CHAPTER 7

LEARNING DESIGN FOR KNOWLEDGE MANAGEMENT SOLUTION IMPLEMENTATION

7.1 INTRODUCTION

The KM, Organizational Learning (OL) and Learning Organization (LO), existing over the years as largely separate fields. There is a link between OL, LO and KM, even though OL and LO primarily deals with learning (at the individual, group, and organizational levels), and KM deals with the management of existing and newly created knowledge within the organization. New knowledge is created when learning occurs at the individual level, and this learning must then be translated to the group and organizational levels resulting in a new justified belief system for the organization.

7.1.1 Organizational Learning

Organizational learning (OL) can be described as the study of learning processes within the organization. OL is a process based on individual learning where in organizations engaged in creating and obtaining knowledge can adapt to the changing conditions of the environment or to change the environment proactively. OL deals with the socio-psychological process of learning and this field is largely descriptive in nature (Friedman et al 2005; Örtenblad 2001; Sun and Scott 2003; Tsang 1997). This is captured in the definition offered by Sun and Scott (2003) where in OL is described as “the learning process used in the organization. It deals with the question of how individuals in the organization learn”. Literature discusses about OL as an

7.1.2 Learning Organization

LO is primarily the domain of practitioners whose perspective centres on the characteristics of an organization that promote learning and facilitates the creation of a certain type of organization (Tsang 1997) and deals with prescription necessary to create a form of an organization that is continuously capable of recreating itself (Sun and Scott 2003; Senge 1990). LO is thus considered more normative in nature. Although some researchers still use the terms OL and LO interchangeably (Crossan et al 1999; Rahim 2002), the normative nature of the LO discipline is well-established and is distinguished from the descriptive nature of OL (Robinson 2001). Therefore, given that a LO must be capable of continuously recreating itself, the type of learning capability is considered more double-loop. In this research, for the purpose of discussing the linkage between OL, LO, and KM, the work of Senge (1990), which formulates five disciplines of the LO, will be considered. The five disciplines are team learning, personal mastery, shared vision, systems thinking, and mental models. These five disciplines inherently denote the levels of learning. Personal mastery and mental models at the individual level, team learning and shared vision at the group level, whilst systems’ thinking at the organizational level (Isaacs 1993; Argyris 2004).

7.1.3 Knowledge Management

Knowledge is a relationship between the knower and the known and only learners create knowledge. Knowledge is said to be the justified true belief of individuals (Nonaka 1994). More specifically, practices that arise out
of the belief system must not create mismatches between actual and expected outcomes and only then true knowledge is transferred. The immediate purpose of KM is not to improve either worker effectiveness or an organization's bottom line. Its purpose is to enhance knowledge processing held at different levels (i.e., individual, group levels and organizational levels). It is also imperative to note that KM doesn't directly manage, create or integrate most knowledge outcomes in organizations, but only impacts knowledge processes (performed by operational process agents), which, in turn, impact knowledge outcomes. Researches have shown that lack of proper KM in an organization can reveal negative indicators of organizational performance (Bontis et al 2002). Researchers have studied a three tier nature of KM in the organization (Argote et al 2003): creating or developing new knowledge; retaining the knowledge; and transferring knowledge. Stemming from this three tiers computational view and organic view (Hazlett et al 2005), or 1st 2nd and 3rd generation KM (Cavaleri 2004) have been evolved. Seely-Brown and Duguid (1991); Hazlett et al (2005); Argote, (2005) and Dyck et al (2005), etc have researched and found that KM is inevitable for organizational management and organizational performance once knowledge transformation happens. This goes hand in hand with the “theory in action” theme of LO, where all knowledge has to be generalized and crafted in ways in which employees can use it to make the knowledge actionable.

7.1.4 Learning Culture

It is only recently that researchers have begun to make genuinely systematic connections between learning, knowledge sharing and culture within organizations. A learning culture is a non negotiable criterion for the success of KM in any organization. The learning culture in an organization makes sure that there is a collaborative environment of knowledge transfer in the organization and that knowledge is extracted from distinct silos and used
as the common knowledge of organization. Secondly, an organization should foster expansive learning environments by realigning its learning goals towards absorbing external knowledge and integrating it with internal knowledge to develop new insights. This concept of learning goal of the organization is found effective for Inducting new roles and responsibilities, succession planning, knowledge transfer, new initiatives for business/operational improvements (innovation) and to meet employee aspirations. As an initial step towards attaining the learning goal of any organization, it is important to mentor the employees to better their roles, responsibilities and competencies, provide seminars, discussions and chats by senior/experienced employees on their core competency areas, facilitating problems and solution sharing between employees, increasing regular training on functional areas to upgrade employee skills and to facilitate and improve the accessibility to e-libraries, research databases, industry best practices etc. These practices of an organization would improve the knowledge transfer and foster an environment conducive for KM initiatives through OL and LO.

7.2 RESEARCH GAP BASED ON LITERATURE

Cumulative evidence from past research in KM suggests that effective implementation of KM solution in any organization requires a robust learning designs and models for various critical elements of process, people and technology. The primary intention of learning design is to devise and design the learning factors for the implementation of KM solution. Research and studies have also highlighted the need for organizational learning and learning organizations in a conducive learning organizational culture as the backdrop of effective KM implementing strategies. There are very few research efforts to map out these dimensions and its influence on KM initiation and success. This research therefore attempts to unfold the effects of improvement in the
performance indicators of the organization from the implementation and prognosis of learning factors and KM initiatives.

A learning organization is a collective undertaking where in organization, people, knowledge, and technology drive learning. These subsystems must work in harmony to achieve better and faster learning, and increase an organization’s relevance. Knowledge capturing and storing is easy when there is an efficient learning design and system, continually builds and improves organizational practice. The learning design methodology influences the way people gather and interpret knowledge to make design decisions. There are several methods to capture learning design knowledge, one of which is the instructional design approach. The first step is to create a learning environment for the individual to acquire new knowledge and elements and thereby to generate processes of analysis. The next step is to bring learning activities which are designed to make employees achieve a given set of actions in order to help them internalize knowledge. This learning design falls in the category of “learning by doing” rather than just following the rules and doing. The development of learning methods then could focus on constructing e-learning activities from KM systems which is absolutely necessary to manage the complexity of e-learning issues in companies. Learning design can be re-used in e-learning and this has emerged as one of the most significant recent development in KM implementations. Based on the detailed literature study, the research gap in the area of OL, LO and KM is identified and it is detailed in Figure 7.1.
7.3 RESEARCH PROCESS AND METHODOLOGY

The development of learning design and identification of impact of learning factors for implementation of KM solution is detailed through this study. Research design is detailed in Figure 7.2.
Figure 7.2 Research Design

7.3.1 Delphi Analysis

Delphi analysis was used to bring out the learning factors from the research and business literature. The learning designs with respect to the above goals and objectives are explained in detail in the research based on a Delphi analysis. The Delphi technique was also used to arrive at the conceptual framework of this research.
The learning designs based on the outcome of Delphi analysis are:

- Organizational Learning
- Expert Management System
- Communities of Practice
- Mentoring
- E- Learning

**7.3.2 The Conceptual Model**

From the Delphi technique it could be understood that KM is easy only with an efficient system to capture and store the knowledge, which forms the basis of learning design. There are several methods to capture learning design knowledge, and an important one is the instructional design approach. A learning environment with the basis of a constructivist model of learning theory, where learning is regarded as an active process in which meaning is developed on the basis of experience, should be created. Learning occurs only when it is situated in realistic settings where experience should be integrated with the task and not as a separate activity, which brings out the “learning by doing” paradigm. As mentioned earlier, e-learning technology is one that compliments the successful initiation and management of KM initiatives. The effects of learning factors may influence the improvement of performance indicators of KM directly or indirectly. The improvement in performance indicators of KM will have a positive impact on the achievement of strategic vision of the organization. This underpins the conceptual framework for this study that is depicted in Figure 7.3.
7.3.3 Construct Definitions

The definitions of constructs are provided in detail:

7.3.3.1 Organizational learning

This is a process to share knowledge at the organization level. The knowledge that is shared could be about news initiatives, individual’s views and opinions on a subject, a common forum for globally addressing a problem, or for collection feedback on success and failures within the organization or external environment.

The KM Administrator would post a knowledge sharing request (directly or on request of a user) on the site under the section called ‘Organization Learning’. The system could capture the following information (Figure 7.4),
Figure 7.4 Process Environment

- Objective of the request
- Community (User / User Group to participate)
- Mode of communication (Chat / Discussion forum)
- Date & time
- Expected learning

Communities (groups of people who share similar goals and interests) are created based on the learning sought. These could be temporary (created only for a certain event) or relatively permanent. The KM Administrator would assign groups of people going to participate in the discussion. Those selected people will have rights to contribute to the Organization learning contributory session. The same group of people only gets mail or alert from the KM Administrator.
The mode of communication could be either Chat / Discussion forum or both. The thread would be stored by the system, and would need to be converted into useful Knowledge items by KM Administrator (externally and manually). The entire transcript would be available under archives and catalogued for easy retrieval. The conversion of the chat transcript/threaded discussion into a knowledge document will be done using the functionalities already available in those respective sections.

Key Roles:
- KM Administrator
- Participant
- User

7.3.3.2 Expert management system

This section is a forum for users within manufacturing organization to locate experts within the organization and get inputs from them. A user can reach the expert’s page through a link on KM site, which will list down all the experts, and their areas of expertise. Alternatively, a simple/advanced search on a specific topic can lead to the expert’s page in the specified areas. The expert’s page would display all relevant information about the Expert like name, division he belongs to, contact, and other relevant links like expert opinion, FAQs, tips, suggestions etc.

7.3.3.3 Communities of practice

A community of practice is a group of peers with a common sense of purpose who agree to work together to share information, build knowledge, develop expertise and solve problems. Communities of practice are
characterized by the willing participation of members, and their ongoing interaction in developing a chosen area of practice.

In other words, Communities of practice are learning forums where members teach and learn from each other and use each other as a sounding board. Communities of practice may focus on problem solving, knowledge sharing and innovation. Each knowledge community further can consist of certain sub-communities which attempts to focus on smaller functional areas.

Guideline to establish and facilitate CoP at manufacturing organization:-

These guidelines provide tips on establishing and facilitating communities of practice; they are not intended to be prescriptive, as communities of practice may vary according to their particular purpose and membership. The guidelines aim to support the facilitation and establishment of communities of practice, provide a consistent high quality experience for participants, and thereby contribute to optimizing the outcomes for community of practice members.

Step 1: Identification of Member needs: An e-mail survey may be a useful tool to get detail about the needs of potential members and scope the parameters of the community of practice. A suggestive questionnaire can be in lines of the following –

- What are your 3 key information and learning needs?
- What activities is your area are being currently undertaken in relation to the above areas?
- What do you expect to gain from participating in the community of practice?
- Are you interested in being part of a small informal steering group that would assist with devising the forward program of meetings and activities?
- We anticipate holding presentations at some meetings - who do you suggest could be suitable presenters and on which topics? (Note: this could include you)
- What are your preferences with regard to meeting times and intervals etc?
- Based on your experience, what are the key success factors for this community of Practice?

The survey results to be analyzed with emphasis on

- The level of demand and need for knowledge and capacity building in the particular topic area
- The willingness and capacity of potential members to contribute to supporting the group
- The level of knowledge and expertise of members in relation to the topic, and their willingness to share this with each other

Step 2: Business Case: A robust Business value has to be ensured in terms of

- Degree of alignment of the topic with manufacturing organization’s business objectives
- Level of priority of the topic amongst potential CoP members
- Whether there is a pre-existing community of practice or forum in the topic
- The available capacity within manufacturing organization to provide facilitation support especially in the initial phase of establishment
- Indicative Value contribution
Step 3: CoP team structure and Operating Principle: The CoP team should be given the form of an official entity to track the workings and outputs. The Structure should ideally be in terms of

- Sponsorship – high level advocate and stakeholder
- Mission and Objectives: the who, what and why
- Roles – Leader, SME, knowledge expert, core team, etc

So as to ensure that the process of identifying goals, terms of reference and operating principles encourages members to own the community of practice, the following points may be useful to take into account.

- If a survey is carried out of potential members' goals and expectations, the results can be presented at the first meeting for discussion and agreement.
- Once agreed, goals and terms of reference can be published on a web page and be periodically reviewed in consultation with members.
- Operating principles can also help members clarify their expectations of each other.

The rules set for CoP operation should be practical and inspirational, for example:

- At least one new learning from each meeting;
- Privacy and confidentiality is maintained within the community;
- Views expressed are those of individual practitioner members; and
- After each meeting a summary of the discussion is circulated to members and uploaded to the KM portal

Step 4: Identification of Scope of KM Team and online support: The KM team has to act as a facilitating group and encourage cross-division ownership. In addition the KM team would be entrusted with the following:-
• Regular meetings to plan the forward program and identify how facilitation can be shared.
• The team should help identify expertise, resources and references, presenters, site visits, venues and topics for the broader community, as well as facilitate meetings.
• Consider establishing an email discussion list to help communication flow and facilitate relationships across the team and participants
• Ensure support of the CoPs from relevant Units/Divisions
• Encourage and facilitate the CoPs to become self supporting
• Ensure that information sharing can happen from wherever the expertise lies, including within the group, from non-members and/or other Units/Divisions
• An email discussion group may be set up to encourage member's engagement and share expertise and information
• Links to information about communities of practice can be made from the communities of practice web page
• Technical support and facilitation for setting up of Discussion forums for the CoPs

Step 5: Evaluation and Measurement: Seeking regular feedback from members and periodically evaluating outcomes can be a useful means of measuring the 'health' and relevance of the community of practice. Emerging issues can also be identified through these processes. Timing evaluation to feed into the planning cycle can assist with identifying its future. The following points could be included in the evaluation:
• Level of participation in email discussion, presentations and meetings;
• Range of agencies involved;
• Attendance at meetings;
• Outputs achieved, such as better practice checklists and toolkits;
● Evaluation of the uptake and usage of these checklists and toolkits; and
● Member satisfaction.

Step 6: Closing a CoP: A community of practice may be closed in any of the following circumstances:

● The group is no longer active;
● It has achieved its principle purpose;
● It has been assessed by the lead agency as no longer serving its original purpose, is no longer considered to be an organizational priority, or has drifted from its agreed mission; and/or
● It has failed to become self-supporting.

Suitable processes for closing a community of practice may need to be taken into account. Issues to consider include:

● Consulting members regarding closing the community of practice.
● Recognizing the group's achievements
● Acknowledging member's contributions
● Notifying members that the community of practice is closed, via email and at meetings as appropriate.

A joint effort by the KM team and the CoP members to summarize the knowledge gained, practical tips and lessons learned for future projects in the form of K-products, has to take place at the closing of all CoPs.

CoPs relevant to manufacturing organization:-
Some of the CoPs which can be set up for different areas during the initial phase are:

● CoP-New Product Development: This Community of Practice would provide a mechanism for sharing information on various aspects of new
product development like product engineering, market analysis, product lifecycle management, time to market, etc.

- CoP-Emerging technologies: This Community of Practice would provide a mechanism for sharing information on emerging technologies in the Textile industry and the feasibility of adopting these technologies at manufacturing organization.

- CoP-Heat treatment: This Community of Practice would provide a mechanism for sharing information on various manufacturing techniques used to alter the hardness and toughness of a material, mostly metallurgical. The techniques can include annealing, case hardening, induction hardening, precipitation strengthening, tempering, quenching, etc and the probable effects on the materials used in manufacturing organization.

- CoP-Lean manufacturing: A forum where individuals can share variety of perspectives on potential areas of waste elimination and how to reduce the 7 wastes and its effect on production time, delivery, quality and cost.

- CoP-Innovation: CoPs can act as breeding grounds or innovation. Some communities of practice are based around technical or professional peer groups, and the focus is on new and emerging areas of knowledge where there may be the opportunity to gain an edge. These groups can provide the basis for rapid dissemination of new ideas or products.

7.3.3.4 Mentoring

Mentoring is a one-to-one caring, supportive relationship between a mentor and a mentee that is based on trust. The mentor is simply a wise and trusted friend with a commitment to provide guidance and support for the mentee to develop their fullest potential based on their vision for the future.
Mentoring and Coaching have become very popular methods of training and knowledge transfer in recent years. By matching new or inexperienced employees with more experienced senior personnel, the intangible, tacit knowledge of manufacturing organization can be passed on effectively. It allows the new employees to grow without learning the hard way and creates a bond between Mentor/Coach and Mentee. Mentoring and coaching also allow the more experienced personnel to "give back" to the organization.

### 7.3.3.5 E-learning

E-learning is the delivery of a learning, training or education program by electronic means. E-learning involves the use of a computer or electronic device (e.g. a mobile phone) in some way to provide training, educational or learning material. A shift to e-learning is a shift towards a new learning culture. An effective e-learning strategy will take the long view and be built on a strong business case. It will range from technology issues to environmental factors, and will consider the transition from a change management perspective. One has to have a solid understanding of the needs and the plethora of technology-enabled learning options to lay the foundation for both short-term and long-term success in changing the learning culture of manufacturing organization. Some of the suggested e-learning courses that manufacturing organization needs are indicated in Table 7.1

### 7.3.3.6 Process performance indicators

The performance improvements in relational exchanges tend to be measured from a user perspective. As such, the present study will adopt a user perspective with respect to performance improvements. Examples of performance improvements among users can include, but are not limited to, lower searching costs and average cycle (Lieb and Bentz 2005).
Table 7.1 Suggested E-learning Courses

<table>
<thead>
<tr>
<th>Target Audience</th>
<th>E-Learning Modules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Management</td>
<td>Negotiation skills, Business etiquette, Managing change, BSC, Interpersonal &amp; Leadership skills, Lean manufacturing, Motivational techniques</td>
</tr>
<tr>
<td>Middle Management</td>
<td>Presentation skills, Performance management, Coaching skills, Mentoring skills, Six sigma, BSC, Interpersonal &amp; Leadership skills, People management, Problem solving techniques, Waste elimination, Inventory management</td>
</tr>
<tr>
<td>Lower Management</td>
<td>BSC, Sales tips, Basics of IT programming etc.</td>
</tr>
<tr>
<td>General</td>
<td>Managing time at work, Wealth management, Health tips, Investment tips, Retirement planning etc.</td>
</tr>
</tbody>
</table>

7.3.3.7 Financial performance indicators

Financial performance is defined by the financial and market measures to evaluate the companies’ efficiency and effectiveness, such as improvement in search speed and cost reduction (Zhao et al 2006).

7.3.3.8 Strategic performance indicators

Brown et al (2007) found that manufacturing managers were more involved in the strategic planning process in world-class than non-world-class plants, reflecting the importance of functional involvement in improving performance. Strategic performance relates to a company’s performance in serving customers in terms of cost competitiveness (Hayes and Wheelwright 1984; Roth and Miller 1990) and service and quality excellence.

7.3.3.9 Marketing performance indicators

It is important to measure marketing performance to reflect the changing environments and strategies. Many researchers have measured marketing performance in terms of different operational or financial measures, such as profit margins (Bititci 2000).
7.3.4 Hypotheses

In the context of KM, a critical requirement is that the learning factors develop relationships in a coordinated and collaborative way in order to improve performance indicators. This study focuses on the following four research hypotheses:

H1. There is a significant impact of organizational learning on process performance indicator.
H2. There is a significant impact of expert management system on financial performance indicators.
H3. There is a significant impact of communities of practices and e-learning on the system performance indicators.
H4. There is a significant impact of mentoring on the marketing performance indicators.

7.3.5 Research Methodology

The survey constructs used for this study were derived and developed based on the detailed literature review and from semi-structured interviews with KM managers, practitioners and executives of leading manufacturing firms in India. All the questions in the survey are collected on a five-point Likert scale. The reason for choosing a five-point Likert scale is to maintain the reliability of respondents’ perceptions (Lissitz and Green 1975).

7.3.5.1 Sampling and data collection

To test the hypotheses the relevant data were collected from manufacturing firms in India. A questionnaire survey methodology is chosen for the empirical survey, since it is believed to be the effective way of attaining a large number of manufacturing firms. The questionnaire is designed as close-ended questions so that executives of companies can answer
via email. Sample manufacturing firms were identified from the business directory of the India Trade and Development which was the resource centre for all business databases and information of industrial companies. A hard copy survey kit including questionnaire with a self addressed envelope, a statement about the purpose of research, confidentiality agreement and statement and anonymity agreement was given to the respondents. The survey kit also includes an assured statement for sharing of results and implications after the completion of empirical study. All of the above were included in the soft copy survey kit also. Three follow-up reminders were provided for both hard and soft copy survey.

A total of 150 questionnaires were sent to manufacturing firms. After three follow-ups, 85 useable responses were received representing a response rate of 57 percent, which compares favorably well to other such empirical studies. The manufacturing firms involved in this survey is practicing and following KM from minimum of 1 to maximum of 2 years. The proportion of manufacturing firms with number of years is indicated in Figure 7.5.

![Number of Months Practicing KM](image.png)

**Figure 7.5 Proportion of Firms with Number of Months Practicing KM**
7.3.5.2 Construct testing

During a pre-test, KM executives were asked to point out the degree to which certain measures tap the construct domain and to recommend modifications.

7.3.5.3 Reliability testing

Reliability (internal consistency) of the items comprising each dimension was examined using Cronbach’s alpha (Cronbach 1951). Following the guideline established by Nunnally (1978), an alpha score of higher than 0.60 is generally considered to be acceptable, whereas an alpha score of higher than 0.80 is considered a good measure of reliability. Cronbach’s alpha was used to measure the reliability of the hypothesized individual constructs. A commonly used value for acceptable reliability is 0.70 (Hair et al 1998). More reliable measures give greater confidence that the individual indicators are all consistent in their measurements, and therefore, the model is repeatable. The Cronbach’s alpha scores for the constructs of this study like organization learning, process performance indicators, expert management system, financial performance indicators, communities of practices, e-learning, system performance indicators, mentoring, marketing performance indicators 0.878, 0.825, 0.821, 0.921, 0.880, 0.834, 0.856 and 0.818 respectively. All alpha scores are higher than 0.80 and thus depict a good measure of reliability.

7.4 EMPIRICAL ANALYSIS AND RESULTS

The results were then analyzed using the statistical software analysis package Statistical Package for Social Sciences (SPSS). A Multiple regression analysis is a statistical technique that allows us to predict a respondent’s score on one variable on the basis of their scores on several other variables. A multiple linear regression model is an extension of a simple linear regression model to incorporate two or more explanatory variable in a
prediction equation and to identify its effect on the response variable. Multiple regression modeling is now a mainstay of statistical analysis in most fields because of its power and flexibility. Multiple linear regression was used to test the proportion of variance in the chosen outcomes explained by the following groups of independent variables or measures: organizational learning (H1); expert management system (H2); communities of practices and e-learning (H3) and mentoring (H4). Executives were asked to rate their responses to these variables on a 1 (least important) to 5 (most important) Likert scale for those items in order to test these hypotheses.

### 7.4.1 Survey Findings

H1. There is significant impact of organizational learning on process performance indicators.

In order to examine the relationship and extent of effect between the independent variables and dependent variables, the multiple linear regression analysis has been carried out for the data collected. The independent variables/measures that represent the organization learning are objective of request, community, mode of communication, date and time and expected learning \((X_1,X_2\ldots,X_5)\). The dependant variables/outcomes representing the process performance indicators are lower searching costs and average cycle length and service level improvements \((Y\text{ function})\). The linear regression model is given by \(Y = a_0 + a_1X_1 + a_2X_2 + \ldots + a_5X_5\).

Table 7.2 shows results of multiple linear regression analysis including the level of significance for the relationship between the dependant outcomes and independent variables/measures and also the ‘t’ statistic values of those independent variables which have significant partial regression coefficients. Table 7.2 reveals that the tested regression models are meaningful \((p < 0.05)\) leading to the conclusion that the organizational learning can contribute significantly to the improvement of the process performance indicators.
Table 7.2 Contribution of Organization Learning to Improvements in Process Performance Indicators

<table>
<thead>
<tr>
<th>Dependant outcome</th>
<th>Independent measure that has significant partial regression coefficients</th>
<th>B</th>
<th>Std. Error</th>
<th>Beta</th>
<th>t</th>
<th>p</th>
<th>Adj. R^2_2</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower searching costs</td>
<td>Objective of request</td>
<td>1.857</td>
<td>0.310</td>
<td>5.984</td>
<td>0.000</td>
<td>0.509</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Community</td>
<td>0.380</td>
<td>0.178</td>
<td>0.393</td>
<td>2.139</td>
<td>0.034</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mode of communication</td>
<td>0.223</td>
<td>0.175</td>
<td>0.226</td>
<td>2.800</td>
<td>0.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Date and Time</td>
<td>0.335</td>
<td>0.161</td>
<td>0.345</td>
<td>2.075</td>
<td>0.039</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Expected Learning</td>
<td>0.303</td>
<td>0.132</td>
<td>0.276</td>
<td>2.287</td>
<td>0.023</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average cycle length</td>
<td>Mode of communication</td>
<td>1.960</td>
<td>0.640</td>
<td>3.061</td>
<td>0.002</td>
<td>0.236</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Date and Time</td>
<td>0.303</td>
<td>0.119</td>
<td>0.261</td>
<td>2.540</td>
<td>0.012</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>Service level improvements</td>
<td>Objective of request</td>
<td>2.063</td>
<td>0.628</td>
<td>0.329</td>
<td>0.001</td>
<td>0.220</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Community</td>
<td>0.276</td>
<td>0.117</td>
<td>0.241</td>
<td>2.362</td>
<td>0.019</td>
<td>0.001</td>
<td></td>
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<tr>
<td></td>
<td>Mode of communication</td>
<td>0.249</td>
<td>0.126</td>
<td>0.263</td>
<td>1.970</td>
<td>0.050</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Expected Learning</td>
<td>0.303</td>
<td>0.119</td>
<td>0.261</td>
<td>2.443</td>
<td>0.016</td>
<td></td>
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</tbody>
</table>

The results presented in Table 7.2 indicate the support for Hypothesis H1. The contribution of organization learning was significant for dependant variables/outcomes as revealed by the values of \( p < 0.05 \).

H2. There is significant impact of expert management system on financial performance indicators.

The expert management system was identified and these are the independent variables/measures of hypothesis H2. The items considered for H2 are: to locate experts and get inputs, user can reach the experts page, experts page display all relevant information of experts. The dependent variables/outcomes are: improvement in search speed and cost reduction. Table 7.3 shows the results of the analysis that supports the hypothesis that the expert management
system contributes to the improvement of the financial performance indicators, as the tested regression models are observed to be meaningful ($p < 0.05$).

**Table 7.3 Contribution of Expert Management System to Improvements in Financial Performance Indicators**

<table>
<thead>
<tr>
<th>Dependant outcome</th>
<th>Independent measure that have significant partial regression coefficients</th>
<th>$B$</th>
<th>Std. error</th>
<th>Beta</th>
<th>$r$</th>
<th>$p$</th>
<th>$\Delta R^2$</th>
<th>$\Delta R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement in search speed</td>
<td>To locate experts and get inputs</td>
<td>4.432</td>
<td>0.470</td>
<td>9.440</td>
<td>0.000</td>
<td>0.474</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>User can reach the experts page</td>
<td>0.301</td>
<td>0.113</td>
<td>0.266</td>
<td>2.585</td>
<td>0.011</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experts page display all relevant information of experts</td>
<td>0.301</td>
<td>0.130</td>
<td>0.271</td>
<td>2.116</td>
<td>0.029</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost reduction</td>
<td>To locate experts and get inputs</td>
<td>4.307</td>
<td>0.495</td>
<td>8.709</td>
<td>3.283</td>
<td>0.000</td>
<td>0.173</td>
<td></td>
</tr>
<tr>
<td></td>
<td>User can reach the experts page</td>
<td>0.173</td>
<td>0.087</td>
<td>0.191</td>
<td>1.987</td>
<td>0.049</td>
<td>0.007</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experts page display all relevant information of experts</td>
<td>0.308</td>
<td>0.078</td>
<td>0.327</td>
<td>3.952</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results presented in Table 3 indicate the support for Hypothesis H2. The contribution of the independent measures was observed to be significant for five dependant outcomes with a level of significance, $p < 0.05$.

H3. There is significant impact of communities of practices and e-learning on the system performance indicators.

The independent variables/measures representing the communities of practices and e-learning are: problem solving, knowledge sharing and innovation. The dependant variables/outcomes representing the performance indicators: cost competitiveness and service and quality excellence. The results of the analysis are presented in Table 7.4, which shows that the tested regression models are significant ($p < 0.05$) and hence the communities of practices and e-learning significantly contribute to the improvement of the system performance indicators.
Table 7.4 Contribution of Communities of Practices and E-Learning to Improvements in System Performance Indicators

<table>
<thead>
<tr>
<th>Dependant outcome</th>
<th>Independent measure that have significant partial regression coefficients</th>
<th>B</th>
<th>Std. error</th>
<th>Beta</th>
<th>t</th>
<th>p</th>
<th>Adj $R^2$; $p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost competitiveness</td>
<td>Problem solving</td>
<td>-0.38</td>
<td>0.113</td>
<td>-0.393</td>
<td>-2.19</td>
<td>0.034</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Knowledge sharing</td>
<td>0.455</td>
<td>0.179</td>
<td>0.417</td>
<td>2.545</td>
<td>0.012</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Innovation</td>
<td>0.335</td>
<td>0.161</td>
<td>0.345</td>
<td>2.075</td>
<td>0.039</td>
<td></td>
</tr>
<tr>
<td>Service and quality excellence</td>
<td>Problem solving</td>
<td>1.721</td>
<td>0.306</td>
<td></td>
<td>5.619</td>
<td>0.000</td>
<td>0.509</td>
</tr>
<tr>
<td></td>
<td>Knowledge sharing</td>
<td>0.607</td>
<td>0.173</td>
<td>0.604</td>
<td>3.510</td>
<td>0.001</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Innovation</td>
<td>0.221</td>
<td>0.173</td>
<td>0.222</td>
<td>2.798</td>
<td>0.006</td>
<td></td>
</tr>
</tbody>
</table>

The results indicate the support for Hypothesis H3. The contribution was significant for all five dependant outcomes with $p < 0.05$.

H4. There is significant impact of mentoring on marketing performance indicators.

The measures that represent the mentoring are explained in Hypothesis H2. The dependent variables/outcomes that represent the marketing performance indicators can be regarded as profit margins. Table 7.5 shows the results of the analysis, which supports the hypothesis stating that the mentoring significantly contribute to the improvement of the marketing performance indicators as the tested regression models are found to be significant ($p < 0.05$).

Table 7.5 Contribution of Mentoring to Improvements in Marketing Performance Indicators

<table>
<thead>
<tr>
<th>Dependant outcome</th>
<th>Independent measure that have significant partial regression coefficients</th>
<th>B</th>
<th>Std. error</th>
<th>Beta</th>
<th>t</th>
<th>p</th>
<th>Adj $R^2$; $p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit margins</td>
<td>One to one caring</td>
<td>0.880</td>
<td>0.234</td>
<td></td>
<td>3.762</td>
<td>0.000</td>
<td>0.656</td>
</tr>
<tr>
<td></td>
<td>Trust</td>
<td>0.656</td>
<td>0.066</td>
<td>0.672</td>
<td>9.861</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>
The results indicate the support for Hypothesis H4. The contribution is found to be significant for all the four dependant variables \((p < 0.05)\), there for the alternate hypotheses are accepted rejecting the null.

7.5 MANAGERIAL IMPLICATIONS

The findings and results of this empirical study are critical for \(KM\) organizations. The manufacturing sector specifically is faced with growing competitive pressures in a highly disjointed, high market growth, and challenges that intimidate its practicality as confirmed by recent consolidations. Effective, continuing and flexible intra and inter-firm relationships can and should play an important role in an organization’s competitive posture. The organization can react to the needs in a timely fashion and also accustomed to the need of market in more efficient manner than its competitors. This study has examined the significant influence, and the extent of influence of various learning factors on \(KM\) performance indicators. It can be seen that the organizational learning contribute largely to the process performance indicators measures. The financial performance indicators are found to be significantly influenced by the expert management system. It is also observed that by focusing these communities of practices and e-learning, the \(KM\) executives can expect to enhance the marketing performance indicators.

7.6 SUMMARY

Learning designs and models developed in this research have important theoretical contributions to the \(KM\) literature. In addition to this theoretical contribution, this research also provides important implications for \(KM\) managers & practitioners and this design/model can be leveraged as a strategic base for any manufacturing organization in its endeavor to implement \(KM\) solution. The devised model can be fine tuned to suit to the needs of the
specific goals and objectives of $KM$ solution of manufacturing organization. The limitations of the research can be twofold: the learning factors are not designed with respect to human resource and that the base key performance indicators and the learning design can fit only to manufacturing industry. The future scope of this research include exploration and extrapolation of learning design and models for the application of service industry and investigation of other modules such as top management influence design, risk design, training design and model and sustenance design for implementation of $KM$ solution.