The following conclusion thus can be made:

1. Competitive advantage is the biggest factor responsible for knowledge creation. Drive from top management to innovate and changes in the markets are next important factors.

2. Most important role of knowledge as envisaged by top management for next five years is capturing and leveraging the knowledge of customers.

3. External knowledge focus is important for majority of the units.

4. Customer information is considered to be the biggest knowledge asset by all units. Innovation is next terms of importance.

CHAPTER 6

TOOLS AND TECHNIQUES OF KNOWLEDGE MANAGEMENT

Browning (1990) contends that "information technology is no longer a business resource; it is the business environment". Emphasizing the importance of use of Information Technology Egbu (2000) states that IT
carries the potential to “redefine the management and control of innovation on a global basis through the removal of barriers such as time and distance.” Gann (2000) too argues that IT can assist the transfer of knowledge and information between project teams, enabling the development of new knowledge for innovation. Thus the necessity and utility of knowledge management tools and techniques being used in an organization can not be overlooked.

It is common myth that Knowledge Management and Information Technology is conceptually interchangeable (Egbu, 2002). However, KM means much more than IT and it is crucial to view them as mutually exclusive. This is because an organization does not have to employ IT for it to manage some of its knowledge assets. An example is in some organizations, where ‘Quality Circles’, ‘Story telling’ and ‘Lessons Learned Registers’ are used for managing knowledge. These approaches do not have to employ any information technology. Thus not all the tools and techniques used for managing knowledge need IT.

Most of the business content of any organization is unstructured, which includes information in files, messages, memos, reports, and proposals created in different formats and stored at many locations. The vast amounts of information can be collected, filtered and organized and be made available to those who need it in a format in which they need. This is done with the help of knowledge management tools.

Knowledge management tools enable organizations tackle all the problems related to knowledge management more effectively at reduced costs. Also, these tools help to leverage the collective knowledge and
experience of an organization to accelerate innovation and sharpen competitive advantage.

This chapter of the research study presents a broader understanding of major tools and techniques of knowledge management being used in textile industry. The items 14,15,28,29 and 30 in the questionnaire (annexure) are concerned with this objective. Items 28, 29 and 30 have further sub headings which in total make 14 statements. All comparisons have been made with one way ANOVA.

The respondents have rated the statements 14 and 15 on five point scale ranging from (5) ‘strongly agree’, (4) ‘agree’, (3) ‘neither agree nor disagree’, (2) ‘disagree’ and (1) ‘strongly disagree’, whereas for the rest ranking method has been used.

### 6.1 COMPANY INTRANET IS THE PRIMARY CHANNEL OF COMMUNICATION

An intranet is network based on TCP/IP protocols (an internet) belonging to an organization, which is accessible only to the organization's members, employees, or others with authorization. An intranet’s web sites look and act just like any other web sites, but the firewall surrounding an intranet fends off unauthorized access.

Intranets are used to share information.

Table 6.1 presents one way ANOVA calculations on statement regarding intranet as primary channel of communication.

| Table 6.1 |
Intranet as primary channel of communication creation in different sized categories of textile industry

<table>
<thead>
<tr>
<th>Statement</th>
<th>G1 Mean</th>
<th>G1 SD</th>
<th>G2 Mean</th>
<th>G2 SD</th>
<th>G3 Mean</th>
<th>G3 SD</th>
<th>Overall Mean</th>
<th>Overall SD</th>
<th>F-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our intranet is primary channel of communication</td>
<td>2.83</td>
<td>1.00</td>
<td>2.89</td>
<td>0.91</td>
<td>3.20</td>
<td>1.24</td>
<td>2.91</td>
<td>1.03</td>
<td>1.56</td>
</tr>
</tbody>
</table>

The table shows that overall mean score for this statement is very low (2.91). F ratio indicates that response from three groups is relatively same as there is no significant difference among the mean scores of these groups. This is therefore clear that intranet is not the primary channel of communication in any of the three groups. Though Bennett and Gabriel (1999) argue that corporate intranet is an efficient tool for the storage and flow of explicit knowledge. It has been argued further that such a tool can improve company decision-making, quicken employee responses to enquiries about products, which can lead to greater innovation but The results from the study indicate otherwise. This can be attributed to the fact that not many units in textile industry are techno savvy. Use of computers is limited to specific tasks and conventional channels of communication are commonly used.

6.2 FULL INTEGRATION OF INFORMATION

The life blood of every modern enterprise is information. In addition to the internal information related to finance, marketing, production and personnel functions, an organization keeps collecting more and more information from different external sources and applications. The information collected from sources such as documents, libraries, spreadsheets, e-mail and instant messaging archives, electronic forms and
records, publicly available web pages and commercial information services is generally unstructured. Each data source has its own organization and format. Thus, these data files are independent of one another, and don’t easily work well together. If this data is fully integrated into a single, universal database or data warehouse, it becomes much easy to retrieve and use this information for decision making. Regular update of this information assists managers in making better and faster decisions. But the results of study in table 6.2 indicate that the extent of integration of vital information in majority of the units is not high as the overall mean value for this factor is low (3.22).

The reason for lack of integration of information too can be attributed to limited use of technology for knowledge management purposes and relying more on conventional modes to manage data. From the value of F ratio it can be inferred that means are not significantly different for three categories.

Table 6.2
Integration of information in organization in different sized categories of textile industry

<table>
<thead>
<tr>
<th>Statement</th>
<th>G1 Mean</th>
<th>G1 SD</th>
<th>G2 Mean</th>
<th>G2 SD</th>
<th>G3 Mean</th>
<th>G3 SD</th>
<th>Overall Mean</th>
<th>Overall SD</th>
<th>F-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information from all processes, external sources and internal system is fully integrated</td>
<td>3.35</td>
<td>0.84</td>
<td>2.97</td>
<td>1.01</td>
<td>3.20</td>
<td>1.49</td>
<td>3.22</td>
<td>1.03</td>
<td>1.37</td>
</tr>
</tbody>
</table>

6.3 TECHNIQUES BEING USED FOR KNOWLEDGE CREATION

Birkinshaw and Sheehan (2002) suggest a knowledge life-cycle theory where knowledge goes through the stages of creation, mobilization, diffusion and commoditization. New knowledge is ‘born’ as something fairly nebulous,
takes shape as it is tested, matures through application in a few settings, is diffused to a growing audience and eventually becomes widely understood and recognized as common practice (Nonaka and Takeuchi, 1995). Many ideas die in the creation stage because they fail to generate interest or support, but some become more clearly formed and make it to the mobilization stage. Knowledge creation and knowledge capturing are therefore central processes of knowledge management and form the first phase of knowledge management cycle. Several techniques and tools are used to elicit tacit knowledge and to trigger the creation of new knowledge the content of which is subsequently organized in a systematic manner.

As table 6.3 shows that mean value is minimum (1.33) for environmental scanning, it is the most popular technique being used for knowledge creation. F ratio indicates that there is no significant difference among the mean scores of G1, G2 and G3.

**Table 6.3**

<table>
<thead>
<tr>
<th>Commonly used techniques for knowledge creation in different sized categories of textile industry</th>
<th>G1</th>
<th>G2</th>
<th>G3</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commonly used techniques for knowledge creation</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Environmental scanning</td>
<td>1.38</td>
<td>0.49</td>
<td>1.14</td>
<td>0.35</td>
</tr>
<tr>
<td>Data mining</td>
<td>1.38</td>
<td>0.49</td>
<td>1.71</td>
<td>0.46</td>
</tr>
<tr>
<td>Business simulation</td>
<td>1.69</td>
<td>0.46</td>
<td>1.71</td>
<td>0.46</td>
</tr>
<tr>
<td>Content analysis</td>
<td>1.69</td>
<td>0.46</td>
<td>1.71</td>
<td>0.46</td>
</tr>
<tr>
<td>Total</td>
<td>6.15</td>
<td>1.30</td>
<td>6.29</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td>6.25</td>
<td>0.84</td>
<td>6.21</td>
<td>1.12</td>
</tr>
<tr>
<td></td>
<td>0.94</td>
<td>1.04</td>
<td>0.91</td>
<td>0.84</td>
</tr>
<tr>
<td></td>
<td>0.67</td>
<td>0.46</td>
<td>0.71</td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>0.94</td>
<td>1.12</td>
<td>0.94</td>
<td>0.94</td>
</tr>
</tbody>
</table>

Environmental scanning is the acquisition and use of information about events, trends, and relationships in an organization's external environment, the knowledge of which assists management in planning the organization's future course of action. (Aguilar, 1967, Choo and Auster,
The environment is scanned in order to understand the external forces of change so that people in the organization may develop effective responses to secure/improve its position in the future. Scanning is also done in order to avoid surprises, identify threats and opportunities, gain competitive advantage, and improve long-term and short-term planning (Sutton, 1988). An organization’s ability to adapt to its outside environment is dependent on knowing and interpreting the external changes that are taking place, therefore environmental scanning constitutes a primary mode of organizational learning. Environmental scanning includes both looking at information (viewing) and looking for information (searching). ETOP, QUEST and decision tree analysis are the most common techniques used for environmental scanning in most of the textile units.

The second most popular technique is data mining (overall mean score 1.50). Responses for data mining are also nearly same in all groups as F ratio shows that there is no significant difference among mean scores of G1, G2 and G3. It is the process of discovering actionable and meaningful patterns, profiles and trends by sniffing through firm’s data using pattern recognition technologies such as neural networks, machine learning and genetic algorithms (Mena, 1999). Data Mining, the extraction of hidden predictive information from large databases, is a powerful tool with great potential to help companies focus on the most important information in their data warehouses (Folorunso and Ogunde, 2004). Data mining tools predict future trends and behaviors, allowing businesses to make proactive, knowledge-driven decisions. These techniques can be implemented rapidly on existing software and hardware platforms to enhance the value of existing information resources. During the study it has been observed that use of
data mining is more common among the units dealing in fashion and readymade garments.

Simulation is an exact replica of a real life situation. The adoption of simulation as a powerful enabling method for knowledge management is hampered by the relatively high cost of model construction and maintenance. Mean score of 1.67 in table 6.3 indicates that it is not a very popular technique being used in textile units.

Content analysis is a research tool used to determine the presence of certain words or concepts within texts or sets of texts. Researchers quantify and analyze the presence, meanings and relationships of such words and concepts, then make inferences about the messages within the texts e.g. business environment, products and competition etc. To conduct a content analysis on any text, the text is coded, or broken down, into manageable categories on a variety of levels - word, word sense, phrase, sentence, or theme and is then examined using one of content analysis' basic methods: conceptual analysis or relational analysis. The relatively high mean score (1.71) in table 6.3 shows that content analysis is amongst the least popular techniques being used by majority of the units.

From the F ratio it can be inferred that there is no significant difference among the mean value of any of the categories regarding simulation and content analysis.

6.4 COMMONLY USED TECHNIQUES FOR KNOWLEDGE SHARING

Knowledge sharing is a process of sharing, learning and using the knowledge and experience to achieve organizational goals. The defining characteristic of the transition point from creation to mobilization of
knowledge is that the originators share their knowledge with people who make up part of a trusted community (Brown and Duguid, 1991, 2001; Wenger and Snyder, 2000; Iverson and McPhee, 2002). Once mobilized, the knowledge is then diffused through further exchanges within the relevant environment. The commodity stage is where the knowledge becomes common and enters the public domain.

Apart from intra firm knowledge sharing, the practices of knowledge sharing beyond the firm’s boundaries are a topic of interest. For multi unit organization scholars have demonstrated the importance of having lateral linkages among organization subunits for effective knowledge sharing to occur. Research has shown that a subunit’s information processing capacity is enhanced by lateral interunit integration mechanisms (Galbraith, 1973, 1994; Egelhoff, 1993; Gupta and Govindarajan, 2000), product innovation knowledge flows more efficiently through established relationships spanning subunit boundaries (Tushman, 1977; Ghoshal and Bartlett, 1988; Nobel and Birkinshaw, 1998; Hansen, 1999) and best practices are transferred more easily when a positive existing relationship exists between the two parties (Szulanski, 1996).

Table 6.4 (next page) shows that overall mean value is minimum (1.20) for after action review making it most commonly used technique for knowledge sharing. F ratio indicates that there no significant difference among the mean scores of G1, G2 and G3.

After action review (AAR) is focused on learning from a specific event. During after-action reviews, participants in an activity, event, or project conduct a structured discussion of what happened and why in order to learn
from the experience (NHS, 2001). Most common questions discussed during AAR include:

- What was supposed to be done?
- What has been actually achieved?
- What went well?
- What could have gone better?

Because after-action reviews ask what went well and try to get to the root of the reason, they are a useful way to identify successes and define best practices. AAR also seeks to learn from obstacles, mistakes, and other problems. All lessons learned, both positive and negative, are documented and shared with others. Mean scores of three categories (1.08, 1.27, and 1.50 for G1, G2 and G3 respectively) show that AAR is most popular in G1 followed by G2 and G3.

Table 6.4

Commonly used techniques for knowledge sharing creation in different sized categories of textile industry

<table>
<thead>
<tr>
<th>Commonly used techniques for knowledge sharing</th>
<th>G1</th>
<th>G2</th>
<th>G3</th>
<th>Overall</th>
<th>F-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communities of practice</td>
<td>1.31</td>
<td>0.46</td>
<td>1.57</td>
<td>0.50</td>
<td>1.50</td>
</tr>
<tr>
<td>Sharing best practices</td>
<td>1.31</td>
<td>0.46</td>
<td>1.14</td>
<td>0.35</td>
<td>1.25</td>
</tr>
<tr>
<td>After action review</td>
<td>1.08</td>
<td>0.27</td>
<td>1.27</td>
<td>0.45</td>
<td>1.50</td>
</tr>
<tr>
<td>Cross functional teams</td>
<td>1.85</td>
<td>0.36</td>
<td>1.86</td>
<td>0.35</td>
<td>2.00</td>
</tr>
<tr>
<td>Story telling</td>
<td>1.38</td>
<td>0.49</td>
<td>1.14</td>
<td>0.35</td>
<td>1.50</td>
</tr>
<tr>
<td>White pages</td>
<td>1.92</td>
<td>0.27</td>
<td>1.86</td>
<td>0.35</td>
<td>2.00</td>
</tr>
<tr>
<td>Total</td>
<td>8.85</td>
<td>1.47</td>
<td>8.84</td>
<td>1.11</td>
<td>9.75</td>
</tr>
</tbody>
</table>
Sharing best practices (overall mean score 1.25) is the next most popular technique for knowledge sharing. F ratio again shows that there no significant difference among the mean scores of G1, G2 and G3. Also referred to as internal bench marking, studies show that sharing internal best practices can be an important adjunct to other improvement approaches, many of which focus on identifying and solving problems (D’Adamo and Kols, 2005). A single-minded focus on problems may be demoralizing because it characterizes people and activities by their failures.

In contrast, initiatives promoting internal best practices focus on what people are doing right, raise morale by demonstrating faith in the staff, and make achieving excellence seem possible (The Gallup Organization, 2002). It has been found that bottom-up approaches to improvement such as sharing internal best practices encourage more learning within the organization than do top-down approaches, such as setting standards (Gainer, 1998). Also practices developed inside the organization are not only more readily accessible, but they are also more likely to suit the cultural and organizational setting and thus need the least adaptation (Vitasek and Manrodt, 2005).

As seen in table 6.4 the overall mean score of story telling is 1.33 making it third popular technique being used for knowledge sharing purposes. F ratio again shows that there no significant difference among the mean scores of G1, G2 and G3.
Stories are very effective tool for both capturing and coding tacit knowledge. An organizational story is a detailed narrative of management actions, employee interactions, and other intra organizational events that are communicated informally within the organization. Conveying information in a story provides a rich context, causing the story to remain in the conscious memory longer and creating more memory traces than is possible with information not in context. Stories can greatly increase organizational learning, communicate common values and rule sets, and serve as an excellent vehicle for capturing, coding, and transmitting valuable tacit knowledge. But it has been observed during the study that in most of the units, this technique is not used at executive level. It is only used at shop floor level.

A Community of Practice (CoP) is a self-organized group of employees who share common work experiences, interests or aims (Wenger and Snyder, 2000). Community members are bound together by their collectively developed understanding of what their community is about. Communities evolve through mutual engagement and as members build their community they produce a shared repertoire such as language, values and routines. Lesser and Storck (2001) have found that although many communities of practice create organizational value, there has been relatively little systematic study of the linkage between communities of practice outcomes and the underlying social mechanisms that are at work. They argue that the social capital resident in communities of practice led to behavioral changes, which in turn positively influenced business performance.

But results in the table 6.4 indicate that communities of practice are not very popular technique of knowledge sharing (overall mean score is
relatively high: 1.42). Infrequent use of company intranet in most of the units is the reason for this. Geographical proximity of various units in multiunit companies is also a factor as it enhances the daily interaction of people and not much need is felt for online communities.

A cross-functional team refers to a group of people with different functional expertise working towards a common goal. It may include people from finance, marketing, operations, and human resources departments. Generally it includes employees from all levels of an organization. As seen in table 6.4 the mean score of cross functional teams is relatively high (overall mean score 1.88). Therefore it can be said that formation of such teams is very uncommon in textile industry of Punjab.

A white page is an online directory of experts which is easily accessible through company intranet. The directory contains every detail regarding the exports’ department, qualification, area of work and experience and area of expertise.

Table 6.4 shows that overall mean value of this technique is very high (overall average mean score 1.92) making it least popular choice for knowledge sharing. The reason for this can be less frequent use of company intranet at the workplace in majority of the units. This finding also supports the fact that for majority of the units’ external focus of knowledge is much more important than internal focus.

6.5 TECHNIQUES BEING USED FOR ORGANIZING AND MANAGING KNOWLEDGE
Organizing and managing knowledge refers to maintenance of knowledge (on day to day basis) in an organization to make it convenient for its people to understand and use it.

Table 6.5 presents one way ANOVA calculations of scores of commonly used techniques for organizing and managing knowledge recorded by three groups i.e. G1, G2 and G3.

As seen in the table, the overall mean score is minimum for knowledge harvesting (1.33) making it the most commonly used technique for managing knowledge. F ratio indicates that there no significant difference among the mean scores of G1, G2 and G3.

<table>
<thead>
<tr>
<th>Commonly used techniques for organizing and managing knowledge</th>
<th>G1</th>
<th>G2</th>
<th>G3</th>
<th>Overall</th>
<th>F-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Knowledge harvesting</td>
<td>1.38</td>
<td>0.49</td>
<td>1.29</td>
<td>0.46</td>
<td>1.25</td>
</tr>
<tr>
<td>Knowledge mapping</td>
<td>1.38</td>
<td>0.49</td>
<td>1.71</td>
<td>0.46</td>
<td>1.25</td>
</tr>
<tr>
<td>Knowledge audit</td>
<td>1.46</td>
<td>0.50</td>
<td>1.29</td>
<td>0.46</td>
<td>1.25</td>
</tr>
<tr>
<td>Intranet</td>
<td>1.69</td>
<td>0.46</td>
<td>1.86</td>
<td>0.35</td>
<td>1.75</td>
</tr>
<tr>
<td>Total</td>
<td>5.92</td>
<td>1.08</td>
<td>6.14</td>
<td>1.00</td>
<td>5.50</td>
</tr>
</tbody>
</table>

Knowledge Harvesting is a process that quickly converts top-performer expertise into knowledge assets so that the target learners can understand and actualize the process and achieve good results. (Powers,
APQC). This process can be applied to develop new products, capture knowledge from departing employees, or launch a new KM project. Knowledge harvesting can help address the risks of “brain drain” and capture knowledge before it walks out the door, as many organizations fear.

This finding further indicates that majority of the firms believe in knowledge acquisition than in knowledge creation.

Table 6.5 shows that knowledge audit (with mean score of 1.38) is the second most popular technique. It is clear from F ratio that there no significant difference among the mean scores of G1, G2 and G3. Debenham and Clark (1994) explain knowledge audit as a planning document which provides structural overview of a designated section of an organization’s knowledge as well as details of the qualitative and quantitative characteristics of the individual chunks of knowledge within that designated section. The document also identifies the knowledge repositories in which those chunks reside. They feel that the knowledge audit is a scientific measurement of the state of affairs of specified sections of corporate knowledge.

The knowledge audit process involves the following (Liebowitz et al., 2000; Nissen, 2006):

- Determining existing and potential knowledge sources, flows, and constraints.
- Identifying and locating explicit and tacit knowledge.
- Building a knowledge map of the knowledge stocks and flows.
- Identifying missing knowledge and who needs it.
Providing recommendations to management including suggested questionnaires, interviews, and focus groups are often employed in conducting knowledge audits (Liebowitz et al., 2000). Two types of general question categories are: (i) what knowledge currently exists in the targeted section and (ii) what knowledge is missing in the targeted section. Knowledge audit questions, typically, include questions such as (Liebowitz et al., 2000; Nissen, 2006):

- What knowledge is required for you to do your job?
- What knowledge is currently available?
- How is the knowledge used?
- Who else uses this knowledge?
- Who has expert knowledge on this subject?
- Improvements.

A knowledge audit can reveal an organization’s knowledge strengths, weaknesses, opportunities, threats and risks. Though in most of the units knowledge audit is confused with training audit, the results indicate that G3 units (with minimum score of 1.25 among three groups) are more concerned about knowing and bridging the knowledge gaps of their employees as compared to other two categories.

Knowledge mapping include keeping a record of information and knowledge that the organization needs. It shows details of knowledge that exists within the organization including location, quality, and accessibility; and knowledge required to run the organization smoothly. As seen from the table this technique does not seem highly popular (overall mean score is relatively high, 1.46). The only exception has been Jindal Cotex group where
competency mapping for each job is done and training is imparted on this basis. F ratio shows that there no significant difference among the mean scores of G1, G2 and G3.

An intranet is a valuable tool to support knowledge management initiatives in an organization. Use of intranet can support activities like communities of practice, staff directories and expertise finders and collaborative environments to bring a cultural change.

The use of intranet in textile industry being limited (as is clear from table 6.5); it is least popular technique for managing knowledge. This finding can be correlated with the previous discussion pertaining to very limited use if information and Communication technology in textile industry.

From value F ratio it can be inferred that there is no significant difference in the means of any of the categories.

6.6 TOOLS AND TECHNIQUES USED FOR KNOWLEDGE MANAGEMENT: A COMPARISON OF G1, G2 AND G3.

From tables 6.1, 6.2, 6.3, 6.4 and 6.5, a comparison can be done regarding use of tools and techniques related to knowledge management in G1, G2 and G3 respectively:

1. Use of intranet is very uncommon in G1, G2 and G3.

2. There is no integration business related information in any of the groups.

3. Data mining and environmental scanning are most commonly used techniques for knowledge creation in all the groups.
4. It has been observed that preferences of three groups vary as far as techniques used for knowledge creation are concerned. After action review is the most commonly used technique for knowledge sharing in G1, while it is second preferred technique in G2 and G3. Techniques used for knowledge sharing are story telling (for G2) and sharing best practices (G3).

5. Knowledge harvesting is most commonly used technique for managing knowledge in three groups. Second preferred technique for this purpose is knowledge mapping in G1, and knowledge audit for G2 and G3.

6.7 AN OVERALL PICTURE:

From above discussion following conclusions regarding use of different tools and techniques of knowledge management in textile industry of Punjab can be made:

1. Use of intranet is very uncommon in textile industry.

2. All the information of the companies is not integrated and hence not available to employees on company intranet giving an indication of low penetration of knowledge.

3. Environmental scanning is the most commonly used technique for knowledge creation. Data mining is the next important technique.

4. After action review is the most commonly used technique for knowledge sharing followed by sharing best practices in textile units taken for study.
5. Knowledge harvesting is the most commonly used technique for managing and organizing knowledge in textile industry of Punjab. This is followed by knowledge audit.

CHAPTER 7

EFFECTIVENESS OF KNOWLEDGE MANAGEMENT SYSTEMS IN THE SELECTED COMPANIES

As tools and techniques used for knowledge management in an organization constitute knowledge management system, this chapter is a sequel to previous chapter. Knowledge management system is a computer-based system that supports the implementation of