: What is a spreadsheet-based DSS?

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Most managers are familiar with spreadsheet packages like Microsoft Excel. If a decision support system (DSS) has been or will be implemented using a spreadsheet package it can be termed a spreadsheet-based DSS. A spreadsheet package is the enabling technology for the DSS. Both model-driven and small-scale, data-driven DSS can be implemented using desktop, client-server or cloud-based spreadsheet applications. Spreadsheet-based DSS can be very useful, but such systems often have errors, are inadequately documented and are often inappropriate.

In the world of accounting, a spreadsheet spreads or shows all of the costs, income, taxes, and other financial data on a single sheet of paper for a manager to look at when making a decision. Also, a spreadsheet is a collection of cells whose values can be displayed on a computer screen. An electronic spreadsheet organizes data into columns and rows. The data can then be manipulated by a formula to give an average, maximum or sum. By changing cell definitions and having all cell values re-evaluated, a user performs "what if?" analysis and observes the effects of those changes (see Power, 2004).

Are spreadsheet packages DSS generators? Sprague and Carlson (1982) defined a DSS generator as a computer software package that provides tools and capabilities that help a developer quickly and easily build a specific decision support system (see p. 11). Spreadsheet packages qualify as DSS generators because: a) they have sophisticated data handling and graphic capabilities; b) they can be used for "what if" analysis; and c) spreadsheet software can facilitate the building of a DSS.

Model-driven and data-driven DSS are the most common types of DSS one would consider developing using a spreadsheet package. Spreadsheets seem especially appropriate for building a DSS with one or more small models. A developer would then add buttons, spinners and other tools to support a decision maker in "what if?" and sensitivity analysis. A data-driven DSS can also be implemented using a spreadsheet. A large data set can be downloaded to the DSS application from a DBMS, a web site or a delimited flat file. Then pivot tables and charts can be developed to help a decision maker summarize and manipulate the data.

Spreadsheet-based DSS can be created in a single user or a multiuser development environment. Microsoft Excel is certainly the most popular spreadsheet application development environment. Add-in packages like Crystal Ball, Premium Solver and @Risk increase the capabilities of a spreadsheet and the variety of models that can be implemented. At DSSResources.COM, one can read spreadsheet-based DSS case examples from Decisioneering "SunTrust 'Banks' on Crystal Ball for assessing the risk of commercial loans" and Palisade "Procter & Gamble Uses @RISK and

PrecisionTree World-Wide".

Cliff Ragsdale of Virginia Tech and author of "Spreadsheet Modeling and Decision Analysis" commented in an email in 2001 that "if you want to give students hands-on experience creating a DSS, I don't think you can beat spreadsheets!" Spreadsheets can be used to create many useful "production DSS applications" that deliver real benefits at a modest cost (cf., Power, 2004).

Spreadsheet-based DSS can however create problems. For example, errors in calculation, duplicated data, poor ducumentation. In recent years, Business Intelligence vendors and IT commentators have pointed out that excessive use of spreadsheets can create spreadsheet hell (cf., Raden, 2005, Murphy, 2007.) In a 2004 survey, Durfee found many finance executives felt 'Spreadsheet Hell' described their reliance on spreadsheets either completely or fairly well. The same survey noted 100% of respondents in large and small companies used spreadsheets (cf., Durfee, 2004). In recent years, reliance on spreadsheet-based DSS has declined as companies implemented enterprise business intelligence systems for decision support. Spreadsheets can satisfy many needs in small, stable organizations, but as Durfee found, spreadsheets can become a major burden for managers in larger companies. As always, we need to select the right tool for a specific decision support task.

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