0.705^a</td>
<td>0.543^c</td>
<td>0.449^2</td>
</tr>
<tr>
<td></td>
<td>(N=12)</td>
<td>(N=12)</td>
<td>(N=12)</td>
<td>(N=12)</td>
<td>(N=12)</td>
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<tr>
<td><strong>Adjustment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.686^b</td>
<td>0.287</td>
<td>-0.004</td>
<td>0.209</td>
<td>-0.220</td>
</tr>
<tr>
<td></td>
<td>(N=13)</td>
<td>(N=13)</td>
<td>(N=13)</td>
<td>(N=13)</td>
<td>(N=13)</td>
</tr>
<tr>
<td><strong>Effectiveness</strong></td>
<td>0.441^2</td>
<td>0.483^a</td>
<td>0.400^c</td>
<td>0.349</td>
<td>-0.544^d</td>
</tr>
<tr>
<td></td>
<td>(N=13)</td>
<td>(N=13)</td>
<td>(N=13)</td>
<td>(N=13)</td>
<td>(N=13)</td>
</tr>
</tbody>
</table>

### 2.3.1 Relevant Research of Behavior in Aspect of Business Innovation and Research

Moutinho and Hutcheon (2007) developed a predictive model of store patronage behavior for consumers. Gao and Wei (2007) investigates the ethical acceptability of frequently used behaviors of Chinese enterprises from their executive’s viewpoints. Zhao and Tian (2009) stated that consumer’s perception of social rewards punishments influences their ethical judgement significantly in different consumption situations. Larsson et al (2009) suggested a leadership chain model in which he identified the relationship
between leadership behaviors, health, customer satisfaction and profitable and effective organizations. Chen (2009) examined the joint impact of relationship-selling behaviors and switching barriers as a potential moderator in the light of current service quality, customer satisfaction and customer loyalty paradigm. Singh (2009) investigated the relationship and the impact of organizational learning on KM processes. Vouzas (2009) has drawn the attentions that the human resources issues such as human behavior and employee involvement and commitment are essential for the successful introduction and implementation for any processes. Suppiah and Sandhu (2011) indicated that the organizational culture types influence tacit knowledge sharing behavior and that influence depending on the cultural type. Mills and Smith (2011) evaluated the impact of specific KM enablers and processes on organizational performance.

2.4 TAXONOMY AND TECHNOLOGY ARCHITECTURE

Taxonomy--the classification of items within subject domains--is especially effective in helping with today's information access difficulties. These structures are particularly good at representing open systems and are useful for the implementation of KM. They are helpful in portraying abstract concepts and reflecting the various forms knowledge can take, whether tangible or intangible. Taxonomies do not necessarily use pre-existing classification schemes and are often based on a synthesis derived from user need and language.

Taxonomy can be hierarchical systems that also use controlled navigation and content layers, but they are not always based on the accepted standards used in a traditional setting. The multifaceted subject headings of a taxonomy have the added bonus of reflecting connections and processes in a semantic structure, or ontology, allowing for potentially wider consultation
and application of knowledge objects. Taxonomies leave room for growth and constant revision, depending on external or internal factors. The detailed review on taxonomy and technology architecture in the context of KM is carried out and relevant literature is indicated here.

management technique ‘cladistics’ for the organizations to formally and systematically understand the emergence of new manufacturing forms within their business environment.

2.5 PROCESS, ENVIRONMENT, REWARD AND COMMUNICATION DESIGN

The process design, organizational structure design, reward plan and communication plan are the key elements before the implementation of KM solution. The detailed review on process, environment, reward and communication design in the context of KM is carried out and relevant literature is indicated here.

Choi et al (2004) explored the framework for the KM and business process management and integrate the two paradigms and integrate into single framework and also classifies process knowledge into three types. Rehman et al (2007) explained the true meaning of design context knowledge and can be used in a structured way to support decision making and the prediction of their consequences at the conceptual design stage. Wei et al (2008) examined the impact of KM process on innovation of firms and suggested that the knowledge process architecture of knowledge acquisition, integration, exploitation and protection are essential for effective organization innovation. Hassen et al (2007) explained the concept of reusing the knowledge about causalities and relations between Key Characteristics (KC), and validation of design robustness using Failure Mode and Effect Analysis (FMEA) knowledge. Franken et al (2006) suggests that the choice of KM approach must be closely aligned with the organization’s strategic and operational decision in order to get the anticipated benefits. Salah et al (2011) presents a knowledge-based system to enhance creative conceptual design and it requires
the integration of many components viz. design process, creative tools and design knowledge. Gunther et al (2008) presents two techniques for mining change logs in adaptive process management systems and showed the use of process mining as a analysis tool for truly flexible processes by understanding when and why process changes become necessary. Kunz et al (2010) proposed the Management Control Systems (MCS) have considerable impact on an individuals knowledge processes and the success of implementing KM in firms. Khalfan et al (2010) highlights the benefits of integrated construction SCM through effective KM and conclude that it will improve the overall production. Moon et al (2011) suggests that communities of practices (CoPs) have been recognized as an effective vehicle for taking advantage of explicit and tacit knowledge within an organization.

2.6 LEARNING DESIGN

Our intelligence is based on our learning community. Likewise organizational intelligence is the result of a collective intelligence and knowledge sharing. Levitt and March (1988) have held that organizational learning is a form of intelligence. Knowledge is organized in a way that its disciplines are integrative and interactive, which would ultimately lead to firm learning. Pedler et al. (1989) coined the term Learning Organization (LO) initially. Prietula and Simon (1989) developed an expert intuition through the pattern recognition over many years of experience. Senge (1990) popularized the term LO with his book The Fifth Discipline: The Art and Practice of the Learning Organization. Seely-Brown and Duguid (1991) pointed out that learning and improvisation occurs within communities of practice and the communities can be either formal or informal, which becomes a backdrop of KM initiatives. Dyck et al. (2005) suggests that the tacit-error correction
phase in KM happens in the socialization process, largely as improvisations by the communities of practices.

Behling and Eckel (1991) suggest two types of intuition namely an expert intuition and entrepreneurial intuition, which would be imperative in knowledge sharing and successful KM implementation. Isaacs (1993) suggested that the cognitive map of the individual is both influenced by, and influences, the domain where the process takes place. Argyris (2004) proposed that a socio-psychological process of learning can result in either single-loop or double-loop learning, learning that occurs in organizational learning stage. Tsang (1997) examined the dichotomy between the prescriptive and descriptive researches on and found that organizational learning happens only when the two streams of research are integrated. Crossan et al., (1999) proposed that organizational learning is the principal means of achieving the strategic renewal of an enterprise. Bontis et al. (2002) analyzed the social and behavioral dynamics of learning processes. Nonaka (1994) proposes a paradigm for managing the dynamic aspects of organizational knowledge creating processes and Robinson (2001) distinguished the normative nature of LO from descriptive nature of OL; where in learning organization models emphasize leadership and management, culture, and systems for communication, information, and knowledge along with organizational learning.

Raman and Murali (2000) suggested that collaborative knowledge creation and sharing in an environment is inevitable for the success of the firm. Rahim (2002) points out that only when an interactive process manifested in incompatibility, disagreement, or dissonance within or between social entities, will true learning happen. James and Abraham (2002) addressed the characteristics of learning in knowledge-based work environments of a software firm is the proper use of cooperative decision
making. KM has a multidimensional nature at the organizational level while managing knowledge (Argote et al., 2003) and can be analyzed as the social and behavioral dynamics of learning processes (Bontis et al., 2002). Ambjorn et al. (2008) implied that the role of conceptual modeling is the key process for implementing a better learning design.

De Kerekji et al. (2004) proposed a new model with learning environment which improved problem solving skills and better capacity to transfer knowledge from one situation to another. Cavaleri (2004) explained the knowledge transfer has widely changed at the organizational level from 1st generation to 2nd and 3rd generation KM and that the process of KM integration happens successfully when knowledge transfer happens from individual and group level to the organizational level (Vera and Crossan, 2004).

Hazlett et al. (2005) elaborated that the multi-dimensional nature of KM has evolved from computational view to organic view. Argote (2005) further explained that the organic view concentrates on tacit and explicit knowledge and more on the computational view. Masataka et al., (2006) explained that with practice and learning organizational capability for creating intellect can be increased and later developed an ontology based KM environment. Kenneth (2010) revealed how the learning and KM principles are applied in internal processes and used modified learning model. It was Peter and John (2006) who linked the OL, LO and KM at the process level and theorized the five disciplines of Singe’s and impact the knowledge creating spiral of Nonaka’s, providing better insight to the concept and it interrelations. Sun and scott (2003) found that some barriers are involved in transfer of learning to all levels in the organization and the absence of a link to the learning processes are identified as the major issues in implementation failures. It is postulated that these are the reasons for the gap between the two
streams. Hans (2009) elaborated the obstacles of various nature which restrain to KM implementation and also the policy and decision making in view of cost-benefit. Andrew et al. (2010) elaborated an approach to designing Technology Enhanced Learning (TEL) and outlined the framework of Deep Learning Design (DLD) which leads a sustainable innovations in learning.

Pablos (2004) tried to analyse, from a KM view, how multinational corporations face the triple objective of achieving global efficiency, local sensibility and organizational learning, and found that human resource policies acts as backbones to their success. Alas and Vadi (2006) conducted an empirical research in 44 Estonian organizations which indicated an impact of institutional environments on how cultural orientations influence organizational learning and result in inducing better employee attitudes toward change. Leseure (2010) through multiple case studies of Moroccan textile apparel offshore factories, that one organizational design and culture might not fit well within international operations networks. Alas (2008) compares the organizational change and learning in production and service sectors during a transition in society. From his interviews with members of top management teams of 137 Estonian organizations it was understood that culture mediates the reaction of employees regarding change. Alas et al. (2008) conducted survey in 29 Chinese organizations, and also contributed to the role of OL and culture as inevitable in readiness to change. It reveals the importance of the task and relationship orientation of organizational culture to bring out organizational learning and to have better change readiness in the employees. Singh (2009) investigated the relationship and the impact of organizational learning on KM processes through a quantitative research investigation in which the participants were administered psychometric instruments on organizational learning and KM and found the relationship to be substantial. Loss et al (2010) introduces a theoretical framework for Learning
Collaborative Networked Organizations (L-CNOs). It merges both Organizational Learning (OL) and KM paradigms to support the main elements presented as part of the framework, which supports this present study.

2.7 BALANCED SCORECARD

The literature review for Balanced Scorecard (BSC) in the context of KM is detailed in Table 2.2 and Table 2.3

<table>
<thead>
<tr>
<th>Business Metric</th>
<th>Contribution of research</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intangible Valuation</td>
<td>Intangible assets are evaluated to extract their value components and align them with business strategy.</td>
<td>Green and Ryan (2005)</td>
</tr>
<tr>
<td>Balanced score for BSC</td>
<td>Theory is used to calculate the relative weightage for each factor and comparison</td>
<td>Punniyamoorthy and Murali (2008)</td>
</tr>
<tr>
<td>New challenge for BSC</td>
<td>Organizations have quite different needs, market areas, people, products and services, and will end up with significantly different balanced scorecards.</td>
<td>Chavan (2009)</td>
</tr>
<tr>
<td>Strategic planning</td>
<td>General concepts of strategies planning, system of management of quality and BSC, in order to assist it in the development of the model</td>
<td>Goncalves (2009)</td>
</tr>
<tr>
<td>Performance Measures</td>
<td>To analyse the efficiency and benefits of supply chain (SC) scientifically and validate the usability of methods on performance evaluation index system.</td>
<td>Yang (2009)</td>
</tr>
<tr>
<td>Mapping of KM and business strategy BSC with Greenness</td>
<td>Impact and importance of KM activities in performance of BSC, such as financial, internal process as well as learning and growth perspectives.</td>
<td>Chen and Mohamed (2008)</td>
</tr>
<tr>
<td>Application</td>
<td>Contribution of research</td>
<td>Reference</td>
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<tr>
<td>Finnish municipalities</td>
<td>Analyze of interrelations of the decision-making rationales around accounting performance measurement (PM) adoptions in Finnish municipalities.</td>
<td>Rautianen (2009)</td>
</tr>
<tr>
<td>Stock exchange</td>
<td>Analysis of BSC usage among companies on the Thai stock exchange</td>
<td>Kittiya and Guthrie (2009)</td>
</tr>
<tr>
<td>Electricity Corporation</td>
<td>Importance of the rational analytical deliberation of legitimacy as a fundamental accompaniment to isomorphism in the continuing development of the new performance management system.</td>
<td>James (2009)</td>
</tr>
<tr>
<td>Logistic Industry</td>
<td>From a supply chain perspective, the non-tangible measures such as customer satisfaction are most measured.</td>
<td>Chia et al. (2009)</td>
</tr>
<tr>
<td>Performance of SMEs</td>
<td>Integrated performance measurement framework for supply chain evaluation and planning in Small and medium Enterprises( SMEs).</td>
<td>Thakkar et al. (2009)</td>
</tr>
<tr>
<td>Performance of University</td>
<td>To maintain university operating standards, encourage individual universities to work on inadequacies, and promote university competitiveness, performance measure indicators (PMIs) was established</td>
<td>Chen et al. (2009)</td>
</tr>
<tr>
<td>Investment Companies</td>
<td>A methodology for selecting strategic processes among the processes of Investment Company (IC) based on the BSC framework and the statistical analysis.</td>
<td>Hanafizadeh et al. (2009)</td>
</tr>
<tr>
<td>Finish Food manufacturing</td>
<td>The integration of Performance measuring system(PMS) and EMS issues into BSC</td>
<td>Lansiluoto and Jarvenpaa (2008)</td>
</tr>
<tr>
<td>Cooperative bank</td>
<td>Case study shows how the selection of performance indices affects results and the evaluation of a firm's performance.</td>
<td>Chen et al. (2008)</td>
</tr>
<tr>
<td>Petroleum Industry</td>
<td>Analytical hierarchy process (AHP) and balanced scorecard (BSC) for evaluating performance of the petroleum supply chain.</td>
<td>Varma et al. (2008)</td>
</tr>
<tr>
<td>Performance in financial sector</td>
<td>To assess the improvements that relate to learning and growth, internal processes and customers in financial performance.</td>
<td>Cohen et al. (2008)</td>
</tr>
</tbody>
</table>
2.8 VENDOR MANAGED INVENTORY

In its simplest form, Vendor Managed Inventory (VMI) is the process where the vendor assumes the task of generating purchase orders to replenish a customer’s inventory. VMI is a term that has is used to describe many types of supply chain initiatives. These different ‘VMI’ activities can vary substantially in purpose and application. In all of its forms VMI should be about improving visibility of demand and product flow in a supply chain, facilitating a more timely and accurate replenishment process between a supplier (vendor) and manufacturer or between a manufacturer and supplier. The VMI process is a combination of e-commerce, software and people. The e-commerce layer is the mechanism through which companies communicate the data. VMI is not tied to a specific communications protocol. VMI data can be communicated via EDI or any other reliable communications method. The key feature of the e-commerce layer is that the data will be timely and accurate. The literature on VMI can be broadly classified as follows:

1. Mathematical / Simulation Models:
   a. Single Vendor – Single Retailer
      i. Deterministic Demand
      ii. Stochastic Demand
   b. Single Vendor – Multiple Retailer
      i. Deterministic Demand
      ii. Stochastic Demand

2. Empirical analyses.

2.8.1 Single-Vendor and Single-Buyer with Deterministic Demand

a VMI model seeking the best trade-off among inventory investment, delivery rates and shortage. Fry et al. (2001) compared the Retailer Managed Inventory and VMI system, and showed the latter is superior. Dong and Xu (2002) modeled the profit function of vendor and buyer. Viswanathan and Wang (2003) proved that the VMI model achieves perfect coordination with simultaneous offer of quantity and volume discount.

2.8.2 Single-Vendor and Single-Buyer with Stochastic Demand

Disney and Towill (2002) highlighted the evaluation and optimization procedure for Automatic Pipeline, Inventory Order Based Production Control System (APIOBPCS)-VMI model in order to minimize inventory holding cost and production adaptation costs. David and Eben-Chaime (2003) formulated and analyzed inventory cost models for each party and also for the joint systems. Disney and Towill (2003a, 2003b) built a simulation model to analyze the bullwhip effect. Disney et al. (2004) established e-business enabled supply chain models for quantifying the impact of information and communication technologies, particularly on the effect of dynamic behavior.

2.8.3 Single-Vendor and Multiple-Buyer with Deterministic Demand

considered the integrated inventory and transport decisions in VMI systems modeled by Cetinkaya and Lee (2000), and presented an efficient algorithm for exact optimization and an alternative heuristic. Viswanathan and Piplani (2001) proposed a model to study and analyze the benefit of coordinating supply chain inventories through the use of common replenishment periods. Piplani and Viswanathan (2003) conducted a numerical study to analyze how various parameters affect the total costs under Supplier-Owned Inventory strategy. Smaros et al. (2003) used simulation to analyze the demand visibility.

2.8.4 Single-Vendor and Multiple-Buyer with Stochastic Demand


2.8.5 Empirical Analyses / Case Studies

Holmstrom (1998) conducted a case study to show how VMI could be implemented for an Enterprise Resources Planning (ERP) environment. Smaros and Holmstrom (2000) studied the data capture, data transfer, and data management in VMI system. Daugherty et al. (2001) conducted an empirical study, which focused on Electronic Data Interchange (EDI), bar coding, and information system capabilities. Kaipia et al. (2002) developed a time-based method for measuring the benefits of VMI. Kulp (2002) studied the relationship between VMI, information precision, information reliability, consumer demand variability and VMI use on wholesale price. Tyan and Wee
(2003) examined the implications of VMI system in the Taiwanese grocery industry by means of a survey and concluded that VMI has the ability to reduce costs, improves the service levels and creates business opportunities for both parties in the supply chain. Yang et al. (2003) identified five critical factors of VMI from literature and examined through detailed simulation of a hypothetical dual-level VMI delivery system. De Toni and Zamolo (2004) implemented VMI for electrical household appliances with focus on forecast and dispatch plan. Kuk (2004) tested the impact of VMI on information quality enhancement, service improvement and cost reduction through survey in electronic industries. The applications for vendor managed inventory are detailed in Table 2.4.

**Table 2.4 Applications of Vendor Managed Inventory**

<table>
<thead>
<tr>
<th>Application</th>
<th>Contribution of research</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMI in construction</td>
<td>Challenge of managing logistics in small items in construction industry</td>
<td>Tanskanen et al.(2008)</td>
</tr>
<tr>
<td>Patterns of VMI</td>
<td>Three empirically grounded patterns of VMI are proposed. Five contextual inhibitors of VMI impacts are suggested</td>
<td>Kauremaa et al.(2009)</td>
</tr>
<tr>
<td>Information exchange in VMI</td>
<td>Discrete-event simulation is used to examine how a manufacturer can combine traditional order data available from non-VMI customers with sales data available from VMI customers in its production and inventory control and manufacturer efficiency.</td>
<td>Smaros et al.(2003)</td>
</tr>
<tr>
<td>Retail Industry</td>
<td>No of factors to make the efficient operation of VMI difficult, analyze the strategy is effective when the relationship between major retailers and major suppliers is constructive and open.</td>
<td>Blatherwick (1998)</td>
</tr>
</tbody>
</table>
Table 2.4 (continued)

| Guideline of VMI                                                                 | Proposed standard agreement has a flexible structure has easily adopted industrial fields of VMI. | Zammori et al. (2009) |
| Success factors of VMI                                                          | VMI success is impacted by quality of the buyer-supplier relationship, IT-system and intensity of information sharing. | Marloes et al. (2008) |
| Dynamic inventory in VMI                                                       | VMI based simulation approach can minimize the inventory level. | Reddy and Vrat (2007) |
| Benefits of VMI in stochastic demand                                           | Proposed VMI strategies, to reduce the order picking cost and transportation costs resulting in reduced total supply chain costs. | Kiesmüller and Broekmeulen (2010) |

2.9 OBSERVATIONS AND RESEARCH GAP

A careful analysis of literature on the modules / elements which is critical for evaluation and assessment before implementation of KM solution hitherto reveals the following: It is evident that there is a need to develop generic framework, design and models for all the six modules / elements. Given the strategic importance of knowledge there is no doubt that organizations should make sufficient efforts to manage this critical resource. This is important both for their long-term survival and success, and building sustainable competitive advantage. From the state of art of literature, it is evident that the assessment and development of the below modules / elements are not considered in the research.

1. There is a need for development of conceptual framework and generic readiness assessment design and model for the readiness assessment exercise in KM perspective.

2. There is a need for development of conceptual framework and generic readiness assessment design and model for the behavior assessment exercise in KM perspective.
3. Generic base framework, design and model for KM taxonomy and technology architecture is a research lacuna.

4. There is a need for development of generic framework, design and model for process, environment, reward and communication design for implementation of KM solution in manufacturing industry.

5. A generic learning design and model is a research gap.

6. Development of generic framework, design and model for linkage of balanced scorecard and vendor managed inventory in KM perspective is the need

The objective of this research to develop generic framework, design and models for all the modules / elements and to implements for a case organization to demonstrate the effectiveness and efficiency of framework, design and models.

2.10 SUMMARY

This chapter presents a survey of literature on the selected modules / elements related to KM which needs to evaluated and assessed before implementation of KM solution. The gaps identified from the literature provided the motivation for the chapters addressed in this thesis.