Review of Features of Enterprise Portals to Support the Knowledge Management Processes

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ABSTRACT

Many Portal products are being marketed with the claims that organizations can reap the benefits of knowledge management by implementing a portal solution. An exploratory study of review of features of selected Enterprise portal products revealed that Portal products were not able to fully support the requirements of knowledge management processes. These are lacking in services such as categorization, workflow, document management, collaboration, and business intelligence. However, several products were found strong in personalization, content management, folder sharing, and search and retrieval services. Portal products cannot fully support processes such as classification, sharing, capture, maintenance, and generation of knowledge but are good in supporting the presentation process. The study concluded that these products should provide capabilities to handle multimedia, incorporate metadata and taxonomy, and provide tools for workflow and mining.

INTRODUCTION

Enterprise portals are considered a major technological infrastructure in supporting enterprise knowledge management. Davydov (2001) mentioned that an Enterprise portal fulfilled the need for a knowledge management application to synthesize data by filtering and refining. The technology was able to support advanced information dissemination and knowledge management features such as specialized directories, bulletin boards, comprehensive searching and identification of experts. Kotorov & Hsu (2001) confidently referred portals as enterprise knowledge management systems. Szuprowicz (2000) highlighted that the portals could be used to facilitate, capture and share knowledge. Several other notable studies have highlighted the potential of Enterprise portal products. Natarajan and Shekhar (2000) consider portals as the logical culmination of technological advances in the areas of knowledge archival and dissemination and managing innovations. Phifer (1999) considers an Enterprise portal a convenient centralized doorway to an organization's internal data including its information systems and processes. Kozlowski (1999) states that Enterprise portals serve as the digital gateway connecting knowledge workers to a wide spectrum of information, from corporate data to human resources information, policies, procedures, client details, product preferences, and project specifications. However, not much empirical research has been done to investigate the support provided by enterprise portals to facilitate knowledge management processes. This paper reviews the salient features of portal products and examines to what extent they support the knowledge management processes. The review was carried out with the following objectives in view:
- Availability and comprehensiveness of portal features in supporting knowledge management processes.

These features include personalization, collaboration, search and retrieval, categorization, business intelligence, content management and

publishing, document management, workflow process and folder sharing.
- Capabilities of Enterprise portals in supporting knowledge management processes.

These processes focus on creation and distribution of knowledge and include capturing, sharing, storing, classifying, retrieving, maintaining, presenting and generating.

METHODOLOGY

A sample size of 58 portal products was evaluated using a checklist of services and processes after careful reviews of all available product information. Two studies have provided the basis for the methodology used in this research. The Knowledge Structure and Services (KSS) matrix developed by Valente and Housel (2001) to evaluate knowledge management tools and a quantitative evaluation method proposed by Chaudhry (1997) for assessing the functional capabilities of library automation systems. A checklist was developed based on two parameters: Portal Infrastructure Services and Knowledge Management Processes. Sample of portal products in the market was selected and assessed using the checklist.

The Portal Infrastructure Services were used as the first parameter in the checklist. These services or features were selected based on surveys conducted by the Delphi Group (1997) and the Butler Group (2001). These include core processes of creating, organizing and using a knowledge repository (Valente and Housel, 2001).

After an extensive search on the Internet, portal products which claimed to support knowledge management and contained at least two features listed in the checklist were included in the sample. The latest version of the portal product was studied together with all out-of-the-box features. Add-on software components which were not offered in the product suite would not be considered. Detailed product brochures and information on the overall portal architecture were available from the product web sites. Sometimes case studies on that particular portal product and informative white papers were also available. Most of the information came from *detailed product information, brochures, white papers* from the product web site, *multimedia demonstrations* and participation in *free-online-demonstrations* of the portal.

FINDINGS

Portal Infrastructure Services

Each service or feature of the portal products was reviewed based on five essential components. To calculate the mean score for each service, the scores of 58 products for that service were summed up and divided by the total number of product. Figure 1 presents a summary of

the mean score of all the services ranked from the highest mean score to the lowest.

It was found that none of the portal services was able to achieve the maximum mean score of 5. This could be due to the strict criteria used to measure each service or portal products in general, could never satisfy the requirements of a complete knowledge management system. There was always a gap between portal products and their expected functions. 5 of the portal services (categorization, workflow, document management, collaboration and business intelligence) have a mean score below 2.5 while 4 of the services (personalization, content management, folder sharing and search) showed a mean score equal or above 2.5.

The most supported services were Personalization with a mean score of 3.22 followed by Content Management with 2.91, Folder Sharing with 2.81 and lastly Search & Retrieval with 2.5. Contradictory to the findings from Delphi (2001), the survey by Delphi Group in 2000 found that portals actually provide services in the order of Categorization, Publishing, Search and retrieval, Personalization and Collaboration. As the sample size and methodology of the Delphi survey was not described, it was not possible to single out the reasons for the different findings.

Knowledge Management Processes

Eight processes were selected for assessing portal products in this study. They were crucial to the knowledge management lifecycle and contribute to the success of knowledge creation, sharing and retention. The 58 portal products were assessed again on their support for these processes and their mean scores and standard deviations were presented in Figure 2. Only the Presentation process has a mean score above 2.5 while the rest were below 2.5. Thus, Presentation was the most supported process in portal products.

It was also found that the top five portal products which achieved the best individual scores in Portal Infrastructure Services were HummingBird EIP, FileNet, Citrix Nfuse, Brio Portal and DataChannel Server. As for Knowledge Management Processes, the top 5 products were HummingBird EIP, Brio Portal, Comintell Knowledge XChanger, Sybase EP and Autonomy-in-a-box.

Different portal products were strong in different services or processes. However, this study has examined the overall trends of all portal products with respect to their support for knowledge management. Over the years, many companies have implemented knowledge management using highly-hyped technology such as portals but the result was lacking and the price tag was higher than originally anticipated. Deveau (2002) attributed this to the wrong perception of knowledge management. Likewise, Widmayer (2000) insisted that portal was ill equipped to do the total knowledge management job. What was missing between the imple-
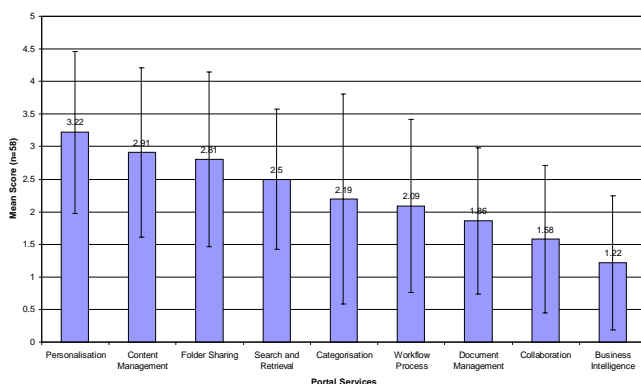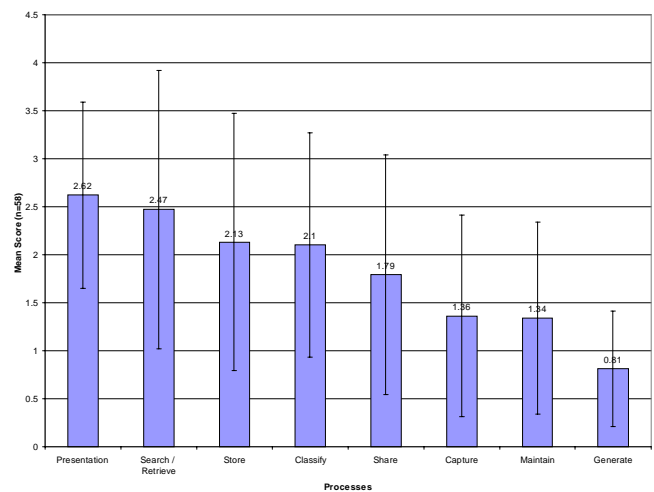

Figure 2: Ranking of Knowledge Management Processes

mentation of Enterprise portals and the realization of a knowledge management organization?

DISCUSSION

In line with the findings of Choksy *et al.* (2001), portal products lacked categorization, collaboration and expert identification. Both collaboration and collaboration services achieved a low mean score in this study. The portal service with the highest mean score was Personalization service at 3.22. Although this was not a very high mean score out of the maximum of 5, we inferred that most of the portal products satisfied the Personalization function which allowed the customization of content for dissemination to the individual. This finding reinforced Collins (2001) argument that portals were able to create a central "window" that presented information to users and a "door" that allowed users to pass through to reach other destinations. The ability of a portal to provide information tailored to the preferences or needs of the user must be one of the key value propositions of a portal (Choksy *et al.*, 2001). Although the overall mean score was 3.22 for Personalization service, some portal products were able to achieve the maximum score of 5 and they were Broadvision Infoexchange Portal, Brio Portal, HummingBird EIP, PeopleSoft Portal, Mediapps Net.Portal, Sybase EP and BEA Weblogic Portal. Please refer to Appendix A for the complete list of components for each portal service.

The second and third highest mean score were 2.91 for Content Management service and 2.81 for Folder Sharing service respectively. It could be deduced that most portal products have the infrastructure services to support information sharing and publication.

Search and Retrieval service has a mean score of 2.5 out of 5 which indicated that an average of only 50% of the components were present for this service. Portal products in the market do not seem have been developed with the retrieval of information as the most important function. Also powerful search engines are not bundled with the products. Only Hyperwave Information Portal product achieved the maximum score of 5.

In the fifth position was the Categorization service with a mean score of 2.19. This was a relatively low score and it may be due to the lack of focus in facilitating the navigation through loads of information using thesaurus, taxonomy and metadata. Automatic categorization was also not well developed.

Workflow Process service obtained a mean score of 2.09. This indicated the low priority placed by vendors on the routing of electronic documents with the approval cycle and actions from the different roles. In the survey, Workflow Process was mostly restricted to the approval of documents within Content and Document Management.

Figure 1: Ranking of Portal Infrastructure Services.

An interesting observation was the low mean score of 1.86 for Document Management services. Of the 58 portal products, the maximum score was 4 and only Livelink, Intraspect and Cyknit were able to receive this score. Overall, all portal products sampled were deficient in the incorporation of metadata into information sources, the indexing of scanned images and did not integrate well with desktop program. Since CIO (1999) mentioned that the ability to digitize documents was the first step in any knowledge management hierarchy, portal products would not be useful if they were unable to process digitized images or document.

Collaboration and Business Intelligence services obtained the lowest mean score of 1.58 and 1.22, respectively. Results showed that portal products were lacking in providing a platform for effective communication with multimedia content, filtering mechanism and asynchronous technology. Likewise they were poor in the ability to analyze data and to integrate with existing Enterprise Resource Planning system. These findings challenged Szuprowicz's (2000) claim that a significant portion of the portal market has already developed powerful reporting and data analysis abilities. Of the 58 products, the maximum score for Collaboration services was 4 and only Covia InfoPortal, Elipva Portal, HummingBird EIP and Livelink could achieve this. As for Business Intelligence services, only Brio Portal and HummingBird EIP were able to obtain the maximum score of 5.

Many portal products claimed that they could support processes in the knowledge management life cycle. Seven out of 8 processes have a mean score of below 2.5 out of the possible maximum of 5. These 7 processes were: Search/Retrieve, Store, Classify, Share, Capture, Maintain and Generate. This finding quantified and magnified the gap between Enterprise portals and Knowledge Management Processes. Please refer to Appendix B for the complete list of components for each portal process. Presentation process has the highest mean score of 2.62 and this could be due to the popular presence of simple personalization and text support in the portal products. On the other hand, Presentation process was lacking in advanced personalization, intuitive search result and multimedia content.

The Store process obtained the third highest mean score of 2.13. The most common component was the ability to link information sources. Components that were less common were multi-dimensional cataloguing/indexing, subject expert directory, knowledge-bases and filtering. iPlanet Portal Server, Orbital Organik and Plumtree Corporate Portal were the only products out of the 58 sample that could achieve the maximum score of 5 for this process.

Overall, the Classify process could only obtain a low mean score of 2.1. Except for push technology, components such as customized publishing tools, information refinery tools, discussion groups and metadata were consistently lacking in the portal product samples. Individual products such as Brio Portal, Comintell Knowledge XChanger and Autonomy-in-a-box have managed to achieve the maximum score of 5.

Four of the processes, namely Share, Capture, Maintain and Generate processes have an unexpected low mean score of less than 2. This means that each of them has less than 2 out of the 5 possible components.

The mean score for Share process was 1.79 and the push-publishing-notification component was more common than online collaboration, group decisions, multimedia support, groupware and videoconferencing. Thus, knowledge sharing was not as easily implemented by using a portal product as previously claimed by vendors. Of the sample, HummingBird EIP and Intraspect Portals were the only products with the maximum score of 5.

It was found that the Capture process achieved a low mean score of 1.36. This process was particularly weak in tracking personal navigational trail, user audit trail and employee skills yellow pages. Out of 58 portal products, none of them was able to achieve a score of 4 or 5. This finding indicated the failure of portals to capture knowledge and to enable them for reuse by other knowledge workers.

Equally neglected was the Maintain process with a mean score of 1.34. Most of the portal products allowed the knowledge source to be manually validated but did not provide project databases, customer support databases, automatic validation and communities of practice. Lotus Kstation and Intraspect were the only products with the maximum individual score of 5.

The Generate process obtained the lowest mean score of 0.81. This inferred the inability of portals to externalize knowledge, mine data and to incorporate conceptual mapping and pattern recognition. However, out of 58 portal products, only Brio Portal was able to achieve the maximum score of 5.

CONCLUSIONS

This study found that Enterprise portals were well equipped with Personalization service, Content Management service, Folder Sharing service and Search or Retrieval services. Technically, Enterprise portal must improve on other services such as Categorization, Workflow, Document Management, Collaboration and Business Intelligence in order to better support knowledge management. They should handle contextual medium such as images, audio and video files, incorporate an accurate metadata or taxonomy system, allow business processes to be mapped to a workflow and offer informative mining of structured and unstructured information.

Where the knowledge management cycle was concerned, using Enterprise portal technology was not sufficient to support all processes. From the results, it was inferred that Enterprise portals were excellent in supporting the Presentation process but weak in supporting the Retrieval, Storage, Classification, Sharing, Capture, Maintenance and Generation processes. In order for Enterprise portals to strengthen its support for knowledge management, the portal product could improve in the deficient area by being extensible or combine with other products.

One inference from this study was that most Enterprise portals offered Personalization service and this would be most likely be the single service which can help bridge the gaps and improve on support for knowledge management. As there were many third-party companies who could develop web parts for a small fee or make them available as free downloads, these portal products can incorporate almost any objects in its portal's interface. For example, if the portal product was weak in Business Intelligence service and Generate process, one can develop and insert a specific web part to provide data mining, data extraction and transformation so that knowledge can be discovered from meaningless information. Thus, it would be important for Enterprise portals to include extensible web parts in its mission to be a knowledge management tool.

Another deduction was that other technologies should be combined with portal products to support Knowledge Management Processes. Although Enterprise portals were lacking in certain area and cannot guarantee to be a complete knowledge management solution, they remain the most promising technology to serve as the infrastructure to accommodate the broad and extensive processes within the knowledge management life cycle.

Future research should focus on evaluation of portal products based on the use of software assessing the portal product at a reference site or at the vendor's demonstration site. In this study, we assessed knowledge management in general terms. However, individual organizations interested in implementing an Enterprise portal could assess the portal products based on the unique objectives of the knowledge management initiative, e.g., faster customer service response time or an increase in ROI.

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