

: *What is the expanded DSS framework?*

by Daniel J. Power

Editor, DSSResources.COM

The expanded Decision Support Systems framework specifies a primary technology dimension and 3 secondary dimensions for identifying and categorizing systems to support decision making. The primary dimension is the dominant technology component or driver that provides decision support. The three secondary dimensions are the targeted users, the specific purpose of the system and the primary deployment or enabling technology. Five generic DSS types are identified and defined based upon the dominant technology component. This framework is the conceptualization used at DSSResources.COM to organize what we have learned about decision support systems, cf., Power, 2000; Power, 2004.

As stated previously, "The goal in defining an expanded DSS framework is to help researchers better identify meaningful, homogeneous categories for research and to help Information Systems professionals describe and explain the various types of decision support systems" (Power, 2004).

According to Gruber, "A conceptualization is an abstract, simplified view of the world that we wish to represent for some purpose". In the jargon of knowledge management and AI, the expanded DSS framework is the "ontology" or specification mechanism for the DSSResources.COM knowledge repository.

When was the expanded DSS framework first published?

Starting in 1999 the framework was used at DSSResources.COM. The expanded DSS framework was explained briefly in the first issue of DSS News, Vol. 1, No. 1, May 10, 2000. In that initial newsletter I responded to a question asking what are the types of DSS. My 99 word response summarized the basics of the expanded DSS framework. At that time, DSS News only had a few hundred subscribers.

In Spring 2000, I organized a technical mini-track on Model-Driven and Web-Based Decision Support Systems for AMCIS 2000. My overview paper briefly summarized the expanded framework. I presented the paper to a small group in a 5 pm session at the meeting. During the session, we squeezed 5 papers into an hour and a half. You can imagine that we didn't have much time to discuss the expanded DSS framework. My friends, who were also presenters, were the primary audience -- Mark Isken (Oakland University), Peter Keenan (University College Dublin), and Vijayan

: *What is the expanded DSS framework?*

Sugumaran and Mohan Tanniru (Oakland University). My paper from the conference is still available on the Web.

The first detailed explanation of the expanded DSS framework was presented at the 2001 Informing Science meeting in Krakow, Poland. My paper titled "Supporting Decision-Makers: An Expanded Framework" was included in the conference e-book. I chose that venue because I wanted to support Eli Cohen's innovative conference, Gordon Davis was a keynote speaker, and I wanted to visit Krakow. The framework was explained in detail in my 2002 book from Greenwood/Quorum titled "Decision Support Systems: Concepts and Resources for Managers". In late 2002, a book chapter that I wrote about categorizing DSS using the expanded framework was also published. A version of this column appeared in DSS News in 2004.

So what is the expanded DSS framework? Let me quote from DSS News, Vol. 1, No. 1: "There are 5 generic types of DSS in terms of the dominant component of the Decision Support System. Also, I identify other types of DSS based on users, delivery and purpose. The five generic DSS are:

1. Communications-Driven DSS
2. Data-Driven DSS
3. Document-Driven DSS
4. Knowledge-Driven DSS
5. Model-Driven DSS

Group DSS are a hybrid of Communications-Driven and Model-Driven DSS. In terms of users, there are Inter-Organizational and Intra-Organizational DSS. In terms of delivery, there are Web-Based, LAN-Based, and Mainframe-Based DSS. Finally, in terms of purpose, there are function specific, industry specific and general purpose DSS."

What does "dominant component" mean? The term component refers back to Ralph Sprague's traditional DSS framework with data and model components. What does it mean to say that a DSS derives its primary functionality from the dominant component? By the late 1970s, data-oriented DSS were recognized as somehow different than model-oriented DSS, but as databases grew much larger in size, the differences in emphasis and functionality between these two types of DSS

: *What is the expanded DSS framework?*

became more noticeable. In fact some consultants argued DSS primarily derived their functionality from providing users with capabilities to query and then generate reports from a data warehouse. In 1997, Dhar and Stein called such systems data-driven DSS and reading their book helped clarify my thinking about Bill Inmon and Ralph Kimball's work on DSS in the early 1990s. Other technology developments in AI, networking and document storage were also broadening the DSS possibilities.

Are there “hybrid DSS” with more than one “dominant component”? For the past few years, I have stopped using the term “hybrid DSS”. Others have used the term before me and on occasion I have used the term “hybrid” as a convenient, but imprecise way, to explain some complex DSS. After an email interchange with Steve Alter a few years ago, I stopped using the term. My current position is that it is more appropriate to identify and discuss decision support sub-systems when they exist, rather than refer to the DSS as a “hybrid”. Also in some situations it is reasonable to evaluate the need for including different types of decision support sub-systems into a more integrated DSS.

Are GDSS “hybrid DSS”? Are all GDSS communications-driven DSS? No! The targeted users of GDSS are an identifiable, interacting group so we can clearly identify that secondary dimension in the expanded framework. But, how one categorizes a GDSS on the primary dimension in the framework depends upon the design of the GDSS software. If one is asking about a specific system like GroupSystems, which was one of the early GDSS, then one must examine the dominant component in that system. I used GroupSystems a few times in the late 1980s and in retrospect the primary functionality came from computerizing heuristic and quantitative models for group use. A human facilitator managed the process and the communications component was not providing the dominant functionality. Even though the communications component made group use of the models possible, the decision support functionality came from aggregating opinions using a model. So today I would conclude that in terms of the primary dimension in the expanded DSS framework the GroupSystems software was a model-driven DSS; the purpose was generalized support of group decision making and the system was a DSS generator rather than a “specific” DSS; the intended users were a group of 5-25 decision makers who had an interest or stake in a specific important decision problem; and the enabling technology was a client-server technology in an IBM PC DOS computing environment. GroupSystems software computerized a heuristic, normative group process model similar to the Nominal Group Technique (cf., Delbecq, Van de Ven, and Gustafson, 1975).

Does the expanded framework replace the prior work by Alter, Sprague and others? **NO**. The expanded DSS framework is an integration and generalization of prior frameworks that reflects changes in decision support practice and technological developments that have occurred in the past 25 years.

How did you develop the framework? In retrospect, the expanded DSS framework evolved gradually while I was collecting and organizing resources for DSSResources.COM and while I was trying to reconcile what I observed happening in practice. For example, the early materials at DSSResources.COM referred to Suggestion DSS (Steve Alter's term) and Knowledge-based DSS (Klein and Methlie). In an attempt to create some consistency in the framework, the dominant component became the “driver” for providing functionality and all of the major categories were

: *What is the expanded DSS framework?*

consistently named, for example model-driven DSS and knowledge-driven. I know some people still prefer terms like model-oriented or model-based and that's OK, but IMHO the expanded DSS framework provides a more useful and consistent naming convention and frame of reference for categorizing, investigating and building Decision Support Systems.

This expanded Decision Support Systems Framework has received widespread interest and citation in the academic and practitioner Information Systems literature.

References

Delbecq, A.L., A.H. Van de Ven, and D. H. Gustafson, Group Techniques for Program Planning. Glenview, IL: Scott, Foresman, Inc., 1975.

Dhar, V. and R. Stein, Intelligent Decision Support Methods: The Science of Knowledge, Upper Saddle River, NJ: Prentice-Hall, 1997.

Gruber, T., "What is an Ontology?" <http://www-ksl.stanford.edu/kst/what-is-an-ontology.html>

Power, D. J., Categorizing Decision Support Systems: A Multidimensional Approach, In Mora, M., G. Forgionne, and J. N. D. Gupta (Eds.), Decision Making Support Systems: Achievements and Challenges for the New Decade, Hershey, PA: Idea Group, 2002, pps. 20-27.

Power, Daniel J. (2004) "Specifying An Expanded Framework for Classifying and Describing Decision Support Systems," Communications of the Association for Information Systems: Vol. 13, Article 13.
Available at: <http://aisel.aisnet.org/cais/vol13/iss1/13>

Power, D. J., Decision Support Systems: Concepts and Resources for Managers, Westport, CT: Greenwood/Quorum Books, 2002, ISBN: 156720497X.

Power, D. J. "Supporting Decision-Makers: An Expanded Framework." In Harriger, A. (Editor), 2001 Informing Science Conference e-book proceedings, Krakow, Poland, June 19-22, 2001, pp.

: *What is the expanded DSS framework?*

431-436, <http://ecommerce.lebow.drexel.edu/eli/pdf/PowerEBKSupp.pdf>.

Power, D. J. "Web-Based and Model-Driven Decision Support Systems: Concepts and Issues". AMCIS 2000, Americas Conference on Information Systems, Long Beach, California, August 10-13, 2000.

The above response is a revised version of Power, D., What is the expanded DSS framework? DSS News, Vol. 5, No. 1, January 4, 2004.

Author: Daniel Power

Last update: 2015-06-21 06:46