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# Decision Support Systems Application Development Trends (2002 – 2012)

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## ABSTRACT

This survey provides newly reported approaches to the design and development of DSSs published in peer reviewed journals. DSS applications were searched using the online database ABI/INFORM complete, which is available on the web through ProQuest. The collected 80 specific DSS applications, where were published in 41 journals, are analyzed to examine the development pattern of DSS in the time period of 2002-2012. This paper summarizes the survey results according to (1) the area of application, (2) the year of publication in each area of application, (3) the distribution of underlying decision support tools in DSSs, (4) a classification based on Alter's taxonomy, and (5) the management level (operational, tactical, or strategic) for which the DSS was designed.

## KEYWORDS

Application Areas, Decision Support Systems, Decision Support Tools, Development Pattern, Survey

## INTRODUCTION

Decision support systems (DSS) have been developed and used to support decision makers rather than making decisions for them in for-profit and not-for profit organizations since the early 1970s. In general, DSSs have been designed and developed to support semi-structured problems for middle level managers utilizing different models to generate alternative solutions (model-driven DSS) or a variety of methods of extracting useful information from a massive-amount of data (data-driven DSS). This survey provides newly reported approaches to the design and development of DSSs published in peer reviewed journals. The result compiled in this paper could not be an exhaustive collection of DSS applications because it includes only new applications at the time of DSS development published in peer reviewed journals. In addition, some DSSs may not be reported to a journal. Thus, we should not interpret the results of this survey as if they reflect the real world usage of DSSs.

## SELECTION CRITERIA

DSS applications were searched using the online database ABI/INFORM complete, which is available on the web through ProQuest, a premier information access and retrieval system. ABI/INFORM includes thousands of leading English language business and management journals. ProQuest is a key partner for content holders of all types, preserving and enabling access to their rich and varied information. These partnerships have built a growing content collection that now encompasses 90,000 authoritative sources, 6 billion digital pages, and spans six centuries.

As a continuation of previous research (H. B. Eom & Lee, 1990; S. B. Eom, Lee, Kim, & Somarajan, 1998), the same selection criteria used in the previous surveys are used here to compile

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read, "The decision to be made is whether or not to buy my own ski equipment." It may sound trite, but in making this statement you have actually clarified and focused the issue that needs to be addressed. You know, for instance, that the issue of actually going skiing is already settled. For more complex problems, just writing down what the issue is can be quite challenging. When the issue is accurately stated in such complex cases, it often constitutes a giant step in working toward a decision.

The next critical element of the decision paper is the presentation of relevant **Background material**. This section gives a synopsis of history and facts that clarify the context surrounding the issue. It prevents decision-making in a vacuum by ensuring that decision-makers understand the genesis and evolution of the issues to be discussed and decided. The actual presentation of material is flexible, but the goal in all instances is the same: summarize the necessary background material in one or two brief, coherent paragraphs.

To continue with the example of the ski equipment, it might be important to note how experienced of a skier you are, how often you ski each season, with whom you ski, what kind of budget you have to support your hobby, whether you currently own equipment, and why you are considering the purchase of equipment at this time. This establishes evaluation criteria and supporting data that will influence your deliberations in the decision-making process.

Presentation of **Options or Alternatives** is another important element of the decision paper. Some issues presented for decision will require relatively simple, yes/no options. Others will be more complex, with choices at opposite ends of a spectrum of options, and several in between. In any case, this section presents a list of feasible alternatives that provides a framework for discussion, a starting point for debate and deliberation. Alternatives are best stated as actions to be taken. This transforms a decision to support a particular option into an automatic action item for implementation. It is also very useful to include a no-action, or default, alternative. This option is a key feature that forces decision-makers to acknowledge that making no decision at all is a decision itself. In the ski equipment example, the list of options might look something like this:

- Option 1: Purchase new equipment
- Option 2: Purchase used equipment
- Option 3: Purchase a combination of new and used equipment
- Option 4: Rent equipment for each ski trip

In this example, Option 4 is the default option, since this is the action that will be required if no decision is made.

The **Discussion** section is the heart of the decision paper. It presents the pros and cons of each option and provides information on impacts, costs, and resources required, both tangible and intangible. There are several ways to present this information. Pros and





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