The Impact of Knowledge Management practices in Software Engineering

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Abstract

Knowledge management (KM) is emerging as a key management responsibility in software development to support acquisition, storage, sharing, and retrieval of knowledge. Software development companies can organize and exploit prior experience to facilitate learning at individual and organizational level by applying knowledge acquired in prior projects.

This paper reports the investigation of various KM practices of twenty leading software development companies in India. This paper also lays the foundations for the best practices in knowledge management and the degree of awareness and implementation of KM practices in software development process.

Keywords: Knowledge Management, Software Engineering knowledge management index.

Introduction:

Knowledge management is the process through which organisations generate value from their intellectual and knowledge-based assets. Most often, generating value from such assets involves sharing them among employees, departments and even with other companies in an effort to devise best practices. Software developers are required to develop knowledge of emerging technologies, while at the same time ensuring that they adhere to organisational processes and methodologies. KM in a software organisation is seen as an opportunity to create a common language of understanding among the software developers, so that they can interact, negotiate and share knowledge and experiences. KM system supports the ability to systematically manage innovative knowledge in software development. A major part of the revenue of the Indian software and services industry comes from the export segment which has registering strong annual growth of about 30% in recent years. Growth in software development, especially in the export industry can be sustained by leveraging existing knowledge and effectively managing knowledge at the organizational level.

2. Objectives

1. To study the impact of knowledge acquisition, knowledge usage in software companies.
2. To analyze the various KM practices and their working in the software development process.
3. To identify the impact of various KM practices in software engineering.
4. To suggest suitable technical and social infrastructure to enhance KM capability.

3. Research design

The researcher has collected primary data as well as secondary data from software companies operated within Tamil Nadu. Purposive Sampling method was adopted. Twenty software companies were selected based on the size of the software projects. A survey schedule has been designed and responses were collected on a predefined four-point rating scale. The data were interpreted on the basis of weighted scores for each parameters. Conclusion was drawn on the basis of Knowledge Management Index.

4. RESULTS

The results of the data analysis are presented as per the sequence of the survey schedule.

4.1 Knowledge Acquisition

The Knowledge Management Index for acquiring knowledge in software companies comes out at 85.73% [Refer Table No. 1]. It reveals that though people are aware of the importance of documentation and it is being done to some extent, a lot needs to be done in this field. Only very critical information is documented and maintained in archives, whereas general information is not documented. This results in high lead-time for retrieving basic information at the start of any project.

4.2 Knowledge Usage

The Knowledge Management Index for using knowledge in software companies comes out at 71.13% [Refer Table No. 2]. There is a perception that there should be a mechanism through which the ideas of officers can be implemented. The company can gain only if ideas are translated into tangible benefits.

4.3 Information Technology

Knowledge Management Index for information technology in the sample population was high, coming out at 91.00% [Refer Table No. 3]. It was suggested that LAN can be used more extensively for information sharing and also centralized cataloguing of reports can go a long way in managing knowledge throughout the company. Extensive use of information technology as a tool for dissemination of information and knowledge sharing will be very effective in this process.

4.4 Sharing of Knowledge

The Knowledge Management Index for sharing of knowledge in IT companies comes out at 72.17%. Managers and developers are encouraged to participate in various forums to share their knowledge. Sharing of knowledge brings about dissemination of information and sparks off a positive change in the culture of the organisation.

4.5 Mechanism of Assessment

The Knowledge Management Index for assessment mechanism in the sample population comes out at 61.38%. There is no formal mechanism to transfer the knowledge gained through seminars, training
programmes, deputation abroad to the workplace. A formal mechanism has to be evolved wherein the transferability of the knowledge to the work centre can be monitored on a regular basis.

4.6 Knowledge Management Architecture

The Knowledge Management Index for knowledge management architecture in the sample units comes out at 64.75%. The maturity level of employees towards the concept of knowledge management is nevertheless relatively inadequate. This can be overcome by consistent efforts to improve the level of acceptability of the concept by inviting experts to train and discuss with functional heads from time to time.

5. Conclusion

A number of activities suggested as being components of the KM process for SE has been examined. The impact of knowledge acquisition, knowledge usage, information technology, sharing of knowledge, mechanism of assessment, knowledge management architect for SE was also assessed.

The results of the study indicate that the tools, techniques and methodologies currently employed for software development are inadequate to address KM effectively. Finally, management should create a collaborative climate for creating and sharing knowledge, provides recognition and rewards to those who significantly contribute to the knowledge effort, and provides technological resources to facilitate the access, use and sharing of the knowledge.

References


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<th>4</th>
<th>3</th>
<th>2</th>
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<th>Weighted Sum</th>
<th>Weighted Average</th>
<th>KMI (%)</th>
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<tbody>
<tr>
<td>1</td>
<td>Groups and individuals and routinely document and share information about their expertise</td>
<td>136</td>
<td>168</td>
<td>62</td>
<td>34</td>
<td>1206</td>
<td>3.02</td>
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<td>2</td>
<td>Training on new systems focuses on how these technologies can be used efficiently to improve the quality and efficiency of people at work</td>
<td>210</td>
<td>60</td>
<td>20</td>
<td>10</td>
<td>1370</td>
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<td>3</td>
<td>The electronic and traditional sources of knowledge contain a wide spectrum of state-of-art information on critical activities</td>
<td>204</td>
<td>158</td>
<td>30</td>
<td>8</td>
<td>1358</td>
<td>3.40</td>
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<td>4</td>
<td>Experts play a role in identifying collecting, classifying and disseminating important information for other users.</td>
<td>360</td>
<td>36</td>
<td>4</td>
<td>0</td>
<td>1556</td>
<td>3.89</td>
<td>85.73</td>
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<td>Effective cataloguing and archiving procedures are in place for document management</td>
<td>208</td>
<td>160</td>
<td>24</td>
<td>8</td>
<td>1368</td>
<td>3.42</td>
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<td>Total</td>
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<td>1118</td>
<td>682</td>
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<tr>
<td>1</td>
<td>We give all innovative ideas thorough consideration</td>
<td>136</td>
<td>164</td>
<td>80</td>
<td>20</td>
<td>1216</td>
<td>3.04</td>
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<td>There exists an explicit mechanism to translate ideas for further business goals.</td>
<td>80</td>
<td>148</td>
<td>124</td>
<td>48</td>
<td>1060</td>
<td>2.65</td>
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<td></td>
<td>216</td>
<td>312</td>
<td>204</td>
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<tr>
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<td>Information technology is the key enabler in ensuring that the right information is available to the right people at the right time.</td>
<td>292</td>
<td>80</td>
<td>20</td>
<td>8</td>
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<td>Cross-functional groups are operational to promote knowledge sharing.</td>
<td>82</td>
<td>152</td>
<td>118</td>
<td>48</td>
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<td>Face-to-face interactions are used to transfer difficult to articulate tacit knowledge</td>
<td>124</td>
<td>176</td>
<td>68</td>
<td>32</td>
<td>1192</td>
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<td>There is a programme of active participation in business conferences and other discussion forums to share and learn ideas and experiences</td>
<td>96</td>
<td>224</td>
<td>68</td>
<td>12</td>
<td>1204</td>
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<td>There is a review mechanism to assess whether the acquired knowledge is being transferred to the work place</td>
<td>44</td>
<td>136</td>
<td>178</td>
<td>42</td>
<td>982</td>
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<td>61.38</td>
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<td>44</td>
<td>136</td>
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<td>Company Knowledge management architecture is reliable and self-sustainable in nature</td>
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<td>46</td>
<td>1036</td>
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<td>158</td>
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