: What are the features of a document-driven DSS?

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This column is installment #3 about features of the five types of computerized decision support systems (Power, 2002) tracked at DSSResources.com. The focus is document-driven DSS.

The goal is to identify important observable attributes, elements or aspects that distinguish document-driven DSS from other DSS and from other computerized information systems. Features are often associated with end user functionality, but these attributes may or may not confer a specific user benefit. Features help us understand the form and structure of a document-driven DSS. Case examples help demonstrate the complexity of how the features can be assembled to create specific document-driven DSS. One question a systems designer should ask is: "What features do you want in the proposed decision support system?" DSS design is similar to purchasing a new car with many customizable features. First, get the intended users to decide on their needs, then find a basic type or model that is a good fit, and finally get the users to identify and evaluate "must have" and "desirable" features so that a cost trade-off can occur. Finally, we build and customize the specific system.

Document-driven DSS often use the same document source storage system as document creators use in their transaction work flow. This means the DSS designer is building a subsystem and must work with all of the constraints associated with the broader document management or Enterprise Content Management (ECM) environment.

Vannevar Bush's (1945) article in the Atlantic Monthly created a challenging vision for managing documents and augmenting people's memory. Bush wrote "Consider a future device for individual use, which is a sort of mechanized private file and library. It needs a name, and, to coin one at random, "memex" will do. A memex is a device in which an individual stores all his books, records, and communications, and which is mechanized so that it may be consulted with exceeding speed and flexibility. It is an enlarged intimate supplement to his memory." Bush's memex is a much broader vision

than today’s document-driven DSS.

A recent IDC study sponsored by storage provider EMC forecasts 988 billion gigabytes of digital information created in 2010. The study notes, "over 95% of the digital universe is unstructured data. In organizations, unstructured data accounts for more than 80% of all information." Content management is a major issue in organizations (Kelly, 2005). Document-driven DSS are intended to help people use digitized, unstructured content in decision making.

A document-driven DSS is a computerized support system that integrates a variety of storage and processing technologies to provide document retrieval and analysis. The system or subsystem is intended to assist in decision making. The Web provides access to large document databases, including databases of hypertext documents, images, sounds and video. Examples of documents that might be accessed by a document-driven DSS are policies and procedures, product specifications, catalogs, and corporate historical documents, including minutes of meetings, corporate records, and important correspondence. A search engine is a powerful decision-aiding tool commonly associated with a document-driven DSS. The features available for designing a document-driven DSS are becoming more numerous and more sophisticated.

Case study examples of document-driven DSS at DSSRresources.com include University of Alberta, Washington County, Iowa and BFGoodrich Aerospace. The University of Alberta increases timely access to policies and procedures and also manages the work flow for creating and managing new policies (Stellent, 2004). Washington County, Iowa has a Web-based Spatial DSS with data and document-driven decision support subsystems. The system let's authorized users retrieve maps, plans and drawings of county infrastructure like roads and buildings (Tully 2006). BFGoodrich Aerospace improved its efficiency in performing non-routine aircraft maintenance (Documentum, 2003) with a workflow system, document management and document-driven decision support.

In autumn 2005, AIIM (www.aiim.org) defined Enterprise Content Management (ECM) as "the technologies used to capture, manage, store, preserve, and deliver content and documents related to organizational processes. ECM tools and strategies allow the management of an

organization's unstructured information, wherever that information exists." ECM support collaboration of content providers, organizers and administrators. According to Wikipedia, a content management system (CMS) is a computer software system used to assist its users in the process of content management. CMS facilitates the organization, control, and publication of a large set of documents and other content, such as images and multimedia resources. A CMS often facilitates the collaborative creation of documents. Some CMS systems also include workflow software support. Many of the ECM/CMS supported tasks are transaction processing rather than decision support, but the software often includes capabilities/features that can be used for building a document-driven decision support subsystem. Part of the design of a document-driven DSS is indexing and organization of documents. ECM/CMS can also facilitate a decision process workflow, with creation of reminders, deadlines, delegation of subtasks, and other decision process administration functions. A document-driven DSS can assist in monitoring decision process status, routing of decision relevant information, and recording of decisions and supporting document links.

Bush's vision of memex identified some key features and abilities the system would provide users:

1) retrieving records using indexes

2) linking together stored documents

3) associating documents

4) adding marginal notes and comments about documents

5) saving annotations and comments for future reference or to share with colleagues

6) searching for and retrieving documents

7) browsing documents, especially rapid scanning

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Bush's list is a good starting point for developing a features list for document-driven DSS. The following are major features from a user's perspective:

1) Ad hoc search and retrieval. Users can enter their own search terms, use stored queries and the system often has an easy to user search interface for applying logical operators. Systems usually support common Boolean operators, such as AND, OR, and NOT and some support operators like NEAR and LIKE. A user specifies a query which initiates a search for documents that are likely to be relevant.

2) Alerts and triggers. Some systems help users establish rules for email notification and for other predefined actions. Users may set alerts for when a document change occurs or completion of a decision processing task.

3) Append notes to a document. Notes and comments may be for future reference or to share with colleagues.

4) Browsing and document navigation. Browsing is an interactive capability that lets a user explore the document collection. The system may provide for rapid scanning of a document.

5) Document translation/multilingual interface. The system translates documents to/from languages.

6) Document management. Users have limited "working storage" for comments, links and evaluative information, users can sometimes publish comments, ratings, etc. Some systems have document check-in/check-out. Users for decision support need to know if a document is or can be modified.

7) Hyperlinks. The system includes links in documents to specific information within that document or to another document.

8) Indexes, both human and machine generated. The index may include an alphabetical listing of key words, names and/or topics. The index or indexes are a guide to the contents of document collection.

9) Metadata retrieval. Some systems provide data about when documents were created and stored, version numbers, document creator, and other history. Users should be able to easily retrieve such data.

10) Relevancy ranking. The search engine assigns a relevance score and search results are displayed in a relevance order. The order is determined by an algorithm that measures factors like number of occurrences of the search term(s) in the documents and the density of the term(s).

11) Record search history, save searches, publish searches for other users. Some systems allow users to easily resume "temporarily abandoned searches". Also, a mechanism may exist for tracking the history of a user session or of a collection of user sessions.

12) Show decision process flowchart. Systems with workflow software may allow users to monitor the progress of specific decisions and the associated documents.

13) Summarization. The system provides extracts text using statistical cues to form summaries.

14) Text mining and text analysis. Some standalone software attempts to extract patterns from natural language text. The system may have a capability for comparing multiple versions of a document for differences.

15) User action recording. In some systems users are expected to indicate approval of documents, enter ratings or make other

evaluations as part of the decision process. Some systems record user interaction and user decisions.

Document retrieval is a key capability that focuses on how people can find needed documents and how much time is spent looking for them. We also need to explore what technology options are available. In most situations, the cost of retrieval for decision relevant documents can be reduced with a well-designed document-driven DSS.

Please note: Decisions made using document-driven DSS can be adversely affected by people misunderstanding the documents and by system design features like how the document is displayed and what tools are available for document retrieval.

The prospects and benefits for managing knowledge and supporting decision making using document-driven DSS is evolving. The Web has made document databases easier to access. Managers can perform their own searches and have more timely unstructured information. Managers need to carefully read and interpret the documents retrieved from the system, but new tools are being developed to help in text mining and analysis. To build sophisticated document-driven DSS, designers need to organize documents and preplan indexes, create a user interface with desired features, institute effective document governance and management. As with any DSS, we should start a development effort by identifying the decisions that we want to support and the decision support capabilities and features managers need and want.

As always your comments, questions and suggestions are welcomed.

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