Five Decision Support System Examples You Need to Know

Although many hold the view that decision support systems (DSS) are a relatively new phenomenon, the truth is they have been around for a long time. In fact, it could be said that anything which provides rational, measurable and scientific data to help leaders make informed decisions is a DSS.

Decision support system examples include manual systems, hybrid systems, all types of analytics as well as sophisticated decision support software. A factor that distinguishes newer computer-based systems from early decision support systems is their ability to analyze extremely large data sets, providing data-driven recommendations that take the guesswork out of decision-making.

The Use of DSS to Guide Decision-Making

While some balk at the idea of trusting complex computer software solutions to make decisions for them, most are comfortable using computer-generated statistics to understand key trends. These include analytics such as sales statistics, warranty rates and cash flow trends that are important indicators helping users determine the health of their businesses and prompting the need for corrective action.

The difficulty is that this level of information can't determine which of several possibilities will maximize returns while achieving the desired result. Nor can it anticipate external changes that may impact profitability, an important factor as most companies operate in an

uncertain environment governed by consumer sentiment, legal regulations and intense competition. Additionally, companies are vulnerable to external influences, such as political uncertainty, major weather events and trade disputes.

These factors sometimes combine to create a perfect storm where decision-making is hampered by a lack of predictability, as well as by an inability to process data fast enough to support decisions. This is why decision support systems that can analyze data quickly, determine patterns and evaluate multiple alternatives are proving invaluable to business leaders.

The Principles Behind DSS

The core principles of DSS evolved from theoretical work done in the last century at the Carnegie Institute of Technology on the theory of organizational decision-making. This work recognized that while human instinct and gut feel often resulted in good decisions, there were numerous instances where gut-driven decisions were wrong.

Instead, researchers developed the concept of using executive information systems to analyze organizational data and produce concise executive information to support decision-making. Over time, and as computer capabilities improved, this approach was expanded to include the use of sophisticated software that modeled business processes, allowing users to evaluate the outcomes of various scenarios. In this way, it was possible to assess which of several alternatives offered the best business return.

The three key elements of DSS include:

Organizational data: Relevant information and knowledge

A model: Mathematical and statistical formulae that represent the business and analyze data

A user interface: Dashboards or other interfaces allowing users to interact with and view results

1. Common Day-to-Day Decision Support System Examples

Decision support systems operate at many levels, and there are many examples in common day-to-day use. For example, GPS route planning determines the fastest and best route between two points by analyzing and comparing multiple possible options. Many GPS systems also include traffic avoidance capabilities that monitor traffic conditions in real time, allowing motorists to avoid congestion. Farmers use crop-planning tools to determine the best time to plant, fertilize and reap. Medical diagnosis software that allows medical personnel to diagnose illnesses is another example. Most systems share a common attribute in that decisions are repetitive and based on known data. However, they aren't infallible and may make incorrect or irrational decisions, something many early GPS users discovered.

2. Decision Support System Examples That Use Historical Data

Historical data analysis, used in every facet of business and life, is well-developed and mature. Although such information is not always directly actionable, it's an important part of DSS because it reports past performance and highlights areas that need attention. Some examples include:

Descriptive analytics: Metrics such as sales results, inventory turnover and revenue growth.

Diagnostic analytics: Diagnostic information that digs a bit deeper to reveal results and explains reasons for past performance as measured by descriptive analytics.

Business intelligence (BI): Although largely based on historical data, BI solutions allow users to develop and run queries that are used to guide and support decision-making.

ERP dashboards: User-configurable dashboards that allow managers to monitor a variety of performance indicators.

3. Manual and Hybrid Decision Support System Examples

Numerous manual techniques exist that support decision-making. These include activities such as the SWOT analysis where teams determine their organization's strengths and weaknesses as well as identifying threats facing the organization and potential opportunities for further growth. The outcomes of a SWOT analysis are actionable decisions for moving the organization forward. Other manual tools include decision matrixes, Pareto analyses and cost benefit analyses.

Hybrid DSS solutions include the use of spreadsheet analyses that tap into the capability of Excel to compute, analyze, compare options and evaluate what-if scenarios.

Although manual and hybrid DSS solutions are relatively slow and unwieldy, in the right hands, they are powerful decision support tools and many organizations rely on them.

4. DSS Software That Helps Predict Future Trends

While it's essential to understand what happened in the past, and why it happened, this knowledge is of limited use when trying to predict the future, except possibly in very stable and predictable environments. However, this is hardly ever the case. Fortunately, techniques exist that make it possible to predict, with a degree of certainty, future trends and changes which will impact a company or business. For example, these tools can predict, based on past performance, external data and market feedback, figures for future product demand, product obsolescence and returns.

This is called predictive analytics and forms the basis of another type of DSS tool, one that helps predict what will happen in the near future. Predictive analytics use a combination of data mining, statistical tools and machine learning algorithms to determine the likelihood of certain events taking place. Banks use these techniques to detect fraud, insurance companies use them to evaluate risk, and ride-hailing firms to determine ticket prices based on demand.

5. DSS Modeling to Support Data-Driven Decision-Making

The most effective decision support system examples are those that determine the best decision, based on certain criteria. Such systems remove subjectivity and bias from the decision-making process. Additionally, they are able to evaluate numerous alternative scenarios and identify the best.

The usual approach is to develop a mathematical model of the business, see how it makes decisions and use optimization software to determine the outcomes of various scenarios. This technique is based on prescriptive analytics and is extremely powerful. While some suggest that it's only the decision-making process that should be modeled, developing a full model of the organization increases versatility and improves accuracy in terms of financial outcomes.

There are two optimization approaches, rules based and optimization models. Rules-based (heuristics) models work well when possible results can be largely predetermined, such as with assessing insurance risk. On the other hand, optimization models are more adaptable, can handle more complex issues and deal with multiple constraints and tradeoffs.

Choosing the Right DSS System for Your Needs

The most appropriate DSS depends upon organizational maturity, complexity and, to a certain extent, size. In small organizations, hybrid systems may suffice. If the organization is new to analytics, historical DSS systems would be a good place to start, while those involved in activities such as trading and commodities may benefit more from a predictive decision support system example.